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English Emotional Prosody in the native and non-native mind

Przetwarzanie angielskiej prozodii emocjonalnej w języku rodzimym i obcym

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Poznań, dnia .....

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Introduction

Emotion research has been a very productive field in psychology for well over half a century, with empirical traditions reaching even further back and across multiple disciplines throughout. Though productive, for most of its history the psychological inquiry into the subject of emotions has been mired in reductionist paradigms investigating select aspects of emotional expression focused to a large extent on the problems of emotion recognition. To validate themselves, the leading theories of emotion and research paradigms have frequently claimed continuity of thought from the complex ideas about emotions drawn up by the forefathers of psychology. However, those claims by contemporary theorists and researchers of emotion working in reductionist paradigms have often been based on carefully selective readings and interpretations of the forefathers of the discipline of psychology. The contemporary paradigms have also until very recently been carving their identities by actively fighting what was perceived as ideological, theoretical, or paradigmatic opposition. The moods have, however, begun to shift in the past few years towards revisionist positions on the state of theory and integrative movements in research. Overall, throughout the field of psychological research of emotion the tendency is towards reconciliation and integration of views long believed to be in opposition, and towards combining various research approaches for a more complex, holistic and multimodal understanding of emotions.

Research on emotional prosody, which is the object of investigation in this dissertation, is essentially emotion research of the time before the revisionist movements – in miniature. It is an interesting if comparatively small field, with rather unsystematically accumulated body of research, lacking in consistency of results and

continuity of inquiry, but promising nonetheless. Emotional prosody is an aspect of emotional expression which is tightly embedded in context, dependent on multiple factors connected to speech production, concurrent with semantic content of speech and temporally dynamic. It is, in many ways, the perfect object of study within the new integrative approaches being proposed and developed in psychology. However, being a reflection of the psychological mainstream of emotion research, emotional prosody research is still dominated by *the standard view* approach, which assumes the existence of six basic universal emotions of *happiness*, *sadness*, *anger*, *fear*, *disgust*, and *surprise*, and has the express aim of proving the existence of universal emotions. The methods and interpretations of the standard view are the ones found in the most prominent studies, even though inadequacies of this paradigm in its application to emotional prosody are becoming increasingly apparent.

The standard view was developed on the basis of research of facial expression of emotion, and it appears that what methodological solutions fitted investigations centered around still photographs of faces do not translate well to investigation of such dynamic manifestations of emotions as emotional prosody is. As a result, research on emotional prosody suffers from all the trappings of the standard view paradigm. There is the insistence on separating the one target aspect of emotional expression (still images faces or prosody isolated from semantic and/or visual cues) and the preferential use of forced choice response formats. There is also virtually exclusive focus on the ability to recognize emotions with a parallel lack of interest in the traits of speakers actually producing emotional prosody, and a complacency with achieving the one consistently reproduced result of *the standard paradigm*: above-chance recognition of emotion. The latter comes with a corresponding tendency to play down the results which fly in the face of the idea of the panhuman nature of basic emotions. The culture- and language-specific relativistic effects are never outright ignored, but the critical focus is usually put on successively produced above-chance recognition rates rather than on possible causes of variability. This is also probably one of the reasons why researchers and theorists of the revisionist and integrative movements have set their sights on emotional prosody.

This dissertation falls into the category of revisionist-integrative studies, and it deals with emotional prosody, specifically in the context of processing emotional prosody of one language (English) by non-native speakers of that language. It is also an

exercise in research method, in that this will be the first attempt in the field of emotional prosody research of a comprehensive application of an integrative research paradigm. The dissertation is divided into two parts: a theoretical one and an empirical one. The theoretical first part is devoted to a historical review, which traces the origins of the contemporary approaches to emotion research, and a review of the existing empirical literature on the subject of emotional prosody (Chapters 1-2). The empirical second part reports on the development and validation of stimuli, and on the experiment in which they were used, and it encompasses a discussion of the results of the experiment, its place in the existing emotion research landscape, along with its implications, limitations, and future directions (Chapters 3-6).

Chapter 1 is an overview of the main theories and research directions which led to the development of the contemporary integrative paradigms. The overview starts with Charles Darwin, Wilhelm Wundt and William James, whose prolific scientific output laid the foundations for the discipline of psychology and whose authority is most frequently called upon to support the claims and assumptions of contemporary emotion research. It then skips over the better part of the first half of the 20th century which relegated psychological interest in and inquiry of emotions to the margins and focused on behaviorism. The story is then picked up in the year 1956, the dawn of the period of the Chomskyan Revolution and the birth of cognitive psychology. The review then covers the transitional period between 1950s and 1960s. Finally, it continues to a detailed discussion of the most prominent theories and researchers of the second half of the 20th century whose collective contributions to the scientific debate on the nature of emotions shaped the mainstream thinking in the field and led directly to the formulation of the contemporary integrative paradigms: Paul Ekman, James A. Russell, Klaus R. Scherer, and Lisa Feldman Barrett.

Chapter 2 is a critical review and meta-analysis of a representative sample of empirical literature on emotional prosody, and it concerns a selection of the most relevant studies done on the subject in recent years. The review covers the main trends in research methodology, the overall consensus on the mechanisms and processes underlying emotional prosody, as well as the existing body of evidence. This review is divided into three major sections. The first discusses the aspects and results of emotional prosody research which are generally agreed upon. The second part covers a detailed critical review of three critical aspects of emotion research methodology: the

stimulation, that is the matters of developing experimental stimuli; the validation, that is the matter of validating the effectiveness of the developed stimuli; and the participation, that is the matter of selecting a specific population. The third and last part discusses how the study for this dissertation was designed in the light of such a critical review of the existing literature.

Chapter 3 reports on the development of experimental stimuli for the empirical part of this dissertation. The report covers the aspects discussed in Chapter 2 as a matter of critical review of methodology and the design of this study. Discussed first is the selection and counterbalancing of speakers who provides samples of emotional speech from which experimental stimuli were created. The measures implemented to control for various speaker idiosyncrasies and independent factors are discussed in relevant detail. Following that the method of emotion elicitation and the materials involved for the purpose are described. Next comes the description of the recorded sample material, its evaluation and processing into stimuli for both the rating and the experimental stages. Finally, the method of ongoing evaluation of the speakers' emotions in the course of the emotion elicitation procedure is described and the effects reported on and interpreted.

Chapter 4 reports on the stimuli validation procedure, and also parallels Chapter 2 in the matter of critical review of literature and study design for this dissertation. The report opens with a discussion of the selection of raters for the stimuli and the methods of counterbalancing and controls for participant idiosyncrasies. Following that a detailed description of the three rating procedures involved in the validation study: the Dimensional Procedure, which is based on the valence and arousal dimensions of emotional meaning; the Categorical Procedure, which replicates the forced-choice response paradigms predominant in the existing research; and the Free Label Procedure, which is based on a simple stimulus naming task. The results of all these procedures along with their implications for the following experimental stage are then discussed.

Chapter 5 contains the description of the experiment proper. The matters of participants selection, counterbalancing and control for personal idiosyncrasies are discussed first. The experimental procedure is described next along with the details of all the experimental tasks, which are the same here as in the rating described in Chapter 4, though with some small differences, all of which are described where necessary. The results of statistical analyses for each experimental task are reported separately. For

each task the statistical analysis of accuracy scores is reported first, followed by a qualitative report of the results and error patterns. Each section is then shortly summarized and put into perspective of the general results. The chapter is concluded with a short summary of all the results.

In Chapter 6 the results described in Chapter 5 are discussed in detail. In the course of the discussion the results are interpreted against the variables dictated by the idiosyncrasies of the speakers and the participants. Both the accuracy scores and the error patterns are discussed against the results produced by the emotional prosody research and with respect to the more general results and effects reported in the field of emotion research and other disciplines. The advances achieved with this study for emotional prosody research and emotion research are listed alongside with the study's limitations and future directions that could reduce them.

Chapter 1: Emotion research in anthropology, psychology, and linguistics

1.1. Introduction

Throughout its scientific history, emotion has been a notoriously hard phenomenon to define, describe, and therefore investigate. It is hard to do systematic research of a problem that is ill-defined, and there have been very few as ill-defined as emotion. This deficiency was by far not for lack of trying. Because there was precious little consensus about what emotions were, virtually every researcher would come up with his or her own definition thereof, leading to endless debates and discussions when matters came to comparing experimental results. Based on varying definitions, assumptions, and premises, the results often had few to no points of intersection that would validate comparisons across the body of empirical evidence. The generalizations extended from various experimental results bred often unproductive discussions on the nature of emotions and disrupting the natural progression of various lines of inquiry in emotion research.

Issues of defining emotions, naming them, of determining what about them is culturally determined and panhuman, what idiosyncratic and inherent, how different emotions should be defined and categorized – all these issues and more divided researchers investigating emotions on various angles. Issues of cultural dependency implicated anthropology, issues of universality – psychologists, and the need to mediate emotions and emotion research through language – linguists. Clearly, to define emotions the tools and methods from all three disciplines would have to be integrated, but that realization only crystallized following half a century wherein the three

disciplines had drifted apart. While the separation had a detrimental effect overall on all three, it helped to clarify the positions on emotions, language, and meaning for all three, and allowed highly specialized methods to form in each discipline. And though formally at odds, anthropology and psychology kept influencing one another throughout this period. Much of the strong universalist bent with respect to emotions in psychology was a reaction to the proposition that emotions, as much as thought might be influenced by language, as proposed by anthropology. While contemporary models of emotion tend towards integration of anthropological, psychological and linguistic paradigms of emotion research, the older reductionist paradigms still prevail in many areas of experimental research, especially in psychology.

This dissertation will focus on emotional prosody – an interesting albeit still developing field within emotion research. Emotional prosody research is, in its trends, methods, and theories a microcosm of the contemporary emotion research. And both the general emotion research and the specific emotional prosody research are a product of the history of how the emotion was developed and investigated as an empirical problem over the past century. The basic assumptions of universality or cultural dependency and the concern for language as a formative factor in the construction of emotion concepts have all shaped the emotion research methods. The ideas and debates over the nature of emotions which defined much of the 20th century emotion scholarship still define how research is carried out today. Therefore I found it instructive to trace the trends which determine emotion research and theory today to its roots. I should note, that this overview is limited strictly to those researchers and thinkers whose work has had the greatest impact on modern emotion research, and whose works are still invoked today as the venerable starting points of theoretical and practical origin.

In the case of anthropology, this meant going back to the history of the linguistic relativity hypothesis and the Boasian school. In the case of psychology to the forefathers of psychology and emotion studies: Charles Darwin, Wilhelm Wundt, and William James. For linguistics it would be limited to the achievements of several specialized disciplines developed by and large in opposition to Chomskyan linguistics, each of which shows instrumental potential for the future development of the field of emotion research. This chapter is concerned with the history of the problem of emotion research in anthropology, psychology, and linguistics from the earliest relevant points,

which for all three was the turn of the 20th century, to modern times with illustrations and examples to support the claims and assumptions postulated by each discipline.

1.2. Emotions in Anthropology

Anthropological research on emotions has by and large been confined to the field of linguistic anthropology within the framework of linguistic relativity – a notion developed in the early 20th century by Franz Boas and two of his students, Edward Sapir and Benjamin Lee Whorf. Linguistic relativity as a theoretical proposition would experience one of the fastest ever descents into what John Joseph calls "vulgarization" (Joseph 2002: 181), that is misinterpretation by over-simplification and decontextualization of ideas. Linguistic relativity was very firmly the product of both the anthropological tradition and the innovation of its proponents. On the one hand, it grew out of the anthropological concern with documenting the diversity of human cultures in all their instances and manifestations. On the other hand, Boas, Sapir, and Whorf have directed that concern towards language and its influence on thought. And although their positions on the nature of that influence were always mild and carefully caveated, it would be the "vulgarized" version of the linguistic relativity, most popularly known as the Sapir-Whorf Hypothesis, that would became possibly the most influential theory in the history of emotion research (Pavlenko 2005: 12).

The heavy criticism it would receive from psychology in the post-1956 period would hang in the background of all universalist theories of emotion, deepening the rift between anthropology and psychology (Duranti 2003: 333f), as well as between linguistics and psychology, since the theory did gain a measure of acceptance in linguistics (Allan 2009: 250). Still, despite the fact that anthropological research of emotions became increasingly isolated from the expertise of other disciplines, it still managed to produce an impressive body of evidence in favor of linguistic relativity effects on emotion expression and perception. In this section I will provide a historical overview of the development and subsequent "vulgarization" of linguistic relativity and its causes, as well as a general overview of some of the evidence for linguistic relativity in the case of emotions.

1.2.1. Franz Boas

Interestingly for the attitude late 20th century psychology would take, Franz Boas – the forefather of the ideas that would grow to become linguistic relativism – was a psychologist by training and an anthropologist only by passion. His influence on the field of American anthropology, it could reasonably be argued, paralleled that of Wilhelm Wundt on German psychology. Among his students were Edward Sapir, soon to be attached irrevocably to the "vulgarized" interpretation of the linguistic relativity, and Margaret Mead, one of the most influential and widely known field anthropologists of the 20th century. In the early 20th century the prejudice against otherness in civilizational terms was still the norm, and that attitude had left its mark on Boas' discourse and teachings. Taking a remarkably enlightened position, he would speak against the patronizing tone of the Western scientific discourse on the subject of primitive cultures (Pavlenko 2005: 8). He fiercely opposed the idea that illiteracy equated with cultural or intellectual paucity (Kay and Kempton 1984: 65). In his view, every existing culture, literate or not, had an inherent value, and its legacy should be described and preserved for posterity, a sentiment that he would express most vividly in fathering the idea of salvage anthropology – a movement devoted to the description of cultures on the brink of disappearing mainly due to societal, civilizational, and environmental changes.

He also considered language one of the four major objects of anthropological investigation (alongside culture, material artifacts, and human remains) (Duranti 2003: 324), and as early as 1910 he proposed that cultural differences expressed in linguistic variation should become the central area of empirical interest for anthropologists (Boas 1910: 377). Boas took the view that with respect to mental and linguistic capability any human culture can express any concept that would be within the limits of human cognitive system, though each culture would make the expression in ways idiosyncratic for its language (Boas 1911: 64). It is important to note, that Boas considered language to be the totality of the means, both verbal and non-verbal, used by humans to communicate their mental and emotional states to others (Boas 1938: 124).

Emotions, he thought were most naturally expressed through the non-verbal channel, especially through vocalizations and body language (Boas 1938: 126), though he also noted that an emotional load will also be attached to the words and concepts of

particular cultural significance to a given population (Boas 138: 142). Possibly influenced by William James, keeping in mind his training as a psychologist, Boas considered both emotion and thought as deeply subjective processes, though in an anthropological vein, he also believed the cultural and situational contexts in which thought and emotion occur to play a role (Boas 1938: 5).

Thus, though still somewhat mired in Cartesian dualism, Boasian thought already contained the seeds of relativism, and it foreshadowed some of the dichotomies that would haunt the empirical study of emotions for decades to come. On the one hand he believed that the cognitive capacities of all mankind are equal, on the other he believed various differences in cultural and linguistic manifestations of cognition and emotions alike. However it would be his sensitivity to the idea of cultural context influencing the forms of expression and the idea of making language the central object of investigation that would have the most profound influence on the future course of American anthropology.

1.2.2. Edward Sapir

Edward Sapir was a linguist first, before he became an anthropologist, which perhaps explains why he naturally gravitated towards Franz Boas. Linguistic training shines through Sapir's take on Boas' ideas, and through his choices of which ideas to develop and which to abandon in drawing up his own early version of linguistic relativity. Like Boas, he believed both language and thought to be grounded in and limited by what our biological and psychological makeup allows, but that culture has the greatest influence on language and thought within those set limits (Sapir 1929: 210). Following his mentor, Sapir made language the center of his anthropological scrutiny, but he reoriented the focus from the relationship between language and culture to that between the verbal aspect of language and thought.

Sapir understood language in two ways, and the subtlety of that distinction would become of some importance. The first meaning related to the linguistic code, language the conventionalized system of primarily verbal signs used voluntarily to communicate our thoughts, emotions and desires, a verbally codified communication (Sapir 1921). The second meaning encompassed the mental representation of language

coded by the language of the first meaning, a system of concepts and rules of grammar governing it (Sapir 1921). In other words, for Sapir language had a dual nature: as language the code and language the thought. His was the first formulation of a linguistic relativity hypothesis, whereby our perception of the world was never clear, but filtered through the prism of our thought-language system, an arrangement so entrenched and so strong that it works without our being aware of it (Sapir 1924: 155). However, Sapir was still a student of Boas, and he did not claim our thoughts are completely dominated by language. The arrangement was more dynamic, with thought-language being flexible enough to allow us to exchange, develop, arrive at, evaluate and adopt novel concepts through our use of code-language, with the novel concepts then being duly coded into the code-language as needed (Sapir 1921). And yet we are still limited by what our thought-language can do. As Sapir succinctly put it, "the word, as we know, in not only a key; it may also be a fetter" (Sapir 1921). Such key and fetter arrangement would also be reflected in Sapir's ideas about emotion within language, thought, and relativity.

Like Boas, Sapir considered emotions to be phenomena of the non-verbal communication (Sapir 1921), expressed not through what he understands as language, but through gestures, which he understands as all physical, bodily manifestations of communication including body language, facial expressions and speech tone (Sapir 1927a: 122). However, emotions being a significant factor in culture and social life, and the non-verbal co-existing with the verbal communication, emotions would tend to find their way into the latter. In everyday interpersonal communication the strictly denotative function of language continuously intersects with the expressive function of emotions (Sapir 1927b: 426). Not only do different cultures have a trove of words which are significant, even constitutive of that culture, that are emotionally loaded (Sapir 1927-32: 430), but given appropriate interpersonal interaction circumstances any word – even the inherently neutral one – can become imbued with emotion (Sapir 1927b: 425). Such potential omnipresence of emotions in communication along with the significance we ascribe our emotional lives makes emotions the most highly variable aspect of social life across cultures (Sapir 1927b: 432). The variability is compounded by display rules – a term that would later become Paul Ekman's first proviso to account for emotions other than basic – that is culturally imposed rules which regulate what in

terms of emotions can and cannot be openly expressed in particular social circumstances (Sapir 1930: 210).

Because of what he believed the mechanism of emotions to be, and because of the variability introduced by both this mechanism and the workings of the display rules, Sapir postulated that investigating emotions should always take into account the cultural context wherein given emotions become manifest. Indeed, he thought the only valid interpretation of the meaning and significance of any emotion terms can only be attained by investigating them within their own linguistic and cultural context, never outside it (Sapir 1926: 94). All in all, Sapir's view of relativity was far from deterministic, as it still allowed for the creation and/or acquisition of new concepts and terms with which to code them. On the other hand his view of the relationship between language and emotions shows a better defined and stronger lean towards relativity. It should perhaps be reiterated that Sapir was a linguist first and his take on linguistic relativism may be a legacy of linguistic structuralism – itself quite the deterministic notion – more than that of psychology or anthropology picked up from Franz Boas.

1.2.3. Benjamin Lee Whorf

Benjamin Lee Whorf did not consider emotions in his work in any meaningful detail, considering them merely one of the many aspects of the subjective experience of the world (e.g. Whorf 1939b: 164). However, as his name would become the one inexorably tied to the hardline strong interpretation of linguistic relativity, I would be amiss to leave out an overview of his thoughts on relativity.

Whorf's first calling, as in the case of his mentors – Boas and Sapir – was not anthropology. His first profession was as a chemical and fire prevention engineer, and his extensive practical experience with how habituated lines of thinking may lead to behaviors compromising fire safety helped him explain the mechanisms behind linguistic relativity, as in his famous example of "empty gasoline drums"[1]. Whorf was

[1] In his fire prevention practice Whorf noticed that just changing gasoline storage labels from 'gasoline drums' with the implication "full" to 'empty gasoline drums' changes people's behavior around such storage areas. The folk knowledge dictates that gasoline explodes upon contact with open flame, but no gasoline equals no danger. Hence people tend to act carelessly around "empty gasoline drums". As a fire prevention agent Whorf knew that gasoline vapor is more dangerous than any amount of liquid gasoline,

probably the first scholar to be trained formally as an anthropological linguist. The influence of Boas turned his attention to Mesoamerican cultures, and that of Sapir – towards the relationship between language and thought in those remote Indian cultures. Additionally, Whorf would devote a small but very significant portion of his attention towards popularizing and legitimizing linguistics as a scientific discipline; a discipline which could not only complement but actually advance other disciplines. Indeed, the passages which became the greatest focus of criticism were dropped in those popularizing papers (see 1.3 Emotion in Psychology).

Whorf's position on linguistic relativity is actually not far removed from that of Sapir. It is definitely much farther from a deterministic interpretation of his writing that would later earn his theory the disparaging label of "Whorfianism." He took over Sapir's dual understanding of language as a code and as a mode of thinking. Whorf saw language the code as outward manifestation of culture, of the "mass mind" forged by cultural habits and coded in language (Whorf 1939a:213). The force of habit is what blinds us to the modus operandi of language the thought, which leads us to believe that our deeply subjective vision of reality filtered through language and culture is the objective reality. As for Sapir, for Whorf language influences thought through our habit of using patterns of reasoning, conceptualization, and coding that are specific to our language (Whorf 1939a: 147).

He expected to find such patterns on virtually every level of language organization from phonology, through morphology, semantics, and syntax to pragmatics (see Whorf 1938). He even proposed a plan of systematically describing and mapping out those relativistic patterns in all languages of the world, though even today with the power of computers and the Internet to systematize and speed up the process the plan is probably too ambitious to be practicable (see Whorf 1938: 125). Still, while he believed that members of a culture will tend to think in ways specific for that culture and its language, like Sapir, he did not think of language as merely a "fetter" on the mind. Like Sapir, he postulated that the human cognitive capacity and flexibility outstrips the limits

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hence "empty" drums potentially present a greater fire and explosion hazard than the "full" ones, not least because people disregard the necessary precautions about open flames when handling them. Hence habitual way of thinking about what constitutes danger guided by the denotations of "full" vs. "empty" by the handlers presents a very dangerous situation and a good example of how linguistic relativity operates in everyday life.

imposed by any language, allowing for "intellectual adjustment" to the patterns of thinking of other cultures in pursuit of cross-cultural comprehension (Whorf 1941b: 21).

According to Whorf, what language influences most profoundly, what lies at the heart of his understanding of linguistic relativity, is the habit of thinking in ways specific to one's culture and language. The habit of perceiving the objective reality through a filter of language and culture, both of which are so deeply habituated that we fail to notice them, but which make us see not the unobstructed and unchanged objective reality, but our own subjective variant of it (Whorf 1939a: 138). And such a proposition, both in terms of its mechanism and its implication is hardly deterministic. Habits can, after all, be broken. And it is the breaking of such a habit that Whorf had in mind when he penned the lines that were to become the most quoted and the most misrepresented words of all his works.

Those lines, the locus classicus of what is usually understood as the Whorfian definition of linguistic relativity go as follows: "users of markedly different grammars are pointed by their grammars toward different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world" (Whorf 1940b: 221). The passage comes from a paper which was a part of a series written for the MIT Technological Review between 1940 and 1941. The target audience of the journal was composed of hard scientists (mathematicians, physicists, chemists, engineers and the like) and the papers advocated the idea that linguistics is a scientific discipline capable of advancing the hard sciences by identifying and breaking their ossified thinking patterns. Whorf argued for relativity most strongly not with respect to language in general but to language as the medium of communication of science. He warned that becoming stuck in one's own culturally and linguistically defined ways of thinking about scientific problems poses a serious threat to the rapid progress of scientific thought (Whorf 1940a: 214). What was at stake, should one submit to the habits of thought determined by one language, was the objectivity of scientific inquiry, the very heart of hard science (Whorf 1940b: 221).

At the time of writing the MIT Technological Review papers English has already risen to the prominent status of the lingua franca of science, and Whorf warned that allowing science to slip into a habit of being thought of only in English would undoubtedly warp its coveted objectivity into an English-centric subjectivity (Whorf

1941a: 244). The solution he proposed to prevent this dreaded arrested development of science was to involve multilingual linguists – people who not only speak multiple languages but are trained and schooled in the ways languages work, how they code various concepts, and would therefore be able to provide multi-linguistic "corrective" perspectives on different scientific ideas (Whorf 1940a:214). Whorf was not a linguistic determinist in the "vulgarized" modern understanding. But he saw how scientific thought in particular may be hampered by relativistic influence of language, and how linguistics can prevent the detrimental effects of linguistic relativism on science. The criticism of this formulation of relativism by Whorf was, in other words, somewhat misguided in that it assumed that Whorf meant it to concern all manifestations of language (Joseph 2002: 181).

All things considered, from Boas through Sapir to Whorf, linguistic relativity was less of the Nietzschean nightmare of "the prison-house of language" and more of a strong appeal to include cultural, situational and linguistic factors in considering and investigating different cultures. At all times all three of the initial proponents of relativity emphasized that human cognition is universally capable of achieving understanding despite the differences in culture and language that stand between them. They were also at pains to show that an individual who is aware of the nature of relationship between language and thought may escape the "fetters" and use the "keys", a liberation that may be greatly assisted, according to Whorf, by learning a (number of) new language systems.

Even the strongest formulations of relativity were heavily caveated and contextualized. They pertained to the dangers of relativistic effects when people are by force of habit unaware of them, and the greatest danger those effects posed was for the scientific community, whose objectivity and speed of progress could be called into question under relativistic effects of language.

The global context of the time when the latter statements were issued by Whorf should also be considered (Joseph 2002: 190). It was the early 1940s, the US was on the brink of joining yet another global war, which was, to an extent greater even than the previous world war, based on scientific warfare. Scientific progress and scientific solutions to military problems were much on people's minds, and any means that could help science advance faster and further were employed by scholars in all parts of academia (conscientious objectors notwithstanding). Still, the idea of the subconscious,

almost insidious control language is capable of exerting on cognition, and in consequence on behavior, was in great part the undoing of linguistic relativity outside anthropology in the years following World War II (Joseph 2002: 191). The process of the "vulgarization" of the theory had begun very soon after Boas', Sapir's and Whorf's deaths, and it would not be reversed until well into the 21st century.

1.2.4. The Development of Sapir-Whorf hypothesis

For Boas, Sapir, and Whorf linguistic relativity never became what psychologists would call a testable hypothesis. For them it was rather a principle deduced from the linguistic and anthropological evidence. Sapir, Whorf, and Boas died in quick succession in 1939, 1941 and 1942 respectively. Linguistic relativity, now in the progressively "vulgarized" forms would be developed by their successors and critics in the 1950s. The term "Sapir-Whorf Hypothesis" was likely first mentioned during a conference commemorating the life and work of those two scholars in 1954 in a paper read by the linguist-anthropologist Harry Hoijer (Koerner 2003: 39). The idea behind the term was first popularized by Hayakawa's inclusion of the one of Whorf's *MIT Technological Review* papers in an appendix to his *Language in action* (Andrews 2008: 122), and the term itself by its mention in an Introduction to a collection of Whorf's writings edited by a psychologist, John B. Carroll, and published in 1956 (Carroll 1956: 29; Koerner 2003: 39f). This collection would later become the go-to publication for Whorf's writings. Finally, in 1958 a psychologist Roger Brown reformulated linguistic relativity into "weak" and "strong" versions, whereby the "weak" was essentially a reiteration of the moderate positions of Boas, Sapir, and Whorf, while the "strong" was strictly deterministic, claiming that without certain language structures thought processes corresponding to them are impossible (Brown 1958: 260, as cited in Pavlenko 2013). Thus, the process of "vulgarization" was, for all intents and purposes, completed.

Between 1950s and 1960s anthropology, psychology and linguistics all drifted apart, just as cross-linguistic and cross-cultural studies of emotions were becoming a prominent research venue in psychology. Anthropology would continue its investigations and the grand work of documenting the vast dimensions of human cultures within the linguistic and cultural relativism framework yielding a

comparatively large volume of field studies (Foley 197: 209). In linguistics the rising star of Noam Chomsky would push the discipline into abstract fields of normativity, structuralism and universal grammars and away from any practical field engagements outside the linguistic mainstream (Duranti 2001: 71f). Psychology descended into heavy criticism of linguistic relativism and launched on a nearly half a century long campaign of searching for and proving the existence of universal principles underlying emotional expression (Kay and Kempton 1984: 66).

The drifting apart of those three disciplines was not an absolute phenomenon, and some attempts were being made throughout the second half of the 20th century to exchange ideas and experience and to discuss evidence across disciplinary boundaries. Notably, the discipline of sociolinguistics grew into the middle ground, intermediary position between linguistics and anthropology allowing for at least some cross-talk between those two disciplines (Duranti 2001: 7). The late 90s saw a modest revival of active interest in linguistic relativity with the works of the linguist cum psychologist John Lucy, who pointed out that the progress in the anthropological investigation of linguistic relativity has been hampered by the lack of a single systematic method of description and documentation of languages and cultures under investigation (Lucy 1997: 291f). He would then go on to propose such a reorganized and systematized method of empirical research (Foley 1997:209).

Around the turn of the 21st century a much-overdue return to the basic, "de-vulgarized" formulations of linguistic relativity was underway. Many linguists, anthropologists, psychologists, and practitioners of emotion research of all kinds whose empirical concern is the cross-cultural communication have embraced the original ideas behind linguistic relativity, and have produced volumes of research on the variability of emotional expression across cultures (for reviews see Elfenbein and Ambady 2002a; Markus and Kitayama 1991; Mesquita and Frijda 1992; Russell 1991). The rifts between the disciplines of linguistics, anthropology, and psychology are being systematically bridged, and interdisciplinary approaches become the norm rather than fluke exceptions. It is not uncommon for scholars from one discipline to accept evidence from other disciplines as they come to terms with the new integrative paradigms of emotion research (e.g. Duranti 2003: 330; Lutz and White 1986: 410). Before we move on to an overview of the anthropological evidence for linguistic relativity in the expression of emotion, two things should be noted. For one thing, this

body of evidence is still marked with the inconsistency of data collection method pointed out by Lucy. For another, the evidence is often acknowledged or even adopted by anthropologists, though the original researchers' ties with anthropology might be tangential, limited to the acceptance of the principle of linguistic relativity.

1.2.5. Relativity of emotions in syntactic structures of language

Although Edward Sapir originally targeted the grammar rules in particular in his understanding of linguistic relativity, the evidence from the investigation the syntactic features of emotion expression has been literally merely incidental. Since syntax is one of the subtler vehicles of verbal communication, this venue might have been one of great interest. However, syntax and the rules of grammar happen to be the prerogative of Chomskyan linguistics, which in the second half of the 20th century became the mainstream of linguistics. Its focus on the abstract construction of ideal Language and how it should work somewhat marginalized the investigation of how natural languages actually do work. Still, some passing comments with respect to how emotions might be relativistically coded in syntactic structures of different languages can be found.

Besnier (1986: 255) reports that in Tuvaluan, a Polynesian language spoken exclusively on the island of Tuvalu, ergatively or pseudo-ergatively marked noun phrases express a severely negative emotional attitude towards the object of a sentence they appear in. Niyekawa-Howard describes how very specific forms of passivity in sentences are used to express complex emotions in Japanese. She gives the example of adversative passives, which carry the meaning of negative experiences of a subject subjected against his/her will to an unpleasant event (Niyekawa-Howard 1968: 2). It has also been observed by some theorists, that emotionally loaded phrases seem to disrupt Theta-role assignment in English. The problem has been described in some detail as an emotional "Target/Subject Matter Restriction", whereby no simple predicates exist that could express both the Subject/Target and the Causer roles in an emotionally loaded phrase (Pesetsky 1995: 60f).

The evidence for linguistic relativity in syntactic coding of emotion all comes from incidental fragments and passing remarks, which makes for an unfortunately small pool of instances to discuss. However with the ascent of integrative paradigms and

diversification of linguistic studies in recent years it is to be hoped this small but promising venue will be explored further. Especially so since the issue of Theta role assignment ties in with the concept of self, one of the most crucial constructs in emotional processing.

1.2.6. Relativity of emotions in semantics

Most of the anthropolinguistic works on emotions were carried out in the 1970s and 1980s, and their focus was on Sapir's idea to study culturally significant words in their own cultural context. The seminal works in the field would be massive case studies devoted to one culture, studied by one anthropologist. Hence there would largely be a lot of detail and structure individually with a corresponding lack of systematicity that would allow for broad comparisons across cases. Nonetheless, these studies present an impressive body of evidence in favor of linguistic relativity and allow a glimpse into the Whorfian "mass mind" of various cultures through the emotional lens of their terms for different emotions. Most of those massive studies concern remote cultures, far removed from the Western cultural perspective resonating with Darwin's prediction for the course of such studies and Boas' idea of salvage anthropology. In more recent years some additional evidence came from a curious breed of case studies which focus solely on individual culturally significant emotion terms, and largely concerning the languages and cultures of the broadly understood West.

Linguistic relativity with respect to emotion expression manifests itself in ways as varied as the cultures in which it was investigated. One of the best known examples of that is not the existence of a unique emotion, but an apparent lack of one that is considered pretty universal. The missing emotion is anger, and it appears to be pressed out of existence by the construct of *ihuma*. *Ihuma* is a construct unique to the Utku Eskimo inhabiting the northern reaches of Canada and described by Jean Briggs in a book under the telling title Never in anger (Briggs 1970). The concept of *ihuma* is next to impossible to translate. It denotes a certain kind of disposition acquired with time which encompasses the repression of the expressions of any extreme levels of emotion, but especially of negative emotions, particularly *anger* (Briggs 1970: 351). Furthermore, *ihuma* means having the kind of *cheerful*, *warm* and generally *positive*

disposition that predisposes people for collaborative action (Briggs 1970: 360). It is very characteristically perceived as lacking in children, in whom violent or extreme manifestations of negative emotions are tolerated, since it is understood that being a child is to have no *ihuma*, hence a child cannot be held accountable for any emotional outbursts (Briggs 1970: 335). The closest equivalent of *ihuma* in English would likely be "reason", which indeed is the term Briggs uses herself, however it is a "reason" with a very specific focus on emotional control as a mark of adulthood, highly specific for the social organization of the Utku Eskimo.

Whereas in the cold wastes of Canada, among Utku, anger might be repressed to the point of non-existence, in other cultures it is central to what is felt constitutes culture. On the other side of the world, on the island of Luzon the focal point of the culture of the Ilongot tribesmen is the emotional concept of *liget*. This concept, though often glossed as "*energy, anger, passion*" actually has a more complex meaning composed of two major aspects. On the one hand it denotes states of ill health, bad sensations or feeling, social disruption or withdrawal; on the other hand it denotes the essence of life force, the vitality inherent in all worthwhile human endeavor (Rosaldo 1980: 45). Liget is the affective driving force behind cathartic acts of ritual violence, such as the traditional Luzon practice of headhunting, but also behind all manifestations of sensual physical *love*, and behind heavy manual labor (Rosaldo 1980: 46). The core common meaning of "virility" and "force" could, at need, be extracted, but for the Ilongot *liget* is an elemental and visceral force that appears to permeate all the animate aspects of reality, man and his environment alike, and whether it entails something subjectively *good* or *bad* will crucially depend on the situation (Rosaldo 1980: 47). Once again, a concept so deeply rooted in its cultural context even the anthropologist describing it found it hard to contain her explication of the concept to less than a chapter. Non-equivalence of culture-specific terms, anthropologists repeat like a mantra, rules the emotion research in cross-linguistic contexts.

The word *emotion* denoting states of psychosomatic excitation dates back to 1649 and Descartes' *Passions de l'Ame* (Frijda 2008:68), so the idea that emotions constitute a distinct and valid category of phenomena had been around for well over 300 years by the time when the seminal studies in anthropological linguistics were being carried out. Therefore it might have come as something of a surprise to the Western researchers for whom the existence of emotions was a basic assumption, that some

cultures do not have such a category. The Ifaluk people of the Ifalik atoll in Micronesia have a collection of words that denote their internal, visceral states that are evoked by highly specific social or environmental circumstances (Lutz 1982: 115), but none of them even approaches the level of general abstraction that *anger*, *fear*, *disgust*, *sadness*, *surprise*, or *happiness* have in the West (Ekman, Sorenson, and Friesen 1969: 87). The Ifalukian words for those states can be clustered into meaningful categories, but such clustering does not correspond to the six-way English division either. One such specific cluster, labeled as "emotions of connectedness and loss" includes *fago*, which denotes, depending on the situation, *love*, *compassion*, or *sadness* at the prospect of losing a loved one; and *laloileng*, which denotes a mixture of loneliness, abandonment and insecurity caused by such isolation (Lutz 1982: 117). Another cluster groups various denotations of danger or threat posed by either environmental or social situations. This one includes, for example *metagu* which denotes a very general *nervousness* or *anxiety* in situations where ritualized deference is expected, *ma – shame* or *embarrassment* at failing to perform as expected in a situation of such ritualized deference, and *bobo – disappointment* at failing to perform appropriately (Lutz 1982: 116). As in most small island communities, the social hierarchy is of utmost importance. It is the organizing principle of the social life and it permeates and profoundly influences how the emotions of Ifalukians are constructed, expressed, and perceived. In Ifaluk "emotion" without reference to how it features in social situation does not exist.

Emotions or emotion-like phenomena defined as relating to highly specific social situation in a particular community indeed seems to be the norm for most if not all remote cultures studied. The speakers of Bahasa Melayu, the national language of Brunei in Malaysia, have a term denoting a psychosomatic state that could be classified as emotion, which denotes a variety of conditions from mild discomfort to requiring medical attention. *Awumbuk* is only half-jokingly referred to as "social hangover". It is a state of diffused *sadness*, sense of *loss*, *boredom* and *lassitude* that follows the departure of a guest (Fajans 1983: 176). Depending on whether the guest was a family member, close or more distant friend, how long they stayed and the intensity of their social engagement with the host, the latter's subjective severity of *awumbuk* will vary. The manner of the "departure" of a house guest will also matter – whether the guest merely departs to return to his/her home, or "departs" this world and dies – the strength and repercussions of *awumbuk* will also change. In some cases, as with the death of a

house guest who had also been a family member *awubuk* may take on the quality of clinical depression and last for days (Fajans 1983: 177). To the Malaysians *awumbuk* is a crucial part of their national identity and is one of those emotional phenomena that appear to be characteristic of the Eastern collectivist societies.

A curious case of a similar typically Eastern notion is presented by the case of Japanese *amae*. Japan has long been an interesting location for the study of relativistic ideas due to its unique position of having an economy and large portions of popular culture adopted practically verbatim from the West whilst it retains an earnest and revered core of inherently Eastern traditions. Like all of the above examples, *amae* entails much more than only a sensation of an emotion – it can denote the kind of behavior that may be prompted by *amae*, the feeling itself, the interpersonal relationship it describes, or even subscribing to a belief that *amae* is a crucial part of the Japanese culture (Niiya et al. 2006: 281). *Amae* is the type of emotion wherein one depends on another's *affection*, *love* and *indulgent care*. Characteristically manifest in intimate relationships, *amae* will entail positive or negative feelings depending on the situation, and the situation will typically be one of one party making a request of another, especially so if the request is perceived as inappropriate (Niiya et al. 2006: 280). The complicated nature of *amae*, with its definitional dependence on specific types of behaviors and relationships results from the interdependent (as opposed to the Western independent) self that is the norm in Japan (Niiya et al. 2006: 281). How the self is culturally defined would become a crucial factor in modern theories of emotion (see Markus and Kitayama 1991).

Though the interdependent self is characteristic for the broadly understood Eastern cultures, that does not mean that profoundly social and collectivist ideas about emotions are completely absent in the West. Social situations and interpersonal relationships are the defining contexts for emotions, so some culture-specific terms are bound to exist in Western cultures and languages as well. However, only precious few studies have so far been devoted to the Western cultural sphere. A couple of noteworthy examples describe single terms for emotions which are constitutive of national character in Dutch and Danish. The Dutch have the term *gezelligheit*, which is usually described as a feeling of low-key *conviviality*, *sociability*, lack of inhibitions or *shame* and general *openness* to others, but it may also mean actively extending such a disposition to others in an effort to make them feel comfortable and welcome (Lindeman 2009: 40).

In similar vein, the Danish *hygge* describes the feelings of safety and comfort in social situations, which also entails an egalitarian attitude and active refusal to submit to social or economic stratification, a culture-binding sense of togetherness, of "being Danish together" (Linnett 2011: 22). It is less the meaning of these two terms and more the national self-marking status that they hold that bespeaks their uniqueness and nigh untranslatability here. A connotational non-equivalence as it were.

On the whole, the above evidence does suffer from the idiosyncratic methods of data collection, but it is nonetheless revealing and points to a number of contextual issues that demand attention should one aspire to propose a single coherent theory of emotion. Emotions are not simply subjective feelings and reactions. They are constitutive of multiple aspects of selfhood, as evidenced by the Japanese concept of *amae*, and within the concept of self they contribute to the construction of the ideas of adulthood (as in the Utku *ihuma*) and nationhood (as in the Bahasa Malayu *awumbuk*). Emotions also reflect, regulate, and help uphold social relations, hierarchies and rituals of communities in different cultures (as in the Ifalukian visceral-relational system). Finally, the anthropological evidence of linguistic relativity highlights the critical problem of linguistic, semantic, and functional non-equivalence of emotion terms (Ilongot *liget*, Dutch *gezelligheit*, Danish *hygge*). This non-equivalence is the most visible, and most obvious difference noted by anthropological linguists with respect to the semantics of emotion terms.

1.2.7. Relativity of emotions in pragmatics of language

According to Sapir, emotions are most naturally communicated through the non-verbal channel. Any aspect of communication outside the propositional content of speech and to a major extent dependent on human physiology falls into the category of means on non-verbal communication of emotion: tone of voice, posture, gestures, and facial expressions. Overriding all of these are the culturally dependent display rules which determine to some extent what emotions can be displayed in which social situations. In spite of the fact that the non-verbal communication plays such an important role in emotion research, not much research has actually been done regarding the non-verbal cues. The only considerable body of evidence comes from the research on emotional

prosody, that is the acoustic and psychoacoustic properties of emotional speech (for a detailed account see Chapter 2). Nonetheless a short overview of the existing evidence for linguistic relativity as expressed in the non-verbal channel also reveals some important aspects of linguistic relativity in the communication of emotion.

Display rules are acquired socially through multiple interactions with the members of one's culture, and determine what emotions to what extent can be openly expressed in the presence of various members of one's community. Because they are passed on through interactions, coded in culturally determined ways, display rules will necessarily vary across cultures. The Iranian culture promotes collectivist ideas and prosocial behaviors, but also emphasizes the importance of familial hierarchy and showing deference to the elders in a family. Therefore children learn to employ more restrictive display rules in expressing emotion to their kin than with respect to their peers, as excessive behaviors are seen as disrespectful of the elders. In contrast, Dutch children restrain their displays of emotions in front of their peers more than in front of their kin, mainly because in their Western youth culture tends to ostracize temperamental or extremely emotional individuals, whereas the kin will tend to tolerate emotional outbursts (Novin et al. 2008: 405). The context in which the emotions are to be expressed matters in yet another sense – whether an individual child is alone or in company. Children in the Western cultures, e.g. in the UK will use their knowledge of display rules differently, often doing their best to repress the expression of negative emotions for fear of negative repercussions of interpersonal nature (Zeman and Garber 1996: 965).

Interestingly, the onset of assertiveness in adulthood in the Western cultures appears to reverse the propensity to display negative emotions. For the adult English speakers in the USA and Canada expressing powerfully negative, potentially socially dangerous emotions such as *anger*, *disgust*, or *contempt* is seen as perfectly acceptable. On the other hand, for the Japanese such displays would be unthinkable (Safdar et al. 2009: 8). For adults, the distinction between private and professional contexts appears to also influence how restrictive are the display rules deployed, with the professional settings prompting more restrained and emotionally closed off behaviors (Moran et al. 2012: 332). Display rules are culture-specific, but they are also social. Depending on the perceived status and the relationship between community members present, the rules

determine how much or how little emotion we can actually allow ourselves to show openly.

The actual aspects of communication that display rules regulate are as variable as the display rules themselves. The body in its entirety is a notoriously hard object for the study of expression because it is a very complex mechanism subject to far more factors than just emotions and display rules. The overall posture, hand gestures, facial expressions and even managing one's personal space can all contribute to the expression of attitudes and emotions. It has been found, for example, that depending on the ethnic background of the mother, the quality, quantity, and pattern of gestural communication between her and her infant will vary significantly (Tamis-LeMonda et al. 2012: 394).

Iconic gestures, which are a kind of codified language themselves, are highly variable as well, even when they are so deeply habituated it appears unnatural that they may carry a different meaning in other cultures. Nods and head shakes for affirmation and negation, preferential use of the left or right hand for welcoming gestures, pointing, siting vs. standing postures to show deference, grimaces such as sticking out a tongue – all have been shown to mean different things depending on the culture that employs them (Labarre 1947: 49f). The East-West differences are also manifest here, as for example the Japanese will tend to rely on the context and the reading of body language to interpret an emotional expression, while Westerners will rely more on the cues from propositional content and the face (Kleinsmith et al. 2006: 1387). The attitude of dominance defined by emotional expression control also varies from East to West. In business negotiation settings the Chinese choose to organize the physical office space around them to signal their level of control over the situation. Canadians businessmen, on the other hand, tend to relax their body postures and create a physical distance between them and their client better to control the situation in the emotional dimension as well. In both cases culturally-dependent display rules determine their physical actions (Semnai-Azad and Adair 2011: 467).

Emotional prosody presents another interesting case, as the voice and its properties resides, as it were, cheek by jowl with the propositional content of speech. While the urge to speak may be controlled by will, the voice relies on breathing muscles the willful control of which is only partial. Hence emotional signatures in the voice cannot easily be controlled. Differences in how emotions are expressed and perceived in

the voice have even been found in cultures that share a language and culturally have diverged from one another only recently. Different varieties of English such as Kenyan, Australian, Indian, Singaporean, and American appear to have different prosodic signatures for negative emotions such as *anger*, *sadness*, *fear*, and *pride* (Laukka et al. 2014: 448). Even vocalizations, those seemingly most basic and primitive vocal means of signaling distress tend to show variations across languages and cultures (Gendron et al. 2014: 7). Patterns of laughter (Labarre 1947: 53) and crying (Labarre 1947: 55) have also been found to be relative, especially in the manner and causes for both. From iconic gestures, through body postures, to vocal signals, virtually all aspects of non-verbal communication have been found to manifest relativistic effects. All of that variation combined with the complex variations in display rules makes for an exceedingly complicated material for analysis.

The non-verbal channel of communicating emotions, though postulated as the most natural for the expression of emotions is rather underrepresented in the body of evidence in favor of linguistic relativity. It is, however hardly surprising, all things considered. Language in the understanding of "the code" is a system which is well structured and straightforward, accessible to consciousness and conventionalized – all of which traits make it a much more easy point of access to the "mass mind" of a culture than the body language. Body language, whether expressed in posture, facial expression, or gesture is much more dependent of barely controllable vagaries of human physiology under the influence of emotions. Furthermore, because of its huge variability and – apart from the iconic gestures – near impossibility of describing the body language with any measure of systematicity studies investigating the non-verbal aspects of emotion expression have naturally been slow in coming. Adequate tools for such a description are only now becoming available. Nonetheless, even with the small amount of evidence we have from the non-verbal channel also tells us something about the relativity of emotion communication. The iconic gestures which do not arise naturally from the human physiology but must be acquired in the course of cultural learning vary across cultures as much as the verbal expressions do. The more natural manifestations seem to be less variable but what control through display rules may be exerted will cause variations in expression as well. What is more, once again the East-West divide of cultures seems to be of some significance here as well.

1.2.8. Conclusions for anthropological studies of emotions

Across the classic division of linguistic analysis into syntax, semantics, and pragmatics, encompassing grammar, meaning, and the non-verbal communication respectively there is anthropological evidence for linguistic relativity in the expression of emotions. However, the evidence, or rather the description of evidence reveals a measure of universality as well. However much they struggled to describe the culturally unique terms, however much contextual and cultural information they had to supplement to clarify the meanings, the anthropologists were able to grasp and explain these unique terms in English. They were able to overcome the cultural and linguistic relativity effects, and though the heuristic effects of the unique emotion expressions are lost in translation, the meaning can be described, explained and understood.

The linguistic relativity scholarship in the 20th century struggled continuously between the need to express unique aspects of emotional expressions in English (Janney 1996: 81) and the fear of falling into the Whorfian trap of having their scientific integrity compromised by the language they were reporting their findings in (Leavitt 1996: 515). Unlike the linguists, who have drifted into the abstract realms of Universal Grammar or psychologists who have actively opposed the very idea behind linguistic relativity, anthropologists kept the theoretical continuity of the idea since Boas. They followed the Boasian conviction that the human mind is capable of working around cultural boundaries, Sapir's idea of language setting both limits and defying them, and were aware of the potential danger posed by the Whorfian trap.

While linguistics and psychology kept their distance, anthropology kept quietly accumulating a fairly impressive body of evidence that indeed there are differences in how different cultures comprehend, code and express their emotions both verbally and non-verbally. The most important observations that would carry over into the psychological research of emotions were the non-equivalence, the variations in the concepts of self, and the influence of broadly understood context. All of these would sit rather uncomfortably alongside the universalist theories of emotion, and would eventually force psychology to reevaluate its initially combative attitude towards relativity of emotions.

1.3. Emotions in Psychology

The history of emotion research in psychology is long and venerable, and could be variously sub-divided into distinct periods depending on what specific problem within emotion research one wishes to investigate in a historical perspective. This overview has been designed to include only those perspectives on emotions (historical and contemporary), which had the greatest influence on the development of emotional prosody research. Accordingly, four major historical periods were distinguished. The first period encompasses the time just before the rise of psychology as a scientific discipline, which produced a single major work on the subject of emotions – Charles Darwin's *The expression of emotions in man and animals*. The second period encompasses the earliest period of development of psychology as a discipline with the works of William James and Wilhelm Wundt. The third period encompasses the mid-1950s until mid-1990s with the emergence of Chomskyan linguistics, cognitive psychology, and the rise to prominence of Paul Ekman's theory of basic universal emotions. The fourth period started in the 1990s with the prominent revisionist works by James A. Russell. This period continues to this day and it is characterized by a return to the original sources of the major theories of emotion and integrative and interdisciplinary approaches and postulating a reconciliation of the evidence from anthropology, psychology and linguistics to paint the most complete picture of emotions to date. However varied the temperaments of each of these periods, common themes and problems of the difficult science of making sense of emotions run through the history of psychological investigation of emotions since before psychology became a fully-fledged discipline.

1.3.1. Charles Darwin

It is only natural to think psychology would be the discipline to first tackle emotions in a focused and systematic manner. However, the first and one of the most comprehensive studies of the subject actually predates the emergence of psychology as a scientific discipline. Published in 1872 *The expression of emotion in man and animals*, by Charles Darwin remains one of the most prescient scientific documents of its time, anticipating

many of the issues that would trouble and divide the nascent discipline of psychology throughout its progress (Hess and Thibault 2009: 120). Darwin the scientist was very firmly a product of his times. The scientific landscape of the 19th century, with its one "natural science" and only one "scientific method" allowed him to move freely between subjects and bodies of evidence from various fields (including zoology, botany, geology, biology, and medicine) compiling a holistic and insightful model of emotions. And although his data collecting method2 (Darwin 1873: 15) leaves a lot to be desired from the point of view of modern scientific sensibilities, the theoretical assumptions and the conclusions he draws are decidedly astute from the selfsame point of view.

In terms of facial expression of emotion, Darwin's "legacy" (Ekman 1998b: 363) has been claimed by the proponents of the universal basic emotions as their theoretical origin. In terms of the general theory of emotions – what they are, how they function, and what their purpose is – Darwin's position transcends the narrow confines of facial expression alone. Indeed, he considers a broad range of emotional phenomena and a wide spectrum of non-verbal expressions of emotions: from whole-body expressions such as dancing for "*joy*, *high spirits*, *love*, *tender feelings*, *devotion*" (Darwin 1873:198), through physiological reactions such as *weeping* for "*suffering* of the body and mind" (Darwin 1873: 147), to the quality of the voice such as "choked up voice" for "*hatred* and *anger*" (Darwin 1873: 240f). The richness of the physiological and physical reactions and reflexes as expressions of emotion as described by Darwin are beyond the scope of this overview; but this richness suggested Darwin already understood that emotions are inherently best expressed non-verbally.

There are indications he also understood that how emotions are experienced vs. how they are expressed are two interrelated but discrete problems. Likewise, he observed that humans recognize emotions with ease, but seem to fail to competently describe the experience in language in a subtle foreshadowing of the litany of problems psychology would struggle with over labeling emotions (Darwin 1873: 13). Darwin considered also the influence of processes we today would call enculturation and socialization (Darwin 1873: 28), and the involvement of the neural system in the expression of emotions (Darwin 1873: 28f), both of which themes would come back with vengeance in the post-1956 period.

[2] Mainly through correspondence with scientists and artists around the world.

Aside from all of the above, there are two ideas contained in *The expression of emotion in man and animals* that cumulatively would predict both the direction of empirical research and the greatest theoretical divide in the future investigation of emotions. First, he proposed that there exist "innate" emotions, defined by evolution and contemporarily panhuman, the existence and scope of which can be confirmed by contrasting the empirical data on emotion recognition from remote primitive cultures to that from the Western civilized cultures. Second, he expressed his belief that the said contrast would reveal variation in emotion expression across cultures which would reflect the level of variation in languages (Darwin 1873: 15). Research on emotions focused on the search of the one universal principle underlying emotional phenomena would indeed take researchers to far-flung places in search of communities that had experienced minimal to negligible contact with the Western culture. And the question of what constitutes the true nature of emotions and whether that nature makes emotions universal or culture-specific would put a rift between anthropologists and psychologists for most of the following century.

In the contemporary revisionist and integrative approaches to emotion theory, Darwin's holistic view and his ideas about integrating many levels of analysis into the description of and experimentation on emotions have been going through a modest revival[3]. And yet it remains true that Darwin's observations have only been appreciated by scientists and the educated public of his time and are becoming appreciated today, while the century in between, which would most benefit from his broad approach, largely neglected his work (Ekman 1998a: xxiii). Hence it had little bearing on the forefathers of psychology in the second period, and been barely glanced over and often misrepresented in the chaotic period after that significant year.

1.3.2. The forefathers of the discipline of psychology

The period between *The expression of emotion in man and animals* and the mid-20th century was in many respects a transitional period, and it was a busy time for psychology. Within a little over half a century the discipline of psychology would be

[3] Paul Ekman calls this revival and acknowledgement a „struggle" over "Charles Darwin's legacy about facial expressions of emotion", as he would prefer to claim the „legacy" for the basic universal emotions approach to emotions alone (Ekman 1998b: 363).

born, go through a number of transformations for better and for worse, be legitimized as a true scientific discipline, earn recognition from the Nobel Prize committee, and grow into maturity in the influence its theories and conclusions exerted over the general public consciousness. With respect to emotion research, however, the only truly significant works came at the very beginning of this eventful period from two of the most prominent psychologists of their day – Wilhelm Wundt in Europe, and William James in the USA. This would also be the time period when this geopolitical divide would become important, as the balance of power and influence tipped and shifted to the New World.

Since both Wundt and James lived out the most productive periods of their professional lives in the late 19th and the very early 20th century, their work sits half-way between the broad scope that made Darwin's work so insightful, and the fragmented and highly specialized visions offered by the newly emerging discrete scientific disciplines. Holistic and – to put a modern term to good anachronistic use – multidisciplinary on the one hand, Wundt and James already identified themselves as dedicated psychologists, and as such many of the characteristics peculiar to modern psychology started with them, especially so in the subject of emotion research. The dominance of two opposing theories with a prominent scientist leading each side of the argument, the drive towards empiricism grounded in verifiable theoretical assumptions, the search for the universal principles, and search for validation of claims in biology, physiology, and medicine – all of these were present in Wundt and James' writings and became topical in the post‑1956 period.

Wundt and James, though their opinions differed on the subject of the nature of emotion, actually had a lot in common. Both majored in medicine, though neither took up the practice; they specialized in philosophy, physiology, and psychology; both used their expertise in medicine and physiology to ground their psychological claims in the ultimate universal principle of human biology (Goodman 2013; Kim 2014). Both men took interest, in true 19th century scholar fashion, in the buzz subjects of the scientific world. Wundt took up politics, with some unfortunate results for his good name in later years, as he implemented his theories on society and culture to the extreme-right nationalistic and "virulently anti-Semitic" policies of the early 20th century Germany (Kim 2014). James bravely ventured into the Amazonian rainforest to search for evidence for the "Snowball Earth" hypothesis of global ice age with the author of the

theory and a kind of geological superstar of the day, Louis Agassiz[4] (Goodman 2013). And in true 20th century scholar fashion, both James and Wundt had sweeping, complex and yet thematically focused visions of what psychology encompassed, though there was a fundamental difference in how they interpreted emotional phenomena.

1.3.2.1. Wilhelm Maximilian Wundt

Citing Wilhelm Maximilian Wundt as the father of psychology has become such an oft-used statement that it almost seems devoid of all its weight. And it is without a doubt a weighty statement to put on a single person's shoulders. In the case of Wundt, however, it barely hints at the magnitude of his work and his influence upon the young discipline of psychology he had been busy establishing virtually all his working life. Throughout an incredible 65 years of active and prolific academic career he produced an estimated 53,000 pages of publications on a variety of topics from medicine to politics, supervised and promoted 186 PhD dissertations, and established – and also, importantly, got his university to recognize it as such – the first experimental psychology laboratory in the world (Kim 2014). Even by standards of the 19th century, rich though it was in voluminous academic achievements, Wundt was in a class of his own. It is not too much to say psychology today would not be what it is without Wilhelm Wundt.

Wundt had strong and clearly defined opinions on emotions as psychic phenomena, though he never consolidated his thoughts on the subject the way James would. With respect to emotions Wundt formulated – in bits and pieces in multiple publications – a remarkably progressive theory, many aspects of which were decades ahead of its time. To begin with, seeing psychology as the only type of science capable of intimating the human psyche, he claimed emotions as an object of study exclusively for psychology (Wundt 1902: 2). Somewhat foreshadowing Freud's rise to fame, he postulated that emotions are vital and important parts of the human psyche (Wundt 1902: 33), and that they influence significantly how humans think and behave (Wundt 1894: 371f). He also differentiated between emotions which "intrude upon consciousness", and feelings, which do not, presaging the long discussion between

[4] For an exceedingly entertaining history of the geological sciences in the 19th century, see Bryson, Bill. 2003. *The Short Story of Nearly Everything* (Chapter 27 – „Ice Time").

Zajonc and Lazarus on the primacy of consciousness vs. affect in the post-1956 period (Wundt 1894: 372).

With respect to the facial expression, Wundt believed that specific emotions have their dedicated specific facial expressions which are biologically defined from birth (the argument from nature; a universalist idea that would be picked up and elaborated by Paul Ekman), but that they are then molded by culture and socialization (the argument from nurture; a culture-specificity idea that would later grow into cultural relativism) (Wundt 1894: 384). However, his core idea about the nature of emotional experience is probably the most interesting. The idea was that emotions, however diverse in expression, have a universal, common origin in the very primitive dimensions of meaning. He pointed out *sorrow* and *joy* specifically as the two core emotions from which all others develop (Wundt 1894: 373), and among the dimensions for the classification of emotions he mentions "pleasure" and "intensity" (Wundt 1902: 196f) - all of which would in the late 20th century be elaborated and reformulated into the dimensional and appraisal approaches to emotions. All in all, Wundt's vision of emotional phenomena was remarkably comprehensive and contained within it antecedents of the great theories of the later periods.

1.3.2.2. William James

What Wilhelm Wundt was in Europe William James became in the United States. Like Wundt, he is also frequently labeled with the moniker "father", in this case – of American psychology (Parajes 2002: 41). Though he established the first experimental psychology laboratory in the United States, all his major contributions to psychology were theoretical. Praised for his contributions to philosophy, linguistics, education, politics, sociology, as well as psychology (Parajes 2002: 56), James exercised most of his intellectual influence over all of these disciplines through mainly just one publication – his magnum opus, *The principles of psychology*. The work was intended to be a college psychology textbook, and was ordered by the publisher Henry Holt. The process of writing took James 12 years (Goodman 2013), broken up by bouts of chronic

depression and neurasthenia both of which plagued James all his life[5] (Parajes 2002: 43). The result of the 12-years' work was two volumes and twelve hundred pages of inspiration for entire generations of psychologists, and a literary tour-de-force[6].

His preferred method of "doing psychology" exemplified in *The principles of psychology* was introspection based on the assumption of the universal nature of human psychic experience, which allowed him to use the evidence of his own senses and analysis of his own internal life as evidence for his theories (Goodman 2013). From the modern perspective such "pure theorizing" might seem quaint, but James' view of psychology in general and emotions in particular was anything but free-floating ideation. The many subjects he studied and multiple educational trips to Europe (Goodman 2013) gave him a breadth of empirically-grounded knowledge that could rival the greatest minds of his generation. Thus, though based on introspective methods, *The principles of psychology* are founded not only on the cutting-edge results from the empirical studies contemporary to James, but also on a vast synthesis of theory from many areas of science of the day.

James' theory of emotion was part response to Wundt's theory, part refinement of Darwin's ideas, part philosophical treatise and part the results of James' inductive reasoning. At the time of writing *The principles of psychology* Wundt's useful distinction between feeling and emotion was yet to come, and Wundt's opinion was that emotion preceded any cognitive or behavioral changes. James opposed the idea claiming that the behavioral reflexes and physiological changes come first, before emotion is fully realized and appraised (James 1893: 376). He based this claim on Darwin's idea of adaptive fit, whereby emotions have an evolutionary, adaptive origin and operate on a fast, visceral level (Darwin 1890: 479). Some Cartesian dualism seems evident in James' insistence on a large disconnect between "reason", or cold cognition, and emotions. In strong emotional outbursts reason may be reduced to the role of a "passive spectator" (James 1890: 461), though it may also serve to control and willfully suppress or change the quality of the outburst (James 1893: 383). The idea of willful

[5] James had a weak constitution and a number of chronic ailments. It could be argued that his preference for introspective methods were prompted by his poor health, and while an undeniable hindrance to James, his sickliness spared him from the bloodbath of the American Civil War.

[6] James himself was, however, deeply dissatisfied with his work, and Wilhelm Wundt, while praising it as a literary work, was mostly condescending regarding its portent for psychology – as he put it "It is literature, it is beautiful, but it is not psychology" (Pajares 2002: 44).

control of and coping with emotions would become the focus of Richard Lazarus' work in the post-1956 period. There is also an implication in James' writing that emotion might be a continuous experience, merely fading in and out of focus of human attention at any given moment (James 1893: 384). This idea, of the prevalence and omnipresence of emotion would later be picked up by Robert Zajonc and a few more of the scholars in the broadly named field of "affective science." All in all, rethinking and refining the ideas of his predecessors in human physiology of emotion and philosophy James shows a subtle understanding of the complexities of the emotional experience.

James' understanding of what emotions are was based very firmly in biology, but extended far outside the biological limitations and into the high cognitive processes. First and foremost, in spite of the lasting influence and popularity of phrenology, James did not think there existed dedicated emotion centers in the brain (James 1890: 497), an insight that would only begin to find solid empirical evidence (e.g. Panksepp 1998) and to be widely accepted in psychology (Zimbardo 2009: 385) in the early 21st century. To James emotions were embodied, reflexive physiological reactions as unconsciously felt and consciously realized (James 1893: 373). There is, according to James, a small number of "coarser" or basic emotions – powerful, physiologically well expressed, and strongly felt. Those emotions are: "*anger*, *fear*, *love*, *hate*, *joy*, *grief*, *shame*, *pride*, and their varieties" (James 1893: 374). All other emotions are of aesthetic or intellectual nature and are much less powerfully expressed or felt.

This division of the more central "basic" emotions and the more peripheral "secondary" emotions would, of course, become all but appropriated by Paul Ekman into his theory of basic emotions, including the idea of emotion families. James, however, also recognized the significance of the fundamentally subjective and personal nature of emotional experience. He realized some emotional experiences need no external stimulation to occur, but occur in response to memories, fantasies, and imagination (James 1893: 374). Additionally, he proposed that so subjective is the nature of emotional experience and emotion expression (James 1893: 382), that establishing a "typical" exemplar of an emotion that would be universal is impossible (James 1890: 454). Importantly, though he acknowledged the portent of the great amount of words for emotions in various languages, he believed the fundamental nature of the phenomena they refer to much more important than cataloging of every word for emotion known to man (James 1893: 375). To sum up, James' idea of emotions as an

individual experience was that they are primary, visceral, evolutionarily developed, highly subjective, and infinite in forms of experience and expression.

1.3.3. Conclusions for the forefathers of psychology

William James died in 1910, Wilhelm Wundt followed 10 years later. Between their deaths and 1956 psychology would focus on a succession of cognitively-oriented problems such as intelligence, memory, and child development. It was also a time where political matters all too often stood in the way of free, outspoken, and good psychological and psychiatric practice. Cases of suppressing research or publishing results on the emotional and psychological trauma of the battlefields of The Great War are fairly well documented, and they hampered the diagnosis, description and relief of shell shock and PTSD (Jones 2007: 1643). World War II would soon follow with similar practices implemented on a wide scale. The period was in a sense the best time to do psychology in, except for psychologists dealing with emotion. What ruled the public, and with it the scientific imagination, was the subconscious in the Freudian sense as the destructive side of human nature, and a variety of ideas directed at controlling the chaos of a world shocked out of all semblance of normalcy after two world wars. Knowing more about child development would help shape better human beings, controlling the effects of learning through intelligence testing would ensure humanity would never again stray from the straight and narrow of reason (Joseph 2002: 184). Emotions, meanwhile were relegated to the post-modern art forms in literature and dadaist movements in visual arts wherein the psychic pain and emotional outbursts hid in forms so bizarre to the general public as to alienate it almost completely. This goes some way to explain why the revival of the idea of giving emotions if not central than at least a prominent place in the theory and practice of psychology would have to wait until later periods.

1.3.4. 1950s to 1960s - transition period

It is exceedingly rare that in a historical overview of parallel problems a single date stands out as significant in some way for the development of all the concerned disciplines. It so happens, that in the study of emotions in anthropology, psychology, and linguistics in the modern period there is such a date: 1956. In anthropology, the *Language, thought and reality: Selected works of Benjamin Lee Whorf* edited by John B. Carroll was published, and soon became the go-to publication for both the adherents and the critics of the linguistic relativity. In linguistics, Noam Chomsky's landmark presentation at the *Symposium on Information Theory at MIT* marked the start of Chomsky's massive influence on the development of modern linguistics. The same presentation gave birth to cognitive psychology with a marked interest in emotional aspects of the human psyche. The increased interest in emotions as an object of research in psychology eventually brought the rise of reductionist paradigms of investigating emotions with the most prominent example of Paul Ekman's model of universal basic emotions.

The period between 1950s and late 1960s would be remarkable for psychology in one other respect. The mainstream of emotion research in psychology would continue drifting apart from both the relativistic position of anthropology and the increasingly abstract position of linguistics. At the same time it would search for evidence of universality of emotions in remote cultures and different languages. The paradox of investigating emotions in cross-linguistic and cross-cultural environments without linguistic and anthropological expertise to back it up may be obvious to us now, as the history of emotion research begins to come full circle and the revisionist movements make the hindsight approach 20/20. But myopia is the hallmark of every revolution, and revolution in thinking about psychology, about emotions, about the place of emotions in psychology was no less than some of the researchers of this period had in mind.

1.3.4.1. The year 1956

Both popular and scientific communities were well aware of the Whorfian formulation of linguistic relativity before the 1956 publication of *Language, thought and reality*.

The breakthrough in popularization of the subject came not long after Whorf's death, when his 1940 paper "Science and linguistics" (one of the *MIT Technological Review* series) appeared as an appendix in the December 1941 selection of the *Book of the Month Club*, Samuel Ichiye Hayakawa's *Language in action* (Andrews 2008: 122). Though this was the first instance of popularizing Whorf's ideas, it would be Carroll's edited collection that would become the ultimate source for Whorfian theory of linguistic relativity. This would become the go-to definitive reference for every scholar citing the Sapir-Whorf Hypothesis in general. Arguably, Carroll's "Introduction" to the collection had something to do with the deterministic lean in the interpretation of Whorf, as the editor seems to be leaning that way himself (Carroll 1956: 29f). The reputation of the Sapir-Whorf Hypothesis in the deterministic interpretation was definitely not helped by the controversial and enormously popular works by the anthropologist Margaret Mead, especially her 1928 opus *Coming of age in Samoa* (Joseph 2002: 189). It is also worth noting that the general public and the scientific community were at the time highly receptive to the idea of subconscious manipulation through language – the receptivity fed by the popularization of Freudian ideas and the widespread awareness of and disillusionment with the wartime practice of propaganda (Joseph 2002: 190).

The move towards deterministic interpretation of Sapir-Whorf Hypothesis in the scientific sphere, as was already mentioned in the section of anthropology, was likely cemented by Brown's reformulation of Sapir-Whorf Hypothesis into "weak" and "strong" variants in 1958 (Pavlenko 2013). The cumulative result for psychology in general, and psychology of emotion in particular, that with respect to accepting the anthropological evidence of linguistic and emotional diversity psychologists became reluctant at best and disparaging at worst. And although, as Darwin had proposed decades before, the psychological research on emotional expression would be taken to cultures far removed from the Western civilization, no anthropologists would be involved or consulted on the matter of interpreting the evidence gathered.

What happened between linguistics and psychology meanwhile was much more clearly defined, though it was much more drifting apart than a break caused by strong difference of opinions. The drift started with Noam Chomsky's "Three models for the description of language" paper read at the *1956 Symposium on Information Theory at MIT*. This and the presentations by Miller, and Newell and Simon launched the new

sub-discipline of cognitive psychology, which would focus much of its attention on emotions among other aspects of on-line processing (Eyesenck and Keane 1995: 1). For linguistics, in turn, this and the later publications by Chomsky would briefly (about 20 years) enliven the field by promising a simple and systematic solution to the fundamental problem of describing all the complexity and chaos of human languages. This promise, long dubbed impressively as the "Chomskyan Revolution" (Newmeyer 1986: 1), however, dissolved into increasingly abstract, abstruse and fractious argument over the finer details of the Universal Grammmar theory, leading to an increasing undertone of disillusionment of many linguists with Chomskyanism as the mainstream (Droste and Joseph 1991: 1).

By then, however, the damage has been done. Linguistics had drifted away from the rapidly progressing practice of empiricism in social sciences promoted by the milestones set by cognitive psychology and whatever empirical practice existed in the field was on the fringes of mainstream or in collaborations with representatives of other disciplines. Linguistics had, in a word, retreated into Jamesian introspection. The fallout of the situation for psychology, already estranged from anthropology, was that it would pursue inquiries into the nature of emotions, a practice largely dependent on the medium of language, without any linguistic expertise. The attention of mainstream linguistics was simply elsewhere. The discomfort the psychologists felt with respect to the evidence of diversity from anthropology as well as the linguistic nature of the SWH and the isolation of linguistics all would have profound consequences on the emotion research to follow, including arguably the most important movement in the field – Paul Ekman's universal basic emotions theory.

1.3.4.2. From 1956 till Paul Ekman

The period to follow 1956 would be characterized by many of the trends set by Wundt and James and it would be plagued by the lack of free exchange of thought and evidence across the relevant and interdependent fields of psychology, anthropology, and linguistics. There would be the trend of two major opposing theories led by a major proponent on opposite sides of the argument. Thinking about emotions and emotion research would be built around many theoretical and practical dichotomies. There

would be an aim, expressed more or less openly, to find and empirically confirm the existence of a simple universal principle guiding the perception and expression of emotions. Finally, the entire period to follow would for psychology be one practically defined by the Whorfian trap. By Whorfian trap I understand the intended meaning of the most quoted passage of Whorf's writing, the *locus classicus* discussed in the previous section, which was to warn scientists of the danger of arrested progress that comes with not venturing outside the scientific discourse and language of one's own discipline. Throughout the next, third period in psychological investigation of emotions, even when not openly mentioned, the implications of the deterministic interpretation of SWH lurked behind the forceful argumentation in favor of universal psychological, neurological, or neurochemical core of emotions. In other words, as they shirked the evidence form anthropology and failed to connect with the expertise from linguistics, psychologists descended into the Whorfian trap. And it would be the biggest and most ambitious theory of emotion of that period that would best exemplify that descent – Paul Ekman's universal basic emotions, also known as the standard view.

1.3.4.3. Paul Ekman

Few psychologists in history could boast quite the level and scope of academic, professional, and even popular success on par with Paul Ekman. His idea of six universal basic emotions recognizable from the face regardless of cultural or linguistic divisions had an undeniable appeal in the 2nd half of the 20th century in the boom period of emotion research due to its simplicity, easily definable aspects and straightforward nature that translated well into the language of research hypotheses. His Facial Action Coding System (FACS) remains to this day one of the finest tools for the meticulous description of facial expression in existence (Sayette 2001: 168), and has found multiple uses in matters of US national security and defense as well as in commercial environments (Fischer 2013). His ideas about facial cues of deception have even been popularized in lay consciousness through TV shows such as Fox's *Lie to me* (Fischer 2013), and through his popular honors such as being named one of the TIME Magazine's top 100 most influential men in the world in 2009 (Taylor 2009). And although the latter honor was mainly awarded him for his work on deception, his

greatest legacy in psychology has been his big idea about basic, universal, pan-human emotions. That idea went from strength to strength: from a popular new theory in the late 60s, to an introductory psychology textbook standard in the 70s, to canon understanding of emotions in psychology in the late 80s (Russell 1994: 105). His theory of emotions became so entrenched that it became referred to as *the standard view*.

Ekman devoted a great part of his career to the study of emotions. Early on his position was mild and broad-minded, as he attempted to reconcile the early versions of the categorical and dimensional views of emotions by Woodworth and Schlosberg respectively (Ekman and Friesen 1967: 713). At that stage he also incorporated into his model a wider spectrum of non-verbal emotion cues including body language (Ekman and Friesen 1965: 727). However this broad position was soon to be brushed aside by a much more radical idea. That idea was that there exists a set of very specific, but universally human psycho-somatic states which are expressed through a set of very specific facial configurations which are universal for all mankind and – importantly – universally recognized across cultures and languages. This was his initial operational definition for emotions, and in this form it has become most widely known. The basic emotions postulated from the start were: *anger*, *fear*, *disgust*, *sadness*, *surprise*, and *happiness* (Ekman et al. 1969: 87). With this basic premise, as he would later put it, he had set out to "settle the matter [of the nature of emotions] decisively" (Ekman 1998b: 365). The strength of the premise would be in its focus and simplicity that initially did not deny or negate the large body of evidence for cultural and linguistic diversity of emotional phenomena. But its greatest weakness would become Ekman's attitude towards both that central premise and the increasingly critical and inconsistent approach to the peripheral notions of culture and diversity.

The notion of cultural relativity, though peripheral to Ekman's theory as delineated above, has seemingly always been on his mind. Indeed almost from the start he framed his theoretical premise in stark opposition to the evidence and conclusions of anthropology that would lean in the direction of either cultural or linguistic relativity. His attitude towards that alternative account of the nature of emotion ranged from disdainful (see Ekman 1998b: 364 for his opinion on the great anthropologist Margaret Mead) to vitriolic (see Ekman 1994a for his reply to a revision of his results and methodology constructed by Russell).

However, that body of evidence – both linguistic and anthropological – was insistent, and demanded some accounting for if Ekman's theory was to stand as the "decisive" one. Even in his initial work with the Fore he and his collaborators had already noticed a considerable variety in the facial configurations within the limits of definitional features of the proposed six categories of emotional expression. For *anger* alone they found "more than 60 expressions" (Ekman 1992: 172). This variability was interpreted as a type/token phenomenon governed by "display rules" - a number of socio-cultural principles habitually employed in various communities that regulate how the universal basic emotions are expressed in the face (Ekman 1970: 152). The type/token analogy could also be applied to Ekman's account of the variability of the linguistic expressions used in various languages for emotions. The number of those linguistic "labels" for emotions and emotion-like phenomena far exceeded the proposed basic six (e.g. Wallace and Carson's 1973 tally of 2000 emotion words in English alone). Ekman therefore proposed that these linguistic expressions formed semantic families with the basic six emotions at the center, bearing, in a prototype fashion, the necessary and sufficient characteristics for emotion category membership (Ekman 1994a: 19). At the same time, however, Ekman clarified that no single linguistic label can or should be attached to any one facial expression, and he had been using those labels as necessary simulacra to discuss the nature of emotions (Ekman 1994b: 270). The definition of emotions themselves went through some changes throughout Ekman's career.

While the hard core of the six basic emotions (*anger*, *fear*, *disgust*, *sadness*, *surprise*, and *happiness)* never changed, some uncertainties about exactly what constituted the necessary and sufficient characteristics for category membership for each caused some fluctuation in both the number and the definition of the basic emotions. The initial number of necessary and sufficient criteria for emotions to be classified as "basic" was nine (Ekman 1992: 175), but it changed to seven or eight (Ekman 1994a: 19), to eleven (Ekman 1999: 55), and peaked at twelve (Ekman and Cordado 2012: 365). Those criteria ranged from Ekman's original claims of basic emotions having distinct facial expressions to acknowledging the role of appraisals as constitutive parts of emotion and demanding concurrent existence in other primates (Ekman and Cordado 2012: 365). As he developed those criteria, Ekman shifted his position from a radical claim wherein no "non-basic" emotions were allowed and any

phenomenon fitting all his criteria would be classified as "basic emotion" (Ekman 1992: 195) to one where the non-basic, or secondary emotions fit only some of his criteria (Ekman 1994a: 19). The criteria themselves, in turn, while retaining the basic six emotions, made for a much more relaxed and inclusive system and allowed more emotions to fit into the definition of "basic" emotions. The number of those therefore grew to twelve (Ekman 1992: 193), to fifteen (Ekman 1999: 55), to arguably many more as he proposed the existence of sixteen of positive emotions alone (Ekman 2003: 6). Needless to say the number of provisos and conditions added to Ekman's basic theory somewhat clouded the simple focus of the original. And yet Ekman kept active in the field of emotion research, constantly adding modifications to the theory and arguing vigorously with the proponents of alternative theories and his opponents. The opponents, meanwhile, started revisiting and revising Ekman's original results and proposing completely new visions of what the nature of emotions was.

1.3.5. Conclusions for 1950s till 1960s

The period starting in the mid-1950s and stretching well into the 1990s was the most productive, most chaotic, and the most interesting period in the history of emotion research in psychology. Despite the estrangement from anthropology, the long shadow of the deterministic misreading of Sapir-Whorf Hypothesis still hung about the vocal argumentation in favor of universal principles underlying emotional phenomena. Throughout almost the entirety of the psychological mainstream thinking about emotions, discomfort with the need to use everyday terms to refer to emotions was also fairly evident, even if Sapir-Whorf Hypothesis or any relativistic or deterministic ideas were not invoked directly. The period was characterized by reductionist paradigms, numerous dichotomies and multiple theoretical disputes. And the one paradigm that would become mainstream, and would be at the heart of the greatest dispute of the next period was Paul Ekman's universal basic emotions theory, which emerged in the late 60s, whose influence peaked in the 70s, and which continued to lead the mainstream well into the late 80s, when the first big alternative theories started to rise to rival that of Ekman's. The mid- and late 90s saw the first powerful revisionist and integrative movements. Revisionist with respect to the Ekmanian mainstream and integrative with

respect to the major theories of emotion in psychology as well as to the existing evidence from anthropology, especially through the works of James A. Russell and Lisa Feldman Barrett. Still, the period between 1960s and the mid-90s was without a doubt that of Paul Ekman.

1.3.6. Post-Ekmanians

Several aspects of Ekman's prominence in the field of emotion research influenced the way the opposition to his theory formed. His wholesale rejection of the idea of the formative influence of language on thought or emotion, his single-minded devotion to a single-paradigm explanation of the phenomenon of emotions, his insistence on validity through biology, his increasing drift away from practice into theorizing – all these became points of contrastive reference for the new generation of researchers of emotions. Instead of rejecting, they would directly address the issue of interrelationship between language and emotion, they would break with the reductionist approaches to emotion, seek validation beyond biology, and support their theoretical claims with solid research throughout. Working on the fringes of the standard view, this new crop of emotion researchers would slowly work their collective way to the same conclusions and complementary new theories of what emotions actually are. Three names stand out in this new movement: James A. Russell – a meticulous revisionist of Ekman's work and the father of both circumplex model of emotions and of minimal universality; Klaus R. Scherer – who systematized and popularized the appraisal theory of emotions; Lisa Feldman Barrett – who conducted targeted research to reveal the weaknesses of Ekman's methodology and together with James A. Russell formulated the theory of psychological construction of emotion. Klaus R. Scherer's view of appraisal will here be considered as complementary to the psychological construction as eventually formulated by Russell and Barrett.

1.3.6.1. James A. Russell

With the works of James A. Russell the history of emotion research would start coming full circle, back to broad, multiple-level theories in the style of Darwin, James, and Wundt. In his approach, instead of rejecting emotion terms as irrelevant or confounding for the pure reductionist theory of emotions, he placed them in the center of interest. His reasoning behind this reorientation from standard view was thoroughly pragmatic. The subject of psychology was not a mind abstracted, reduced to processing a single emotion; it was a human mind processing incoming emotion episodes on multiple levels, in context, and with multiple references to previous experience and future conjecture about the object of an emotion being processed. And the one key psychology had to unlock the minutiae of that processing was language. Indeed, Russell's operational definition of his research subject has always been very clear: affect defined as "emotion as expressed in language" (Russell 1979: 345).

Russell's openness to all "folk terms" for emotions does not require highly structured ideas like emotion families, or classifications into basic and non-basic emotions. Russell sees emotion terms as referents, mere "guideposts" to meaning (Russell and Barrett 1999: 809). The meaning is a more complicated matter. For Russell, there is no divide between the mental lexicon (mental representation of language) and "mental encyclopedia" (mental representation of knowledge), which allows his idea of emotion concepts to be much more broad and complex (Russell 1991: 428). Emotion concepts for Russell have prototypical organization, with the prototypes representing all salient characteristics of emotion concepts, and the non-prototypical ones representing some of those characteristics – the further away from the center the less. The boundaries of these categories are blurry and overlap with other concepts – not just emotion concepts, but concepts of all kinds (Russell 1983: 1187). Where Ekman sought for a mechanism to explain how different aspects of emotional episodes – from antecedents to facial expressions fit together within his reductionist framework, Russell had no need for such mechanism.

For him, concepts of emotion are complete, coherent "packages," including all contextual, behavioral, somato-sensory, cognitive and affective aspects as well as the linguistic label – the emotion term (Russell 2003: 152). How the conceptually "packaged" emotion is encoded will naturally influence how it is cognitively processed

(Russell 1991: 428). Russell's collaborators have even found some evidence that emotion terms influence how the underlying emotions are processed (Lindquist et al. 2006: 134). The emotion concepts will, according to Russell, vary across cultures and languages, as different historical, geographical, social, and cultural environments will make salient and relevant different aspects of any type of an emotional episode at the historical moment of coding it into language (Russell 1991: 428)[7]. However, whether due to our common human cultural ancestry or our common biological limits, the variation is not limitless, but rather reveals large areas of overlap between cultures, allowing, among other things, for translation equivalence of emotion terms (Russell 1991: 444)[8].

What all emotion terms do have in common are the dimensions of valence (hedonic values of *pleasantness/positivity* and *unpleasantness/negativity*) and arousal (level of activation or intensity) (Russell 2003: 150)[9]. These two dimensions, dubbed "core affect" by Russell form the axes of his circumplex model of affect and are the cornerstone of his Minimal Universality thesis – the idea that the only universal aspect of affective experience is the "core affect". The valence and arousal dimensions were deduced from the many correlations between multiple parameters of semantic meaning of emotion terms (Russell and Mehrabian 1977: 279)[10]. However the redundant dimensions were not rejected, merely relegated to the task of differentiating between emotions as well as between emotion concepts across cultures (Russell and Barrett 1999: 807). For Russell all the dimensions constitute the cognitive aspect of emotion, which allows him to probe those dimensions through linguistic measures (Russell 1980: 1170).

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[7] Russell was aware of the fact this argument was very much like Whorfian relativity and acknowledged the likeness and his awareness of the controversy surrounding the subject (Russell 1991: 428).

[8] However, one should remember that though the translation of the English *anger* may exist in e.g. Arabic, that equivalent may not reflect the same conceptual configuration of salient features, be distributed in everyday usage the same way, or even be the prototypical concept for this emotion in Arabic (Russell 1991: 428).

[9] Russell did at one point become doubtful about the universal nature or the arousal dimension (Russell 1989: 855) as he had come across evidence against it, but eventually he retained it in his circumplex model as it could still be applicable to most cultures and languages.

[10] Initially a third dimension of dominance was also included, but was later abandoned as ill-supported by the evidence by Russell (Russell and Mehrabian 1977: 291). It survives today in the works of the University of Florida Media Core, with various research groups led by Margaret M. Bradley and Peter J. Lang (dominance measures feature prominently in their open databases such as IAPS and IADS).

Core affect, though composed of two measures is subjectively perceived as a single inner state (Russell 2009: 1264). Russell describes core affect as a type of continuously active (Russell and Mehrabian 1977: 274) internal biocognitive barometer tuned to all somato-sensory inputs responding to all disturbances in the equilibrium (Russell 2003: 149). The disturbances can become large enough to break into conscious thought and prompt behaviors that would sustain (for the pleasant) or dumb down (for the unpleasant) stimulation (Russell 2003: 157). Because it represents a very basic and primitive kind of processing, core affect appears to be generalizable to other cultures and languages (Russell 1989: 852). In other words, core affect is Russell's take on the universal principle underlying emotion.

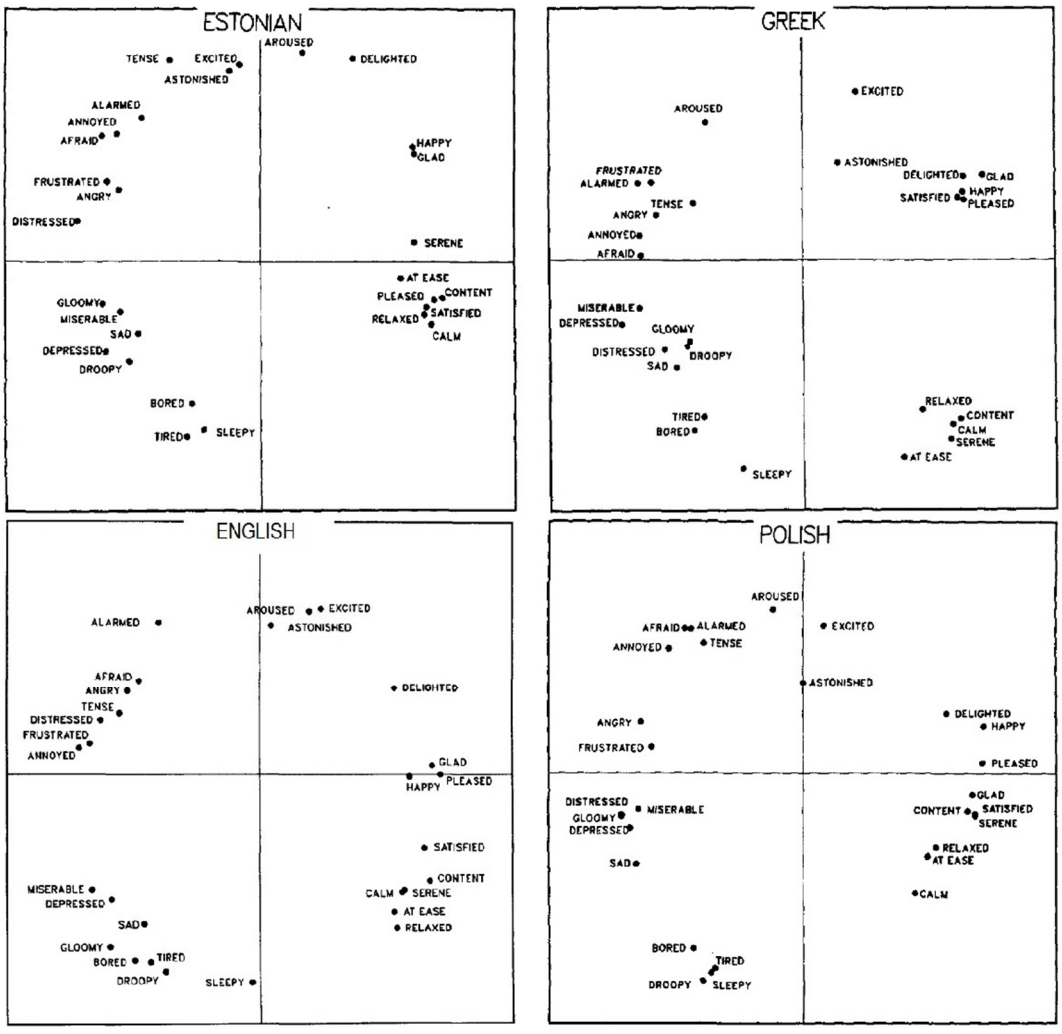

Fig. 1. English, Polish, Estonian and Greek circumplex models of emotion.
Adapted from Russell, Lewicka, and Niit 1989.

This is Russell's Minimal Universality – the idea that there indeed exists a certain aspect of emotional experience that is universal for all mankind, but that aspect is the basic core affect, not Ekman's structured and heavily conditioned basic six emotions (Russell 1995: 380). Russell's core affect classification needs no necessary or sufficient conditions for classification because it exists on such a basic level of processing, that category classification is a matter of resemblance to prototype rather than an absolute one based on fulfilling set criteria (Russell 2009: 1275). However, Russell's model does not reject Ekman's ideas; he incorporates the idea of basic emotions into his model as a product of a higher-order cognitive-affective processing and classification in his advanced form of psychological construction model of emotion developed with Lisa Feldman Barrett (see below). On the most basic applied level, the Minimal Universality, or core affect is measurable through the circumplex – a graphic scalar representation of valence and arousal on *x* and *y* axes respectively, allowing a researcher to plot emotion terms and concepts for purposes of comparison (Russell 1980: 1161).

The examples in Figure 1 on the previous page illustrate several of Russell's points. One, across different cultures and languages we are capable to find close enough translation equivalents of emotion terms to warrant valid comparisons between them. Two, the terms can be evaluated universally on scales of arousal and valence and plotted onto the circumplex. Three, the points of intersection of valence and arousal measurements of those apparently equivalent terms differ (often significantly) across cultures and languages. Four, the two dimensions of valence and arousal alone cannot account for the cultural variation of the apparently equivalent terms. What can potentially account for the variation, says Russell, are the dimensions beyond the scope of Minimal Universality, dimensions best described and accounted for in appraisal theories of emotion (Russel and Barrett 1999: 807). Appraisal theories are, especially in the incarnations before Component Processing Model (CPM), to a large degree overlapping with Russell's Minimal Universality and Russell and Barrett's psychological construction. And however little explored in detail in empirical works, the central assumptions of appraisal appear capable of accounting for a lot of cultural variability of emotions.

1.3.6.2. Klaus R. Scherer

Klaus R. Scherer has been a powerhouse of appraisal theory research for the better part of the last 45 years. Collaborating with some of the greatest names representing a variety of approaches to emotion, notably with Paul Ekman and James A. Russell, his work ranged from purely theoretical through empirical to building models of emotional processing. However, Scherer's late period including his Component Processing Model (CPM) will not be considered here, as that aspect of Scherer's work had no bearing on the development of the methodology for this thesis (for a most up-to-date and complete version of CPM see Scherer 2009). I will focus instead on his position on the universality vs. cultural specificity of emotions debate, which not only complements Russell's account, but has potential for reconciling the evidence for both sides of the debate through a data-driven approach.

The mid-90s saw a sea change in the general attitudes towards the standard view. It was becoming evident that the view is too narrow, too rigid, reducing the rich emotional experiences to the lowest common denominator of just recognizing a limited number of emotional expressions with accuracy well over chance level. With revisionist analyses of the methods, the results, the interpretations and generalizations of the results on the one hand and a wish to expand the knowledge of emotions beyond the above chance recognition of emotion (the standard result of the standard view approaches) researchers increasingly begun to turn back to anthropology for explanations. There was a measure of variability in emotion recognition scores across cultures that, while not compromising the above chance universal recognition, could not be explained very easily within the standard view.

Scherer, on the cusp of this new wave, noted the problems that a reconciliation of anthropology and psychology would cause and pointed out the possible empirical solution to serve the reconciliation. He noted, first of all, a fundamental problem of comparison between the evidence of anthropology and psychology. As they were working with different agendas, using completely different methods, the evidence generated by both fields had no *tertium comparationis* that would allow for valid and meaningful comparisons across the disciplines (Scherer 1994: 326). Anthropology documented diversity through voluminous case studies – rich in detail, considerate of context, focused on the meaning and function of emotion terms for the investigated

cultures yielding works of high ecological validity but lacking in systematicity across studies (Scherer 1994: 311). Psychology searched for universality through cross-cultural experimentation – focused on isolated aspects of expression, working without context and treating emotion terms more as a confound than a help, yielding works of low ecological validity, but high systematicity, allowing for comparisons across multiple studies (Scherer 1994: 312). However, Scherer also saw there were some general areas of overlap between the bodies of evidence; they were not impossible to reconcile. He noted that however focused on diversity anthropology was, there was enough universality in emotion terms reported for the anthropologists to comprehend and explain them. However focused on universality psychology was, in turn, there were still variations in the recognition scores in the standard view (Scherer 1994: 326). In other words both sides provide some evidence for both diversity and universality. The question became: how to define and measure the levels of diversity and universality? Scherer proposed that the measure for both could be appraisals.

Appraisals are best described as frameworks of cognitive-affective processing. They are complex, preconscious culturally habituated mappings of how we mentally and emotionally evaluate reality by pointing our attention to certain salient aspects of that reality (Ellsworth and Scherer 2003: 586). Appraisals include the basic perceptions such as the novelty of a stimulus (Ellsworth and Scherer 2003: 576), its intrinsic pleasantness (Ellsworth and Scherer 2003: 577), as well as complex perceptions such as needs and goals under the common category of motivational bases (Ellsworth and Scherer 2003: 578); sense of power and the capability to cope (Ellsworth and Scherer 2003: 580); identity, moral norms, personal values, and sense of justice – all under the category of social dimensions (Ellsworth and Scherer 2003: 581). All of the above appear consistently throughout appraisal theory of emotions, forming what Scherer calls "the backbone of the appraisal system" (Ellsworth and Scherer 2003: 582). They are also, as evident from the list above, a profoundly heterogeneous group somewhat reminiscent of the Maslovian model of needs, wherein almost any appraisal dimension mentioned could very well be an individual area of study.

According to Scherer, the basic appraisals, "the backbone," collectively constitute the concept of self. The self is not an isolated entity, but rather is embedded in multiple overlapping contexts: historical, geographical, cultural, social, economic, and these contextual forces shape the self in various ways. This molding of the self by

larger forces is, according to Scherer what causes the cultural differences in the expression and perception of emotions, and as appraisals determine the self, the measure of cultural diversity of emotions can be assessed through appraisals (Scherer 1997: 903). Scherer also proposes, that the most basic, primitive appraisals such as pleasantness, activity, attention or coping capability (which seem to partly overlap with Russell's basic dimensions) are universal for all mankind, as they are biologically based and conditioned by mechanisms of adaptive fit (Scherer 1997: 904). On the other hand, the more complex the appraisals, the more diversity effects will be evident, the greatest showing for appraisals such as morality, fairness, or external attribution of causation (Scherer 1997: 917). Additional weight to these claims is lent by the fact that the acquisition of cultural norms in the course of education appears to significantly influence the data – the longer the exposure to culture and education the stronger and more entrenched the culture-specific (as opposed to universal) appraisals become (Scherer 1997: 904).

Appraisals, especially understood as components of the self can indeed serve as a methodological bridge, a valid measure of the aspects that truly define what cultural diversity in emotion expression and perception is and how to measure it. There are aspects of Scherer's view of appraisal specifically that would be accepted by Ekman and by Russell. Scherer's notion of "push" and "pull" effects, where in human physiology "pushes" an emotional expression out, and cultural norms "pull" them into acceptable forms is very much like Ekman's idea of display rules controlling emotional expression in social environments (Scherer 2011: 423). And yet at the very core of Scherer's appraisal, universal for all mankind are the appraisal dimensions of pleasantness and activity – in parallel to Russell's valence and arousal (Fontaine et al. 2007: 1054). However, a proper systematic study which would assess the level and pattern of culture-dependent appraisal-based differences between at least two cultures on the subject of even the most basic emotions is, to my knowledge, yet to be conducted. It is not surprising, as such a task would require a complex interdisciplinary approach, with massive involvement of culture studies, history, linguistics (with a special emphasis on pragmatics and discourse analysis) and possibly philosophy to complement the stringent qualitative approach of psychology. Still, even in its present stage, appraisal theory may serve to explain some of the culture-dependent variation in

the existing and emerging data from psychological and psycholinguistic research on emotions.

1.3.6.3. Lisa Feldman Barrett

Lisa Feldman Barrett and James A. Russell have a lot in common. They both were struck by the increasingly apparent inadequacies in the standard view, and it influenced their own research on emotions profoundly. Both have conducted theoretical reappraisals of the standard view and empirical research aimed at highlighting the weak points of the approach. They have collaborated on refining their vision of psychological construction theory of emotion, and Russell's idea of core affect became one of the core elements of Barrett's Conceptual Act Theory (CAT) of emotions. However, with respect to the degree of influence, it could be said of Russell that the standard view informed his research, but for Barrett the inadequacies of the system became the defining contrastive features of her own view of emotion research. Theoretical, methodological and empirical – every aspect of the standard view, Barrett contrasted them all in building her own approach. There are, in fact, two distinctive sides of Barrett's theory of emotion. On the one hand, there's her critique of the standard view, pointed and empirically backed, often to the point of revisiting the same populations Ekman had worked with to prove his universality thesis. On the other hand, there is her own Conceptual Act Theory which has grown in equal parts out of the criticisms leveled against the standard view and the conclusions and interpretations of the revisionist movements such as those represented by Russell and Scherer.

Most of Barrett's critique of the standard view centered on different aspects of its methodology and assumptions that weakened its ecological validity, mainly on the reductionist framework of the emotion recognition framework, the westernization and English-centricity of it, and the negligence of language and context as factors in emotional processing. Vast majority of research in the standard view is based on a highly specific steps in the method. Still pictures of actors instructed to pose basic emotions are presented to a group of participants instructed to sort the pictures into categories defined by the basic emotions. This setup, though convenient, admirably simple to replicate, and allowing for multiple cross-cultural comparisons nonetheless

practically depends on the participants obeying demand characteristics (Barrett 2006: 38). Working with her collaborators, Barrett has since shown that once the six-way categorization framework for emotions is removed, relativistic effects set in, and participants categorize according to their own categorization schemata based on behavior or valence, rather than on the Ekmanian categories (Gendron et al. 2014: 259).

Furthermore, the six-way division of the basic emotions, Barrett points out, rather conveniently rests on the assumption that the prototypical categories of English *anger*, *fear*, *disgust*, *sadness*, *surprise*, and *happiness* are universal, in that equivalents of these words may be found in virtually all human languages. This assumption fails to note that translatability does not equate with semantic or functional identity of the words (Barrett 2011:370). As her team's analyses indicated, allowing participants to use any words they see fit to describe an emotional expression or removing the linguistic categorization altogether by having participants merely match and contrast different facial expressions according to emotions expressed on them reduces the recognition rates significantly (Gendron et al. 2012: 314). Further still, Ekman vocally denied that language has anything to do with emotion expression in the face (Ekman 1994b: 270). In response, Barrett's team has shown that shutting language down hampers the processing of even the most prototypical of facial expressions (Lindquist et al. 2006: 381). Finally, the ecological validity of the standard view suffers from its focus being reduced to the front-oriented facial expressions only, only occasionally venturing into investigating vocal emotion expression for disambiguation of facial expressions (Ekman 2003: 6). Barrett's team, in contrast, has shown that various social and physical contexts contribute significantly to how emotions are processed, and coincidentally, that such processing is dependent on widely distributed cortical networks, the patterns of activation reflecting the variability of the situational processing more than regular patterns predicted by the basic emotions (Wilson-Mendenhall et al. 2011: 1120). All in all, from her targeted research, Barrett knew that methods in the standard view are inadequate, that different cultures conceptualize and categorize emotions differently, that language plays an important role in the conceptualizing and categorizing process, and that the context of the processing matters. Her own theory would incorporate all of those considerations and more for a new integrative model of what emotions were, exactly.

The Conceptual Act Theory was an answer to the protracted disputes surrounding the dichotomies at the heart of emotion research (for an overview of all the dichotomies see Lutz and White 1986), as well as an ambitious attempt to account not just for single manifestations of emotions, as in the standard view, but for the entire phenomenon and all its instances (Barrett 2006: 28). The "Conceptual" part of the name of the approach, incidentally, does not mean Barrett leans towards a cognitive explanation[11], rather it refers to the idea of emotion concepts, which are one of the fundamental ideas behind the Conceptual Act Theory. There are three major factors at play in this approach: context, the distinction between emotion and emotion concepts, and language.

Context is a complex notion, referring to at least three levels of analysis: the context of the stimulus, which contains all the information relevant to and concurrent with the stimulus; the context of culture, which sets the cultural and social norms for emotion expression; the context of the perceiver, which encompasses the subjective perspective influenced by the sensations and processes in the body and mind (Barrett et al. 2011: 286, Barrett 2012). All of these contexts are processed and conceptualized to collectively become a body of knowledge of the situations, circumstances, events, agents, objects and relationships between all of the above that define the concepts of emotion. In other words, all we know about emotions from past experiences from what we subjectively feel through what causes it, down to how our culture and language classifies and codifies these experiences constitutes emotion concepts (Barrett et al. 2011: 364).

Anger, *fear*, *disgust*, *sadness*, *surprise*, *happiness* and all the other emotions not included in the standard view are just that – emotion concepts. Such broad and inclusive understanding of what constitutes an emotion concept echoes Russell's rejection of the division between mental lexicon and other types of knowledge. Furthermore, also in accord with Russell, Barrett considers emotion terms an integral and critical part of the emotion concepts – words allow to organize the broad, fuzzy-boundary concepts of

[11] Indeed, in an approach so insistent on sweeping aside almost all past divides and ossified ways of thinking, Barrett remains faithful to this one remarkably persistent tradition in psychology: idiosyncratic understanding of terms with a corresponding lack of a single source that would organize and systematize her definitions and the relations between them. Russell, incidentally, however riveting his writing style, had the same problem.

emotion into coherent, identifiable mental objects, which can be talked about, measured and learned (Barrett et al. 2011: 370).

Because we acquire our cultural notions of emotions through language, words specific to that language even have the power to shape our concepts of emotion depending on how our languages and cultures define given emotion concepts (Barrett et al. 2011: 287, Barrett 2011: 370). As for emotions themselves, for Barrett they are not discrete, preexisting, or innate categories, but rather ad hoc constructs of various psychological primitives that together produce the experience we call "emotion" (Barrett 2006: 49).

At the base of Barrett's idea of emotion is Russell's core affect, working as it did in his view, as a kind of barometer continuously monitoring all the contexts and responding to incoming stimulation (Barrett 2011: 364). Core affect associated with a stimulus activates relevant emotion concepts along with the words which denote them, and the result is a subjective experience of emotion (Barrett 2012: 420). All in all, incorporating core affect from Russell, basic emotion terms from Ekman, and notions of cultural learning reminiscent of Scherer's core idea of self, Conceptual Act Theory is the most complex and ambitious integrative paradigm to date. Its greatest strength is that it is, for all its complexity, viable and testable. On the other hand, its greatest weakness is that as a newly established theory it has yet to accumulate a body of evidence that would allow it to be more widely accepted.

1.3.7. Conclusions for the Post-Ekmanians

The historical overview above incorporates merely those threads of the classic psychological thought on the subject of emotion that had the greatest influence on the contemporary models of emotion processing, and which had a bearing on how the methodology for this dissertation was constructed. Both the theory and practice of emotion research offer a virtually limitless variety of smaller considerations, subjects, and methods. The aim of this overview, however, was to indicate how the attitude towards studying emotions in psychology changed from initial complex models through reductionism back to complexity again. These changes defined the entire discipline of psychology including the small field of emotion prosody which will be the main focus

of this dissertation. The history of thinking about emotions and the research on emotions in psychology has long been marked by shifting attitudes towards the linguistic relativity hypothesis. The forefathers of psychology expressed their acceptance of the idea that there is more to emotion than whatever is felt and perceived, that issues like culture and context play a role.

The reductionist paradigms with Paul Ekman's basic emotions in the lead, rejected linguistic relativity and all its assumptions, but over time were forced to try and accommodate the persistent and sound evidence favoring the theory they were so ill at ease with. Being in opposition to the conclusions of anthropological studies of emotion, though not always openly stated, was the norm in the psychological study of emotions. And such attitude would dominate psychology for the better part of the 2nd half of the 20th century. It would take almost 40 years for psychologists to realize that the reductionist paradigms are vastly insufficient when generalized to account for emotions in general. Psychological construction, though an appealing notion, is still in its initial stage of development and will need much refinement and even more data from systematic research to be universally accepted as a valid model of emotional processing. Russell, Scherer, and Barrett all reached the same conclusion with respect to how this new data should be collected. Namely, however imperfect or contradictory, we should seek to use all leading paradigms – dimensional, categorical, and appraisal to construct a complex, data-driven description of emotions within and across cultures. Only by systematically investigating the patterns of data from all these paradigms from the same populations and using the same materials will we be able to establish points of intersection between all the paradigms. And that, at last, may reveal not only the long-sought *tertium comparationis* between the paradigms, but a better understanding of what emotions truly are, as well.

1.4. The potential of linguistics for emotion research

Aside from its long-term devotion to preceding empirical ventures with solid theoretical groundwork, which distinguishes it from both anthropology and psychology, 20th century linguistics has been influenced by events and earlier developments largely in parallel to both of those disciplines. Like anthropology, modern linguistic thought has

grown out of the developments in the field in the 19th century, and like psychology, its course of development has been affected considerably by the life and works of Noam Chomsky. The 19th century legacy of Saussurean structuralist thought and its progression into the Chomskyan Universal Grammar have set the field of linguistics in its own unique direction (Joseph 2002: 48). The questions of self-definition within or against the Chomskyan mainstream splintered the monolithic discipline of linguistics into specialized sub-disciplines, each with its own methods, assumptions, and agendas (Joseph 2002: 63). The result of this splintering is that linguistics, while united by the core interest in language as a medium of communication, offers a multiplicity of perspectives on specific communication problems, the communication of emotions among them. This approach has produced a few approaches and theories which may serve to complement and explain some of the confounds within the psychological and anthropological body of evidence for and against emotional relativity (see Perlovsky 2009).

The first half of the 20th century in linguistics was dominated by Saussurean structuralism. Despite his death in 1913, Ferdinand de Saussure became, in a way, a teacher to all linguists of the period (Joseph 2002: 48). The metaphor is hardly an exaggeration, as Saussure's only major publication was a collection of his lectures recorded, edited, and published by his students and colleagues (McCabe 2011: 5). Until Saussure came along, linguistics has been quaintly devoted to diachronic (historical) perspective on language, with questions such as origins of languages, words, and grammars dominating the field. Saussure's novel approach echoed some of the language-thought dynamic focus of anthropology, and pointed to a synchronic approach (focusing on the contemporary mechanisms of modern languages) to language as the necessary course for linguistics to take (McCabe 2011: 6)[12].

The major theoretical axis of the Sussurean structuralism was the division between *la langue* and *la parole*. *Langue* was the structure – the lexicon and the rules of grammar of which every speaker of any given language was possessed; the formal linguistic competence of a speaker. *Parole* was the functional act of using the competence of langue in everyday linguistic communication; the performance of

[12] Incidentally, Saussurean structuralists picked the Indo-European language family as the main object of their empirical interest. This move prompted the American anthropological linguists of the Boasian tradition to turn to Amerindian language family instead (Joseph 2002: 50).

language by a speaker (McCabe 2011:7). Within his synchronic approach, Saussure insisted that linguistics as a discipline should focus on *langue* as the perfect underlying structure of the contextually dependent and highly variable *parole* (Joseph 2002: 53). The structuralists of the first half of the 20th century advanced the idea of abstracting from the performative, functional aspects of speech (*parole*) and towards idealized, model aspects of language (*langue*), effectively paving the way to what linguists have since have begun calling the Chomskyan revolution (Joseph 2002: 55).

The Chomskyan revolution in linguistics is not usually dated back to the 1956 MIT Symposium as the birth of cognitive psychology is (Eyesenck and Keane 1995: 1). And although linguists usually point to Chomsky's later works as the driving force behind turning Chomskyan linguistics into mainstream for all linguistics, that first presentation already contained the fundamentals of the theory. Funded by US Department of Defense (Chomsky 1956: 113), Chomsky's early research was dedicated to the development of computing languages for the fledgling computer science (Joseph 2002:60). Chomsky's 1956 presentation already set a new goal for the science of linguistics – of describing an idealized "Language", an object unbiased by performative aspects of communication, with the kind of systematic simplicity and rigor that was the norm in mathematics (Chomsky 1956: 114). Chomskyan linguistics would pursue this basic premise into ever more abstraction from semantics, pragmatics, and any aspect of actual language use, favoring instead the idea of a perfect "deep structure" of grammar carried by the idealized speaker-hearer (Joseph 2002: 64). The mature Chomskyan thought in its mentalistic approach to language as a phenomenon rejected the communicative aspects of language altogether (Allan 2009: 303), which goes some way to explain why problems such as social interaction or emotions rarely graced the mainstream linguistics in the second half of the 20th century.

But whereas the Chomskyan mainstream drifted away from the problems of interpersonal communication, other sub-disciplines of linguistics picked up the subject and made it their own. Sociolinguistics focused on broad sociological context of the human condition and its impact on the performance of language, coincidentally forming a bridge between anthropology and linguistics (Duranti 2003: 326). Semantics, especially in the advanced theoretical form proposed by Anna Wierzbicka linked linguistic investigation of meaning with psychological primitives (Goddard 2003: 405). Semiotics as a study of the correlations between linguistic signs, semantic meaning and

the relation of both to objective reality developed some ideas which could potentially explain some of the problems of reference in the psychological study of emotions and emotion terms. And linguistic pragmatics focused first traditionally of the conventions of interpersonal communication and the rules of successful communication and progressed to explaining the mechanisms of making sense of a multi-layered and complex contexts of human communication. Each of these disciplines, but especially semiotics, semantics, and pragmatics have the potential to inform and advance emotion research, and each will be discussed below in details pertaining specifically to its usefulness in emotion research.

1.4.1. Semiotics

Allan (2009: 5) proposes that there are four ways of studying language: in its physical manifestations as gestures and sounds, in the abstractness of its arbitrary forms, in its cognitive components, and in the ways it serves interpersonal communication. Semiotics encompasses three of these dimensions: the abstract and arbitrary linguistic signs (words), the mental representations of reality (concepts), and interpersonal communication through its situation in objective reality (reality) (Nöth 1995: 79). Semiotics is, in other words, the study of linguistic signs, their meaning and their relation to reality. It is based on the assumptions that signs themselves are arbitrary, meaning that their meanings are based on cultural, social, and communicative consensus, and that objective reality is implicated in meaning in an indirect fashion (Nöth 1995: 240). The signs point to objective reality meaning but have no inherent connection to them.

The best known and the most widely accepted model of semiotic meaning is that proposed by Ogden and Richards as early as 1923 (see Fig. 2), which furthermore echoes a formal meaning relationship described within the classical Greek traditions of the Stoics in 2-1 century BCE (Allan 2009: 61). This idea of keeping the domains of objective reality, language, and thought separate and distinct but connected is a potentially very useful notion for the description of emotions. An arbitrary, language-specific word relates to a concept of emotion formed by observing and experiencing objective reality within social communicative context. There is an indirect

relation between the word and the reality (dotted line), and direct relationships between word and thought and thought and reality (Ogden and Richards 1923: 11f), which speaks to Paul Ekman's basic claims of a referential nature of meaning of emotion terms. The direct connection between word and thought echoes the concern with the role of emotion terms in the formation of emotion concepts expressed by both Russell and Barrett. The direct connection between thought and reality in turn appears to be in agreement with the claims of both appraisal theorists and linguistic anthropologists insisting on the impact of cultural and social dimensions on emotional communication. The notion of the semiotic triangle, however, did not penetrate into psychology, some claim, due to the field being dominated at the time by behaviorism which eschewed all issues pertaining to emotion, language, or meaning (Barrett 2011: 361).

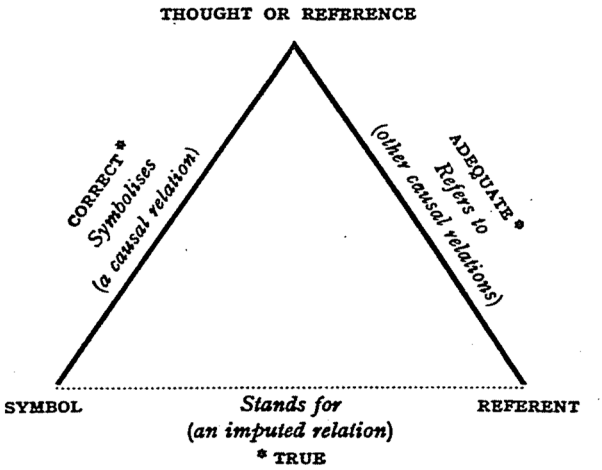

Fig. 2. The semiotic triangle. Adapted from Ogden and Richards 1923: 11.

Semiotics has potential for the study of emotions, if only to resolve the confounds between what emotions are called (words), how they are understood (thoughts), and how they are felt (the objective somatic reality). It may serve to organize and systematize to problem of defining emotions, by including, rather than excluding certain aspects of emotional experiences and processing. A definition of any emotion defined as an entity composed of concepts formed through specific perceptions and experiences of reality and referred to by an arbitrary emotion terms might be a practical solution for the future descriptions and research of emotions.

1.4.2. Semantics

The name of Anna Wierzbicka can be found mentioned in passing throughout both the anthropological and psychological literature on emotion research. The only linguist to be thus honored, her work has always had a broad interdisciplinary appeal due to her insistence on integrating psychology, anthropology, and linguistics into a one cohesive theory of communication (Wierzbicka 1986b: 585). During over 50 years of steadily productive academic career, she developed a framework known as the Natural Semantic Metalanguage, which combines a deep concern for the influences of culture and context on meaning with the postulates of universal core semantics existing in all languages. Importantly for the potential problems of integrating the efforts of both anthropologists and psychologists in emotion research, she brings into the discussion linguistic evidence for both universality and cultural relativity of emotion terms and clarifies, in semantic and pragmatic terms, the whys and wherefores of the dichotomy.

The Natural Semantic Metalanguage (henceforth: NSM), is a system of perceptual primitives, which are supra-linguistic and universal, hypothetically lexicalized in all human languages, and limited only by the biological and cognitive makeup of the human animal. Usually lexicalized in English in Wierzbicka's writings, the NSM is nonetheless not language-specific. Indeed, Wierzbicka has always been openly critical of the English-centric focus of research involving language and meaning (Wierzbicka 1986a: 585). Hypothetically, every element of the NSM has a 1:1 translation equivalent in every human language, thus constituting a collection of irreducible lexicalized perceptual categories, which can be used to describe any concept (Wierzbicka 1980: 3). One of the latest formulations of the NSM contains the following collection of primitives:

Table 1. Hypothetical universal semantic primitives according to Wierzbicka'a Natural Semantic Metalanguage. Adapted from Wierzbicka and Harkins 2001: 12.

LEXICALIZATION CATEGORY	UNIVERSAL PRIMITIVE
Substantives	I, YOU, SOMEONE (person), SOMETHING (thing), PEOPLE, BODY
Determiners	THIS, THE SAME, OTHER
Quantifiers	ONE, TWO, SOME, MANY/MUCH, ALL
Attributes	GOOD, BAD, BIG, SOME
Mental predicates	THINK, KNOW, WANT, FEEL, SEE, HEAR
Speech	SAY, WORD, TRUE

Action, events, movements	DO, HAPPEN, MOVE
Existence and possession	THERE IS, HAVE
Life and Death	LIVE, DIE
Logical Concepts	NOT, MAYBE, CAN, BECAUSE, IF
Time	WHEN (time), NOW, AFTER, BEFORE, A LONG TIME, A SHORT TIME, FOR SOME TIME
Space	WHERE (place), HERE, UNDER, ABOVE, TOUCH (contact), BELOW, FAR, NEAR, SIDE, INSIDE
Intensifier, Augmentor	VERY, MORE
Taxonomy, partonomy	KIND OF, PART OF
Similarity	LIKE

Wierzbicka thinks of the NSM as the "bedrock of intellectual understanding" (Wierzbicka and Harkins 2001: 9), a panhuman core of meaning which because of its primitive nature is fundamental and potentially lexicalized in every language. Contrary to the accepted research practice in her field, she does not believe that only scientists can intimate the nature of emotions, and insists that the laypeople are the best informers on that subject (Wierzbicka and Harkins 2001: 10). The NSM presents an interesting case in that it is a tool built on universal principles but designed to describe differences rather than similarities between languages and cultures, the limited "vocabulary" of the NSM allowing to define points of semantic divergence clearly (Wierzbicka and Harkins 2001: 16). Wierzbicka includes the good/bad primitives in her framework, agreeing with Russell and Barret on the universal character of this very basic dichotomy. Regarding emotions in the sense accepted within the standard view, she believes them to be too complex to fit logically within the NSM. The only emotion she believes to fit universally within the biological and cognitive limitations of mankind is *suffering* (Wierzbicka 2004: 34). *Happiness*, on the other hand, she considers not to be universal – neither phenomenologically nor experientially (Wierzbicka 2004: 37).

For Wierzbicka emotions permeate all aspects of communication, both verbal and non-verbal (Wierzbicka and Harkins 2001: 18). In the course of its linguistic development, each language community is led to lexicalize different emotion concepts within the biological and cognitive limitations of the human species and according to the societal and environmental needs and pressures of the community (Wierzbicka 1986b: 350). The Ifalukian emotion system and the growing out of *anger* in the Utku communities are examples of how varied the results of such historical process can be. Not lexicalizing an emotion concept, however, does not preclude the members of a

given culture form feeling that emotion – they may simply communicate it differently, by proxy of metaphor or circumlocution (Wierzbicka 1986s: 587). Where the boundaries between distinct emotion concepts lie and whether they exist at all for a given culture will necessarily be language-specific (Wierzbicka 1986a: 590). Wierzbicka reports, for instance, cases of Australian aboriginal languages lacking the distinction between *shame* and *fear* and thus unable to perform at predicted levels in the forced choice paradigms of the standard view research (Wierzbicka 1986a: 593).

How emotions are communicated through language, how they are lexicalized matters significantly according to Wierzbicka (Wierzbicka and Harkins 2001: 4). For each language community whether an emotion concept is lexicalized or not, and whether it is lexicalized in emotion terms, metaphors, collocations, or through other linguistic means (Wierzbicka 1998: 457) will constitute and reflect that community's "habits of the mind" and "habits of the heart" (Wierzbicka and Harkins 2001: 17). Such habits may manifest themselves differently in two ways: either in optional features of grammar, or through any aspects of language and grammar that deal directly with the social relations within a given community (Wierzbicka 1986b: 351). The former are exemplified by forms of address from honorifics to diminutives – all fulfill the function of pronouns, but it is their meaning that carries social and cultural significance. The latter is expressed through interjections, emotive and taboo vocabulary, differential use of rhetoric, illocutionary forces, and speech acts (Wierzbicka 1986b: 352). Furthermore, variations in body language and tone of voice in the non-verbal channel are also expressions of culture variation of emotional expression (Wierzbicka and Harkins 2001: 17). All levels of language – from simple linguistic coding involved in lexicalization of emotion concepts to language-specific phraseology and body language – are implicated in the communication of emotions, and all are subject to cultural and linguistic variation.

Two aspects of Wierzbicka's framework have great potential for emotion research. One is the NSM, which combined with the semiotic triangle could potentially become a great tool for systematic cross-linguistic studies of emotion concepts. The other is her focus on the broad linguistic and pragmatic dimensions heretofore neglected by the emotion research (Wierzbicka and Harkins 2001: 2). Almost the only aspect of language considered in the mainstream theories of emotion is emotion terms. And these, while telling and interesting, are by far the least complicated and expressive of emotion

aspects. They are mere labels put to concepts and phenomena for purposes of categorization and coping. Almost all the other means of communicating emotion from the non-verbal channel to phraseology are more complex, more natural, and more abundant. Emotions are expressed, repressed, understood and misunderstood, interpreted on-line and always in context and through cultural and linguistic filters. To reduce our investigations of emotions to mere acts of recognition or simple dimensional description is to miss the point of significance of emotions for human beings altogether (Wierzbicka 2002: 401).

1.4.3. Pragmatics

Context, the main focus of interest of pragmatics has been invoked multiple times throughout this review. Anthropology referred to cultural context, psychology to situational context, linguistics – to objective reality. Pragmatics itself has a great tradition of theoretically grounded research and applied research and has recently developed a number of strictly empirical approaches. It is also in almost every respect a departure from the Chomskyan mainstream in linguistics. Pragmatics deals with the functional, contextualized, and natural aspect of language rather than the abstract ideal pursued by Universal Grammar (Sperber and Wilson 2012: 1f). Meaning in pragmatics is relational, that is based on the kind of relationship described by the semiotic triangle, not inherent to any one object, concept, or word (Allan 2009: 349). The functional center of any pragmatic theory is a contextually situated agent inferring the meaning from the communicative signals and the context in which they occurred (Sperber and Wilson 2012: 3). This agent experiences, expresses, and infers the meaning of emotions in a rich interactive context of social communication. The forms of emotional expression of language being so immensely varied (Wierzbicka 1998: 457), the process of inferring meaning from what is and is not said, how, when, and to whom demands certain mechanisms which would systematize the inference process. Pragmatics is the discipline which explains those mechanisms.

1.4.3.1. Pragmatic dimensions of emotion

A good argument could be made that linguistics in general and pragmatics in particular is the only discipline to consider emotions as communication. Anthropological linguistics focused on decoding unique meanings of culture-specific emotion words, psychology on emotion recognition from specific signals. While anthropology did concern itself a broader scope of linguistic expressions than did psychology, the majority of research in both disciplines was based on the assumption that the understanding of emotions is based on clear and explicit signals – emotional expressions. Pragmatics includes the investigation of the implicit meaning, which has a wider scope than the explicit meaning. Explicit meaning is limited to whatever information is conventionally coded within a signal (Wilson and Sperber 1993: 15). Implicit meaning is communicated, but not overtly expressed, it is a meaning contained in what is not explicitly stated and encoded (Sperber 1994: 180). Implicatures, that is meanings communicated implicitly, may be conveyed in what is or isn't explicitly communicated, how it is communicated, and when – in other words it is meaning situated and dependent on the context in which it is uttered (Wilson and Sperber 2012: 11). Implied meaning is connected to the idea common for both pragmatics and the appraisal theories of emotion: that emotions can and often are deployed strategically and that this kind of emotion communication is a vital part of everyday emotional experiences (Janney 1996: 254).

The communication of emotions relies by and large on implicit, rather than explicit communication, meaning that when emotions are concerned the propositional content offered by speech may not be decisive in how emotions are interpreted (Janney 1996: 273). The implicit/explicit distinction in communication is not equivalent to the verbal/non‑verbal distinction, as both *implicatures* and *explicatures* can be both verbal and non‑verbal (Sperber and Wilson 2012: 11). A pointed silence in response to a question is as much an explicit communication as selecting a euphemism over an expletive an implicit communication of emotion. On the receiving end of emotional expressions, our understanding of the explicit and implicit signals is guided by mechanisms described within Relevance Theory. The Relevance Theory has been developed for the wider context of interpersonal communication, but it can easily be

extended to the communication of emotions. The Theory rests on the *Cognitive* and the *Communicative Principles of Relevance*:

> "*The Cognitive Principle of Relevance*
>
> Human cognition tends to be geared to the maximum of relevance.
>
> *Communicative Principle of Relevance*
>
> Every act of overt communication conveys a presumption of its optimal relevance."

(Wilson and Sperber 2012: 6)

The Cognitive Principle translates into a general rule, whereby our understanding of the world is defined by the search for perceptions and effects maximally beneficial to our general well-being. *The Communicative Principle* complements the above by signaling that every communication – implicit or explicit – which is manifest is also relevant in the sense of maximum benefit (Wilson and Sperber 2012: 7). In other words, every communication of emotion is relevant and attending to it and comprehending it may serve our adaptive fit, all the more so since within pragmatics the communication of emotions is based on assumption of vicariousness of emotional experience of the human animal (Janney 1996: 269). For a social animal such as human, emotions are a barometer of social life, a regulatory mechanism, which serves to manage and maintain social bonds and conflicts within a community.

Pragmatics complements the idea of referential meaning contained within the semiotic triangle and Wierzbicka's NSM by defining the rules and principles guiding both the expression and comprehension of emotions. Whether verbal or on-verbal, communication of emotions is either implicit or explicit, but always overt and relevant, and their correct interpretation and comprehension pays dividends in social life. Semiotics can serve to explicate the meaning of emotion terms in relation to both concepts and objective reality, the semantics within NSM can help translate culture-specific emotion concepts into a universally understandable language, pragmatics can

explain the processes and mechanisms behind the communication of emotion. Each of these three sub-disciplines of linguistics complements the others in their capacity to account for emotional expressions and comprehension.

1.4.3.2. Kopytko's Relational Pragmatics

One of the best and most illustrative examples of how emotions are understood in pragmatics is Roman Kopytko's model of affective pragmatics. Rooted in philosophy, integrating the most recent conclusions from anthropology and psychology with linguistic expertise and the implications of the sum of the 20th century's pragmatic theory, this model is one of the most complex to date – in pragmatics as well as in emotion research in general. Rejecting all reductionist paradigms (Kopytko 2002: 243) and postulating omnipresence of emotion in human communication – both verbal and non-verbal (Kopytko 2002: 235) – Kopytko builds his understanding of emotions on the framework of Relational Pragmatics. Relational Pragmatics rests on the idea that emotions are the property of the relationship between explicit linguistic communication and context. Regarding emotions, he proposes that within the human mind there exists a continuum from concepts which are largely cognitive to those which are largely emotional, though with no purely emotional or cognitive concepts at either end of the continuum (Kopytko 2002: 238). In Relational Pragmatics emotions are non-Cartesian objects, meaning that they are not of merely dual cognitive-affective nature (Kopytko 2002: 235), but implicate the physical, social, cultural, and other factors, as well as the relationships between all those factors (Kopytko 2002: 236). The only possible way to capture such complex relational entities is to investigate them holistically, taking into account the global patterns created by the factors involved in emotion.

Kopytko's account also makes clear why the communicative context approach is more valid than the reductionist paradigms reigning supreme in psychology. First and foremost, for Kopytko emotions are not transient phenomena in the same sense they are for some psychologists. They may not last long, but they have a distinct stimulus-driven onset, a peak of intensity, and an offset. However short they might take, emotions have a timeline, and they differ along that timeline (Kopytko 2002: 240). With respect to expression-mitigating circumstances such as age, gender, power and social hierarchies (Kopytko 2002: 249) as well as assumed emotive goals, the communication of emotions will vary (Kopytko 2002: 252). The meaning of an emotion within communicative context is, in other words negotiated between the different factors involved, and it changes with time (Kopytko 2002: 246). Throughout communicative interactions we continuously monitor our interlocutors and ourselves for signs of

changes in emotion, and adapt our communicative goals to the changing situation (Kopytko 2002: 245).

Regarding cultural variations in the communication of emotion can be explained satisfactorily if redefined as equally significant factors in communicative situation. Kopytko does not think about cultural influences as some sort of nebulous external influence on the subjective and biologically universal experience of emotions. Instead, he places emotions, cultural factors, and all other related aspects of emotion communication on even ground and at the inferential disposal of the active participant of a communicative exchange. The participant's self is the central agent of the communicative situation, one who actively participates in how the relationship between all the factors involved in emotion communication plays out (Kopytko 2002: 246). This agency is expressed in Kopytko's notion of the Individualized Affective Potential (IAP), that is each person's style of "doing emotions", of coping with them, expressing and identifying them, and of using them strategically. Though this affective style will be shaped by culture, language, society, it will always be an entirely idiosyncratic and highly subjective creation (Kopytko 2002: 238). IAP is individual to the point where due to specific circumstances in one's life experience one's capability of "doing" a certain emotion or a certain type of emotions might be disabled, leading to unique patterns of emotional expressiveness in different individuals (Kopytko 2002: 243). A well-developed IAP of fully competent communicators of emotions will allow them to both experience and express, control and strategically deploy their own emotions as well as interpret correctly those of others, even in spite of possible inadequacies of others' IAPs (Kopytko 2002: 242).

Though entirely theoretical, Kopytko's model is firmly grounded in a huge body of evidence from multiple disciplines. It functionally reformulates the classic pragmatic notions of the importance of agency and control in communicating emotions, and it legitimizes the approach by integrating it with the best theory and practice of the field of emotion research. It may well be the most mature model of emotional processing in pragmatics, and offers an intriguing holistic and ecologically powerful perspective on emotion research. The notion of IAP fits in with the complexities of idiosyncrasies described in appraisal models of emotions, predicts the influence of society and culture on the shaping of expressive styles, and it is limited by the biological and cognitive limits of the human species, which are universal for all mankind. It fits with all the

leading psychological theories of emotion while avoiding reductionism, and it complements the linguistic theories capable of accounting for emotions.

1.4.4. Conclusions for the potential of Linguistics for emotion research

Linguistics, though it may have been somewhat isolated from other empirical disciplines over the course of emotion research development, has developed its own methods, tools, and theories which collectively offer a unique perspective on emotions as an empirical problem. A linguistic account of emotion could well fill many gaps and clear many inconsistencies and confounds in the psychology of emotions as well as reconcile evidence from anthropology and psychology. Semiotics explicates the referential nature of emotion terms, that they relate directly to concepts and only indirectly to objective reality, though both relationships are arbitrary. Semantics in Wierzbicka's understanding gives us a universal metalanguage which may serve to construct universally understandable definitions of emotion terms as well as pinpoint fairly precisely the points of divergence of equivalence in the definitions of seemingly equivalent emotion terms in different languages. It also explains how culturally unique emotion terms come into being – through the process of lexicalization of such emotion concepts as are most significant for that culture. Finally, pragmatics supplies the ideas of agency and consciously deployed emotion strategies, as well as relevance for the communication of emotion. Linguists in general, and pragmatists in particular present a sound understanding of both the mainstream and fringe theories of emotion from psychology and anthropology, and their approaches show much appreciation and consideration for the variable views in the fields. Linguistics thus stands in a unique position of having actually become the integrative approach called for by contemporary psychologists declaring themselves in opposition to the standard view.

1.5. Conclusions

It could be said, with some legitimacy, that the field of emotion research in anthropology, psychology, and linguistics has been plagued by paradoxes and ill fate.

All too often, it would seem, the answers to the methodological or theoretical conundrums of one discipline were held by another, with the rifts between the disciplines precluding free exchange of ideas. Anthropologists with an agenda to document the diversity, variety and non-equivalence of emotion terms would unfailingly manage to describe the unique emotions in terms understandable for readers across the world. Psychologists aiming to prove emotions are simple, basic, and universal would find that apart from universal above chance recognizability, the patterns of recognitions with respect to different emotions in different cultures would differ, often to a significant degree. Though anthropologists willingly accepted the universal capacity of the human mind to communicate emotions despite cultural and linguistic differences, and though psychologists grudgingly admitted the cultural and linguistic variability matters, such allowances did little to clear the air until the rise of the integrative approaches. Linguistics all the while worked away at perfecting the models and sub-disciplines concerning meaning – semiotics, semantics, and pragmatics and could have cleared many of the inconsistencies of anthropology and confounds of psychology, but ended up isolated from both.

The modern integrative approaches such as psychological construction are among the first attempts to truly reconcile the evidence, theory and practice of all three of these estranged disciplines. And while the effort is admirable, these theories are still in their nascent stage, with fragmentary and scattered evidence and somewhat non-standardized methods. The study of emotional prosody, which will be the main topic of this thesis, is still largely devoted to the standard view of emotions. Although some of its conclusions tend to fall into the unexplained variation category, the emotional prosody research rarely crosses over into the relativistic positions. Exactly what the theoretical and practical positions of emotional prosody research are will be discussed in detail in Chapter 2.

Chapter 2: The state of the Emotional Prosody research today

2.1. Introduction

Vocal expressions of emotion have been of some interest in psychology virtually since its inception as a scientific discipline. Pooled together, the body of evidence collected on the subject of vocal and prosodic manifestations of emotion is very substantial. However, the evidence that there is rather unsystematic and the research on the subject lacks continuity of inquiry. It is also rarely driven by the results and conclusions of previous research. The reason for this is the profound heterogeneity of the evidence. Though some research on emotional prosody has been conducted in multiple disciplines, the subject has not been pursued as a general aim in any single discipline. Each discipline pursued the problem of emotional prosody using different assumptions, methods, and towards different aims. The collective body of evidence thus produced has remarkably few points on which consistent and valid comparisons could be made, and a consensus reached.

Emotional prosody has been of interest for various sub-disciplines of psychiatry and neurology, as well as for computational sciences, and psychology and its sub-disciplines, with each field contributing its own hypotheses, assumptions, methodologies, and findings to the growing body of research on the subject of vocal expressions of emotion. Psychiatrists focused on the perceptions and behavioral patterns in response to emotional prosodic aspects of auditory hallucinations in schizophrenia (see Hoekert et al. 2007 for a review). Neurologists in various specialized fields focused on how emotional prosody is processed in neurodegenerative disorders (see Taler et al. 2006 for evidence from Alzheimer's disease; Kan et al. 2008 for evidence from

Parkinson's disease; Speedie et al. 1990 for evidence form Huntington's disease) or following traumatic brain injuries (see Schmidt et al. 2010). Psychologists focused largely on healthy populations (see below for a critical review), or on developmental disorders (see Uekermann et al. 2010 for evidence from ADHD patents; Lindner and Rosen 2006 for evidence form patients with Asperger's syndrome).

Within computational sciences the field most actively engaged in emotional prosody specifically was multiple-purpose affective databasing, a field dedicated largely to creating large dedicated multimodal databases of emotional expressions used both in psychology and in man‑machine communication research. Affective databasing has been a dynamically developing field and has produced a fair number of databases of varied usefulness for emotional prosody research (see Ververidis and Kotropoulos 2003, and Ververidis and Kotropoulos 2006 for reviews; see HUMAINE project website for a comprehensive overview of the field). All of these fields work towards different agendas and with their own methods and they have all produced a multiplicity of results and conclusions. As a result, however, there is precious little that would amount to a general consensus on the nature of emotional prosody.

2.2. The overall consensus within emotional prosody research

Apart from its broad appeal as a facet of the emotion research in general, emotional prosody is an interesting object of research for its duality. It is dependent on two fundamentally different forces: the partially controlled physiology and the completely controlled articulation. Physiologically, emotional prosody relies on the intersection of the respiratory and articulatory systems with an occasional interjection from the alimentary canal. The respiratory and digestive systems are under only partial control of consciousness, and are the anatomical foundations of symptomatic vocal expressions of emotion such as retching in *disgust*, weeping in *sadness*, or laughter in *happiness* (Scherer et al. 2003: 440). Articulation, on the other hand, is under virtually complete conscious control, additionally tied to the propositional content of emotional speech, which may be deployed strategically in various social situations (Scherer et al. 2003: 433). The tone in which we speak can agree or disagree with the propositional content of our speech or, more subtly, can color the expression of the propositional content so as

to alter or add meaning to what we are saying. And those slight but meaningful nuances are communicated whether we be willing or no, due to the dual nature of control of the vocal expression of emotions.

Emotional prosody on its own is a collection of simple acoustic features to which meaning is attributed. It is not a very complex phenomenon, but it constitutes an important part of the overall complexity of multimodal expressions of emotion. Also, because it is intimately tied to the propositional content of speech it lends itself to the investigating dynamic processes and subtleties of communication inaccessible through research on still posed photographs of facial expressions of emotion preferentially used in *the standard view* (Elfenbein and Ambady 2002a: 228). It has been argued on that point that emotional prosody constitutes stimulus material of much higher ecological validity than the materials used in the standard view (Elfenbein and Ambady 2002a: 205). Even when it is acted rather than spontaneously expressed (natural), emotional prosody is widely held to be material of high-validity. Some go so far as to value the ecological validity of emotional prosody above that of posed facial expressions, mainly because of the impossibility to control prosodic expressions as much as facial expressions (see Banse and Scherer 1996: 619; also see Xu 2010).

Emotional prosody research is a microcosm of the emotion research, and as such virtually all research paradigms are represented in some manner here. The majority of the empirical work has been carried out within the standard view paradigm, almost the only consistent result of experiments appears to be an effect of arousal on emotional prosody perception, while individual idiosyncrasies such as gender appraisals appear to influence how well emotions are recognized from vocal cues. Paul Ekman tied emotional prosody to his idea of emotion families, suggesting prosody might serve as a disambiguating feature, helping to discriminate between different members of an emotion family (Ekman 2003: 6). This idea, however, has been notoriously hard to test, and has yet to be supported by any significant evidence (Scherer et al. 2003: 445). The basic methodology of the standard view, however, has been implemented widely in emotional prosody research and has even reproduced some of its results. The most prominent reproduced result was the consistent above-chance recognition of emotions from prosody both within and across languages regardless of the speakers' or participants age, language, or gender (Russell et al. 2003: 332). It is worth noting, however, that this above-chance recognition result has been criticized as coming from

forced-choice tasks, making it possibly more of a design artifact than a reflection of how emotions are processed (Russell 1994: 116).

No acoustic or articulatory features can be determined that would consistently and unequivocally point to basic emotions as distinctly as facial expressions do (Scherer et al. 2003: 440). Some aspects of vocal expression of emotions in general and emotional prosody in particular are completely contradictory to the clear distinctions of the facial expressions of emotion. People may laugh hysterically in *fear*, or mirthlessly in *anger*, as well as simply in *happiness*; they may weep for *joy* as well as for *sadness*, *anger*, or *fear* (Russell, Bachorowski, Fernandez-Dols 2003: 339). Perceptually, the nature of vocally expressed emotion is, in other words, inherently ambiguous. And although it is generally thought that some features of prosody, likely to be limited by physiological capacity of the human speech organs, may be universal (Scherer et al. 2003: 445), what captures the attention are the error patterns. Specifically, the errors of misidentifying one basic emotion for another which occur in highly specific and repeated patterns. Of all basic emotions, *anger* and *fear* are recognized at high levels of accuracy, but *happiness* is very often mistaken for *anger* (Scherer et al. 2003: 444), while members of the same emotion families, regardless of their perceived distinctiveness, are very often confused for one another (Scherer et al. 2003: 445). It has also been observed, that the less structured the response paradigm (the basic emotions forced choice paradigm being highly structured) the more misidentification errors are committed, and the more the accuracy approaches chance levels (Russell et al. 2003: 333).

The misidentification errors, particularly the *happiness* identification as *anger* error has been attributed to the fact that both emotions present similar levels of vocally expressed arousal in the sense used in the dimensional emotion research paradigms (Scherer et al. 2003: 436). Indeed, arousal has consistently been concluded to be the one universal and universally distinctive aspect of emotional prosody (Scherer et al. 2003: 439). Valence as a discriminating feature of emotional prosody, on the other, hand found little to no support in the empirical evidence (Russell and Barrett 1999: 807). And although an additional feature of quality (defined as a similarity of the patterns of acoustic markers for specific emotions) has been proposed (Banse and Scherer 1996: 632), it has yet to be confirmed by any substantial research (Scherer et al. 2003: 445). Overall, though the results from the standard view are inconsistent (Russell et al. 2003:

335), the dimensional approach cannot seem to account for emotional prosody processing fully either.

The application of appraisal theories to emotional prosody research is still in its nascent stage, but various accounts and attempts to explain certain results from other approaches and paradigms seem to indicate appraisals, especially those related to the construction of the concept of self, do play a vital role in emotional prosody processing (Scherer et al. 2003: 441). For one thing, gender of the speaker expressing an emotion appears to influence to a significant degree how well emotional prosody is perceived and identified (Russell et al. 2003: 339). Additionally, as the case of alexithymia, that is a sub-clinical disorder of identifying and naming emotions, proves that humans are differentially disposed to perceive various emotions, they are also differentially disposed to express different emotions (Walbott and Scherer 2003: 697). Apart from individual variation, there are culture- and language-specific variations in how emotions are expressed and perceived (Mesquita and Frijda 1992: 194). Emotional prosody shows a consistently powerful in-group effect, whereby recognition rates for emotional prosody produced by members of a given culture will be highest for listeners who are also members of the same culture (Elfenbein and Ambady 2002b: 245). The culture- and language-specific vocal cues to emotions which serve as familiar guideposts to meaning for members of any one culture may be so specific that for members of other cultures they may constitute actual confounds (Elfenbein and Ambady 2002b: 248). Cultural membership and knowledge of languages may therefore also be a factor in how emotions in speech are appraised.

All in all, there actually is some consensus in the field of emotional prosody research. The results of the experiments conducted within the standard view may be biased through participants' obeying to design characteristics *anger*, but the error patterns produced in them are informative as to the nature of emotional prosody perception. Arousal is consistently concluded to be a universal feature present in emotional prosody, which may help making some distinctions between different emotions, if only by classifying them along a continuum of intensity of expression. Appraisals offer a promising but under-explored perspective on the various factors which influence how the perception of emotional prosody is framed. Those things considered, however, no single theoretical account – not the standard view, not the dimensional view, not the appraisal theory – can fully account for how emotional

prosody is perceived. At the same time, parts of each theory combined can account for most of them. Therefore, the one conclusion to be drawn from the state of the empirical research today is that some form of integrative approach is not just preferable but necessary to advance our understanding of emotional prosody.

2.4. The aim of this dissertation

The main research question of this dissertation was prompted by the current state of research on emotional prosody, especially in perspective of the current status of English as the global language. The question is: How is emotional prosody of one language (English) processed in the minds on non-native speakers of that language? Even the most conservative estimates put the total proportion of native to non-native speakers of English worldwide at 50-50 today, and prognoses have the non-native speakers overtaking native speakers by the year 2050 (Graddol 2003: 157). The education that non-native speakers receive is overwhelmingly focused on communicative proficiency in terms of grammatical and pronunciation correctness rather than social aspects of communication such as emotional expression in speech. The system of English language education is geared towards using the language in professional contexts (Crystal 2006: 426), and the nuances of the social, or phatic communication which are suffused with various forms of emotional expression are left to the learners to work out on their own (Crystal 1979: 37). As the proportion of non-native English speakers grows, and the significance of skillful communication of emotions for the public mental health becomes more apparent (see Hu et al. 2014), learning how subtle expressive cues such as emotional prosody are processed by individuals at various levels of language proficiency becomes more and more important. Additionally, learning how emotional prosody of a given language is processed by individuals who are proficient in the grammar of that language but not in the nuances of its phatic communion may even help explain some of the cross-linguistic variations in emotional prosody recognition observed in the data so far.

2.5. Literature review – Introductory remarks

Despite the long history of emotion research, for emotional prosody research the heterogeneity of the field and the many methodological issues within it work against it to a significant extent. Clear and comprehensive definition of what constitutes the universal and the culture-specific features of emotional prosody has so far proved elusive (Scherer et al. 2003: 447). There is virtually no continuity of inquiry into the general nature of emotional prosody, and the field is lacking in applied methods and research paradigms other than the standard view (Scherer 2005: 721). There appears to be, however a general agreement that integrative paradigms in the study of emotional prosody should be introduced (Russell and Barrett 1999: 817).

To investigate the research question behind this dissertation, an integrative approach based on a critical review of the leading contemporary empirical works has been developed. To create a consistent and systematic review, a number of selection and adaptation criteria had to be adopted to construct a coherent picture. Specific selection criteria were applied to find relevant empirical literature that would afford a comprehensive overview of the field of emotion research with its strengths and weaknesses alike. Those criteria included the involvement of non-clinical populations in the study, the use of emotional prosody as stimulus material, and reporting enough relevant methodological details to allow a critical comparison with methods described in other publications. The studies fitting those criteria are all reviewed below. Because of the various research agendas these publications followed, the results from the non-clinical populations were not always reported in the same way or in the same kind of detail. To make comparisons across the board a number of adaptations had to be made, all of which had a bearing on the meta-analytical sections of this review. The adaptations were as follows:

(1) from studies involving clinical populations and non-clinical control groups, only data from the control groups was considered,

(2) from studies reporting on multiple modalities of emotional expression, only data from emotional prosody conditions was considered,

(3) from studies that investigated congruency effects between emotional semantics and prosody, only data from congruent conditions was considered,

(4) from studies that investigated emotional prosody with and without semantic information removed, only data from prosody-only conditions was considered,

(5) from neuroimaging studies including behavioral tasks, only data from the behavioral tasks was considered,

(6) for all studies, if results were reported for separate participant groups, the results were collapsed for consideration,

The review is organized by three critical aspects of emotional prosody research methodology: stimulation, validation, and perception. Stimulation concerns all the factors that have to be taken into consideration in creating the stimulus materials for the investigation of emotional prosody. These include: the selection of the speakers to produce the material (their gender, age, nationality), the language of the study, whether the prosody is isolated from semantics in any way, and the length of the stimuli. Validation concerns the issue of validating or rating the created stimuli to confirm that they work according to the assumptions under which they were created. Perception concerns the basic accuracy and response times in emotion perception tasks as well as the factors involved in the selection of participation for the study. For ease of reference and comparison, Tables 2 and 3 present a short summary of the most important aspects scrutinized (short versions of these tables present limited details for the purposes of this review; full versions with all details can be found in Appendix G).

2.5.1. Stimulation

Regarding stimulation, certain stable trends can be observed in the literature. First, the grand majority of research done is done within a single language context – stimuli are created in one language to be tested in the same language. Second, that the grand majority or research is done with Germanic languages. Third, that semantic information is not always removed from or masked in the stimuli. Fourth, that the preferred method of removing or masking semantics is pseudolanguage, followed by low band pass filters. Fifth, that the stimuli used vary greatly in the numbers used, length, and emotional content (number and kinds of emotions expressed). Sixth, that the preferred mode of "doing emotion" by the speakers employed to produce stimuli is acting it out. And seventh, that there is almost an even split between studies using just one vs.

multiple speakers to produce the material. Each of these factors will be reviewed shortly below. All observations pertain to the 31 studies qualified for this review and are summarized briefly in Tables 2 and 3.

2.5.1.1. Study contexts

Considering the study contexts, only three cross-linguistic studies were found to fit the selection criteria for this review, while of the single-language studies twenty-eight qualified.

2.5.1.2. Study languages

Nineteen out of the 31 studies reviewed involved English as the study language, the language in which or based on which the stimuli were created, and twelve involved German. This makes the Germanic language family rather over-represented in the data compared to all other studied languages, with Japanese being involved 3 times, Arabic twice, and Dutch, Spanish, Portuguese, Hindi, Chinese, Tagalog and Hindi but once. With respect to study language, the research on emotion prosody is West-oriented and, to a significant degree, English-centric.

2.5.1.3. Prosody isolation

One of the biggest problems in preparing stimuli for emotional prosody research is how to tease apart emotional prosody and propositional content of speech, and it has been dealt with in a variety of ways. One way was to not remove semantics, but to either manipulate it or nullify its influence on emotional prosody interpretation. Some researchers opted to investigate the convergence of semantics and prosody, and used stimuli wherein semantics and prosody matched (Drolet et al. 2012: 141; Pell, Paulmann et al. 2008b: 263; Schirmer 2010: 2f; Schirmer and Kotz 2003: 1146). Others took interest in the divergence of semantics and prosody, and used stimuli wherein

semantics and prosody variously matched or mismatched (Kotz and Pullmann 2007: 116; Rota et al. 2008: 402; Mitchell 2006b: 301).

Another approach was to nullify the influence of semantics by using material generally considered not to convey emotions semantically: *neutral* words and sentences (Fujiki et al. 2008: 336f; Hopyan-Misakyan et al. 2009: 140; Schirmer et al. 2005: 444f; Schmidt et al. 2010: 4; Sorocco et al. 2010: 27; Thompson and Balkwill 2006: 410f), numbers (Alba-Ferrara et al. 2011: 2), or vocalizations (Sorocco et al. 2010: 27; Bostanov and Kotchoubey 2003: 262; Sauter et al. 2009: 2411). Some researchers used material more difficult to classify, such as deferential forms of address uttered in various emotional tones (Fujisawa and Shinohara 2011: 430).

The other way to deal with the problem of semantics influencing prosody comprehension is to remove semantics altogether. The removal is usually managed in one of two ways: though the use of pseudo-language or by implementing a low band pass filter to the recorded samples of prosody. The idea behind pseudo-languages was to use something that sounded plausibly like a given language but conveyed no semantics, and it has been realized in different ways. Some studies merely report using a kind of pseudolanguage (Paulmann et al. 2008b: 263; Paulmann et al. 2010: 63). Others recount that only phonological plausibility was sought in creating the pseudo-language stimuli (Goerlich et al. 2011: 3). Some studies report that in creating pseudo-linguistic stimuli by mimicking phonotactics and some of the grammar (Paulmann and Pell 2011: 195f), oftentimes specifying that the partial mimicking of grammar is limited to replacing the relevant content words with nonsense pseudo-language words (Cornew et al. 2009: 5; Pell et al. 2009a: 110f; Pell et al. 2009b: 420). Only sometimes is greater apparent care given to how pseudo-linguistic stimuli are constructed in accordance with the morpho-syntactic and phonotactic principles (Castro and Lima 2010: 76; Rigoulot et al. 2013: 3).

A different way to remove semantics from stimuli was to use a low-band pass filter, that is record normal emotional expressions and process them by removing the ranges of audio spectra which carries the semantic information. And although the technique has been used effectively in multiple studies, there is little agreement as to the cutoff points. For one study the cutoff point was differentiated for male and female speaker samples, with 360Hz for male and 400Hz for female speakers (Dimoska et al. 2010: 371). Only one study reported removing the entire 70-300Hz spectrum (Sorocco

et al. 2010: 27). One study reported a cutoff point of 350Hz (Mitchell 2006a: 3612), two studies reported 333Hz (Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223), and one a uniform cutoff point of 400Hz (Kitayama and Ishii 2002: 34f).

It has been argued, that there is no such thing as language completely devoid of emotion (Russell 1991: 428). On such ground could the studies which retain proper semantic content be criticized. On the other hand, pseudo-languages may pose a foil for ecological validity, as they are not actually the existing languages that emotional prosody usually concerns itself with. It is also worth considering that for actors employed to provide samples of emotional speech doing it in a language they do not know, however similar to their own, may constitute an additional and unwanted processing/production burden. Low band pass filtering, while sometimes resulting in stimuli that are comparable to real-life phenomena, such as hearing a voice from behind a wall, also has its problems. The main problem here is the fact that with the exception of the Sorocco et al. (2010) study, all studies list filtering levels so high that they could not possibly remove all the semantic information. All in all, all approaches seem to have some drawbacks, some bigger than others. And any research into emotional prosody should take those into account.

2.5.1.4. Stimuli: lengths, numbers, and kinds

Another problem researchers face when investigating emotional prosody is stimulus length. On the one hand, the stimuli must be long enough for prosodic effects to be fully realized. On the other hand, they must be short enough to lend themselves to experimental procedures. The usual compromise is to opt for sentence-length stimuli. Regarding the propositional content (whether semantics be masked or no), the number of stimuli can be anything from one to hundreds, and the number of the stimuli is often connected to the number of emotions investigated.

Sentence-length stimuli were used in twenty-two out of the thirty-one reviewed studies, though there appears to be no standard way of reporting or describing the stimuli. Variously reported are the average stimulus length in seconds or syllables, selected examples or even full inventories of transcribed stimuli. Only two studies (Pell et al. 2009a: 110f; Pell et al. 2009b: 420) reported stimuli lengths in seconds and

syllables as well as gave illustrative examples of transcribed stimuli. Five studies reported mean stimulus lengths in either seconds or syllables and gave examples (Castro and Lima 2010: 76; Cornew et al. 2009: 5; Dimoska et al. 2010: 371; Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223). Two studies only reported the mean lengths of stimuli (Drolet et al. 2012: 141; Schmidt et al. 2010: 4). Eight studies only reported selected stimuli transcriptions (Mitchell 2006a: 3612; Mitchell 2006b: 301; Paulmann and Pell 2011: 195f; Paulmann et al. 2008b: 263; Rigoulot et al. 2013: 3; Rota et al. 2008: 402; Sorocco et al. 2010: 27), and two gave full inventories of transcriptions (Hopyan-Misakyan et al. 2009: 140; Thompson and Balkwill 2006: 410f), though it is worth noting that the number of stimuli in those studies was exceptionally low and consisted of one or two sentences. Three studies failed to report any details on the sentences used (Kotz and Pullmann 2007: 116; Paulmann, Kotz 2010: 63; Schirmer et al. 2005: 444f).

Studies using lengths of stimulus different than sentence suffer from the same lack of consistency of reporting. Four studies using words and vocalizations reported transcripts of all stimuli as well as mean lengths in seconds (Bostanov and Kotchoubey 2003: 262; Fujisawa and Shinohara 2011: 430; Goerlich et al. 2011: 3; Kitayama and Ishii 2002: 34f), though it should be noted that the lattermost only implemented one detrimental form of address. One study only reported a transcript of the one narrative passage used (Fujiki et al. 2008: 336f), and two studies only reported average times in seconds (Alba-Ferrara et al. 2011: 2; Schirmer 2010: 2f). Two studies failed to report any relevant details on the word and vocalizations used (Sauter et al. 2009: 2411; Schirmer and Kotz 2003: 1146).

The number of stimuli tended to vary greatly as well, ranging from as few as two in an oddball paradigm using vocalizations (Bostanov and Kotchoubey 2003: 262) to five hundred in a multiple-language study using pseudo-language sentences in four languages (Pell et al. 2009b: 420). Very often the number of the emotions studied was responsible for the total number of stimuli. All studies reported what emotions they involved, and the number of emotions ranged from two (Schirmer et al. 2005: 444f) to nine (Sauter et al. 2009: 2411). All but one (Paulmann et al. 2008b: 263) involved *happiness*, and all but six (Cornew et al. 2009: 5; Dimoska et al. 2010: 371; Kotz and Pullmann 2007: 116; Paulmann et al. 2010: 63; Paulmann et al. 2008b: 263; Schirmer and Kotz 2003: 1146) involved *sadness*. Two studies ventured beyond the

categorizations set by *the standard view*, adding complex emotions such as *pride*, *guilt*, or *boredom* (Alba-Ferrara et al. 2011: 2), or such as *achievement*, *relief*, or *amusement* (Sauter et al. 2009: 2411).

All in all, there is no single, universally accepted way of developing and reporting of the construction of stimuli for emotional prosody. From short syllables or vocalizations, through words to sentences and passages spoken in various emotional tones – all have been used, and reported in a variety of detail. Some stable trends can be determined, in that sentence-length appears to be the most popularly used, mean times are most often reported, and *sadness* and *happiness* are most popularly included, among other basic emotions.

2.5.1.5. Manner of emoting

Overwhelmingly in the study of emotional prosody the stimuli are created by having speakers trained or instructed to express given emotions by acting them out. Of all the thirty-one studies only one used natural, spontaneous expressions of emotions through speech (Drolet et al. 2012: 141), though it too counterbalanced those authentic expressions with acted ones for contrast. All the other studies employed different individuals to be recorded as they play-act emotions.

With respect to natural emotional expressions of sufficient quality and consistency to be used in research emotion induction or using news report materials, though both venues are problematic. There are issues of ethical conduct in effectively inducing real emotions in laboratory circumstances (see Landis 1924 for a very effective, though ethically highly questionable emotion induction study). Regarding using footage of naturally occurring emotional expressions from existing archives of news agencies, unresolved issues of fair use of copyrighted materials frequently stand in the way (Banse and Scherer 1996: 618). The consensus appears to be, that although using natural expressions emotions for stimuli would be preferable, such material is, for the time being, a largely impractical proposition (Banse and Scherer 1996: 619). Despite this fact, there appears to be quite a lot of promise in the field of affective databases such as the Belfast Induced Natural Emotion Database (BINED), wherein new and uncontroversial means of evoking emotions in the lab safely and ethically

become increasingly available (Sneddon et al. 2012). This could mean that more natural material may soon be within reach.

2.5.1.6. Actors of emotion

The selection of individuals to create stimuli is another important problem that has been dealt with in different ways. Out of the thirty-one studies reviewed, the grand majority of eighteen involved naive speakers with no acting experience reported (see Table 2). Seven studies used amateur actors (Cornew et al. 2009: 5; Dimoska et al. 2010: 371; Goerlich et al. 2011: 3; Paulmann and Pell 2011: 195f; Paulmann et al. 2008b: 263; Schirmer 2010: 2f; Rota et al. 2008: 402), and two used professional actors (Alba-Ferrara et al. 2011: 2; Fujisawa and Shinohara 2011: 430). On the grounds of selecting speakers by profession that would lend itself best to modulating voice to express target emotion, one study employed a trained phonetician (Bostanov and Kotchoubey 2003: 262), and two employed professional singers (Castro and Lima 2010: 76; Sauter et al. 2009: 2411). Only one study failed to report on the background of the speakers (Hopyan-Misakyan et al. 2009: 140).

An additional problem regarding the selection of actors was the number and gender of the individuals involved. Of the thirty-one studies under review, fourteen involved a roughly gender-balanced group of speakers ranging from as few as 2 (Schirmer and Kotz 2003: 1146) to as many as 120 (Drolet et al. 2012: 141) total speakers. Seven studies used exclusively a single female speaker each (Cornew et al. 2009: 5; Goerlich et al. 2011: 3; Kotz and Pullmann 2007: 116; Rota et al. 2008: 402; Schirmer 2010: 2f; Schirmer et al. 2005: 444f; Schmidt et al. 2010: 4), and one study used two female speakers (Castro and Lima 2010: 76). Seven studies used exclusively a single male speaker each (Bostanov and Kotchoubey 2003: 262; Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223; Mitchell 2006a: 3612; Mitchell 2006b: 301; Paulmann and Kotz 2010: 63; Paulmann et al. 2008b: 263). Two studies failed to report on the number and gender of the speakers involved (Hopyan-Misakyan et al. 2009: 140; Sorocco et al. 2010: 27).

Previous research and theory have pointed out that due to gender-related issues of emotion expression (Russell et al. 2003: 332), and the more general personal speaker

idiosyncrasies in emotional expression (Scherer et al. 2003: 441), using more than one speaker for the construction of emotional prosodic stimuli is highly advisable (Walbott and Scherer 2003: 698). It appears, however, with 14 out of the 31 studies using a single speaker only for the production of stimulus material, this recommendation was not widely heeded. The issue of using acted vs. natural material has always been present in emotional prosody research, but has only rarely been addressed directly. Although it is widely accepted, and has been demonstrated in research at least once (see Drolet et al. 2012), that there are significant differences in how natural and acted vocal expressions of emotion are processed, it is the acted, not natural stimuli are the norm in the field. Despite the fact that the use of acted stimuli limits the ecological validity of the studies (Walbott and Scherer 2003: 698), the practice is widely defended as it is argued that acting out emotion in a laboratory is not vastly different from strategic deployment of emotion expression in real life (see Xu 2010).

2.5.2. Validation

Validation or rating studies aim to confirm the effectiveness of the created stimuli, and that aspect of methodology also shows a lot of variation in how it is conducted and reported. Outside the studies which actually are validation studies (e.g. Castro and Lima 2010), validation aspects of stimuli development are rather under-reported. Of all the studied reviewed only two reported the rating/validation tasks involved as well as the numbers and genders of the participants of the rating/validation (Castro and Lima 2010: 76; Schirmer 2010: 2f). Two studies reported only the numbers and genders of the raters (Kotz and Pullmann 2007: 116; Schirmer and Kotz 2003: 1146). Eight studies reported on the number of raters and the rating tasks but not on the genders of the raters (Cornew et al. 2009: 5; Fujiki et al. 2008: 336f; Goerlich et al. 2011: 3; Kitayama and Ishii 2002: 34f; Mitchell et al. 2004: 223; Mitchell 2006a: 3612; Mitchell 2006b: 301; Rigoulot et al. 2013: 3). Five studies reported only the number of raters without reporting their genders or the tasks they had performed (Dimoska et al. 2010: 371; Fujisawa and Paulmann and Pell 2011: 195f ; Pell et al. 2009: 110f; Shinohara 2011: 430; Thompson and Balkwill 2006: 410f). Six studies referenced previous rating studies, most of them undisclosed (Alba-Ferrara et al. 2011: 2; Paulmann et al. 2010: 63; Paulmann et al.

2008b: 263; Sauter et al. 2009: 2411; Schirmer et al. 2005: 444f; Sorocco et al. 2010: 27). Eight studies failed to report any doing any rating study on the stimuli included in their research (Bostanov and Kotchoubey 2003: 262; Drolet et al. 2012: 141; Hopyan-Misakyan et al. 2009: 140; Mitchell et al. 2003: 1412; Paulmann et al. 2008b: 263; Pell et al. 2009: 420; Rota et al. 2008: 402; Schmidt et al. 2010: 4).

It is generally accepted that stimuli used in research are subject to researcher biases and may not be very much alike to what we see in real life outside laboratory contexts, and that such negative factors can be mitigated through validation studies (Jolley and Mitchell 2010: 66f). It is, however, apparent upon reviewing the literature from the field, that a systematic and coherent method of rating or validating stimuli does not exist, and conducting validation or rating studies is not even a general rule in the field.

2.5.3. Participation

Participation concerns the proper empirical part of emotional prosody research. Who the participants are and how many of them there are, what kinds of tasks they perform and with what results are all important aspects to consider. Here too the heterogeneity of the field had left its mark. The population sample sizes and composition varies to a considerable extent, as do the accuracy scores. The stable trends here appear to be a conspicuous lack of response time analyses and a predominance of the forced choice paradigm in the response options.

On the whole, the general tendency in the field appears to be to balance, as much as possible, the population sample with respect to gender, as evidenced by the sixteen of the reviewed studies which managed to balance their samples perfectly or very nearly so (Bostanov and Kotchoubey 2003: 262; Cornew et al. 2009: 5; Fujiki et al. 2008: 336f; Fujisawa and Shinohara 2011: 430; Goerlich et al. 2011: 3; Kotz and Pullmann 2007: 116; Paulmann and Pell 2011: 195f; Paulmann et al. 2008b: 263; Pell et al. 2009a: 110f; Pell et al. 2009b: 420; Rigoulot et al. 2013: 3; Sauter et al. 2009: 2411; Schirmer et al. 2005: 444f; Schirmer 2010: 2f; Schirmer and Kotz 2003: 1146; Thompson and Balkwill 2006: 410f;). Seven other studies included both genders but were somewhat biased in favor of one or the other, with three including more male (Dimoska et al. 2010: 371;

Paulmann et al. 2008b: 263; Schmidt et al. 2010: 4), and four including more female participants (Castro and Lima 2010: 76; Kitayama and Ishii 2002: 34f; Mitchell 2006a: 3612; Mitchell 2006b: 301). One study included exclusively females (Drolet et al. 2012: 141), and four included exclusively males (Alba-Ferrara et al. 2011: 2; Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223; Rota et al. 2008: 402). These studies failed to report male to female ratios for their population samples (Hopyan-Misakyan et al. 2009: 140; Paulmann et al. 2010: 63; Sorocco et al. 2010: 27). The numbers of participants likewise varied greatly depending on the methodological demands of the disciplines they represented, ranging from as few as 10 participants in a functional neuroimaging study (Rota et al. 2008: 402) to as many as a total of 148 participants in a behavioral study involving three experiments across two continents (Kitayama and Ishii 2002: 34f).

The age of the participants shows some variation as well. The preference appears to be to use participants in their twenties, as this age group has the largest representation in the literature, with nineteen studies (see Table 2). Five studies fitting the selection criteria for this review focused on children and teens (Fujiki et al. 2008: 336f; Fujisawa and Shinohara 2011: 430; Hopyan-Misakyan et al. 2009: 140; Mitchell 2006a: 301; Schmidt et al. 2010: 4). Two studies focused on subjects in their thirties (Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223), and three on subjects in their forties (Dimoska et al. 2010: 371; Paulmann et al. 2010: 63; Paulmann et al. 2008b: 263). One study reported only age ranges but not age means (Paulmann et al. 2008b: 263), and one failed to report the ages of the participants altogether (Kitayama and Ishii 2002: 34f).

2.5.3.1. Tasks and procedures

Regarding the tasks performed, most of the reviewed studies implemented the forced choice paradigm using universal basic emotions of the standard view as response options. Twenty-four studies used this paradigm (see Table 2), though some added extra measures or modified the response modality per study aims requirements. All the studies using children (Fujiki et al. 2008: 336f; Schmidt et al. 2010: 4; Hopyan-Misakyan et al. 2009: 140; Fujisawa and Shinohara 2011: 430), and one study using adults (Sorocco et al. 2010: 27) used iconic pictures of facial expressions as response options instead of using words. One study added an adequacy [for the expression of a

particular emotion] scale to the forced choice (Castro and Lima 2010: 76), one added a certainty [of categorization] scale (Cornew et al. 2009: 5), and one added an emotional arousal scale (Pell et al. 2009: 420). For all the forced choice tasks the number of options to choose from varied from two (Sauter et al. 2009: 2411) to seven (Castro and Lima 2010: 76; Pell et al. 2009a: 420; Pell et al. 2009b: 110f; Paulmann et al. 2008b: 263). Other paradigms were also represented in some studies. Congruency task was used twice (Bostanov and Kotchoubey 2003: 262; Goerlich et al. 2011: 3), as were recall tasks (Kotz and Pullmann 2007: 116; Schirmer 2010: 2f), and "go/no go" paradigms (Mitchell et al. 2003: 1412; Mitchell et al. 2004: 223).

The results present an interesting case. There are, again, some common tendencies in how the results are reported, in that accuracy rates, usually given in percentage of correct responses are virtually always reported, but response times are almost never reported (the sole exception was the RT-oriented Goerlich et al. 2011 study). Overall, the studies replicate the above-chance result of the standard view paradigms in facial expression research, there is some considerable variability. However, even limiting the review to the results for *happiness* and *sadness* (as those two will be the focus of this dissertation), the way the results are reported, as well as the recognition levels reported vary considerably.

Of all the reviewed studies, only collapsed percentages of emotion recognition accuracy were reported regardless of what the emotions were studied (Dimoska et al. 2010: 371; Mitchell et al. 2004: 223; Mitchell 2006a: 301; Mitchell 2006b: 3612; Paulmann et al. 2008b: 263; Rota et al. 2008: 402; Schmidt et al. 2010: 4; Sorocco et al. 2010: 27). Three studies only reported descriptive results without any numeric values (Bostanov and Kotchoubey 2003: 262; Drolet et al. 2012: 141; Mitchell et al. 2003: 1412). Among the remaining studies reporting the results shows more consistency than the results themselves. For German the recognition rates for *happiness* can go from 44,2% (Paulmann et al. 2010: 65) in one study to 98,82% in another (Kotz and Pullmann 2007: 109), for *sadness* it can go from 63,05% in one study (Paulmann et al. 2008b: 265) to around 82% in another (Schirmer et al. 2005: 446). For English the results are no less varied. The recognition of *sadness* goes from a low of 71,21% in one study (Alba-Ferrara et al. 2011: 1138) to a high of 94,4% in another (Rigoulot et al. 2013: 5), while the recognition of *happiness* from a low of 28% in one study (Paulmann and Pell 2011: 198) to a high of 92,1% in another (Fujiki et al. 2008: 339). The

accuracy scores for other languages largely come from single studies and do not, therefore, offer such obvious contrasts, though it might be expected that given a larger body of evidence similar trends might emerge in other languages as well. For the sake of comparison, Figure 3 shows the collapsed accuracy scores (in percentages) for *happiness* and *sadness* in different language groups for the reviewed single-language studies:

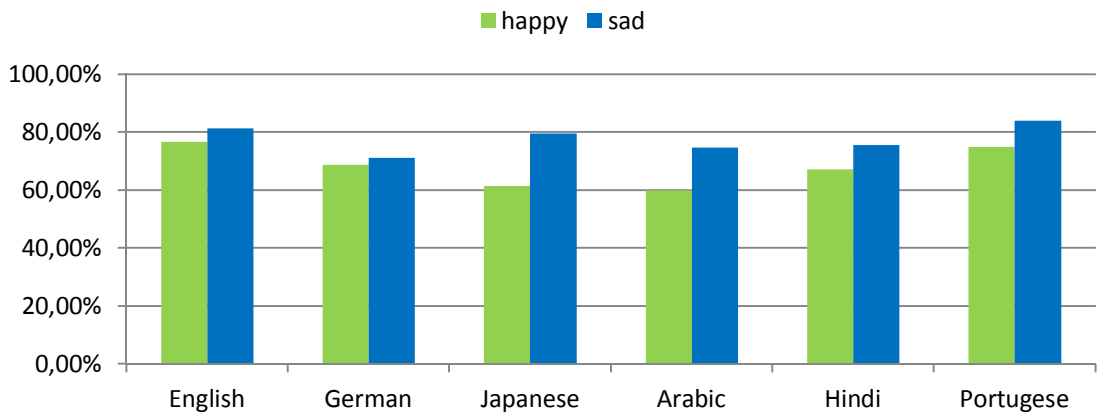

Fig. 3. Within-language emotion recognition for *sad* and *happy* emotional prosody. Scores collapsed form the reviewed research.

The scores for Arabic, Hindi, and Portuguese all come from single studies and comparatively small cohorts (Arabic N = 19, Hindi N = 20, Portuguese N = 80), but the collapsed scores for English, German, and Japanese represent much larger total population samples (English N = 605, German N = 310, Japanese N = 213). For all those studies however, wherein emotional prosody produced by native speakers of a given language was evaluated by the speakers of the same language, the tendency of higher accuracy scores for *sadness* rather than *happiness* holds true. Response time data is not easy to find in emotional prosody research. Only ten of the 31 studies reviewed here gave any account of the response times collected alongside accuracy. Three of those studies only gave descriptive report with no numeric values (Dimoska et al. 2010: 375; Drolet et al. 2012: 144; Rigoulot et al. 2013: 7), and one reported collapsed times for all emotions (Mitchell 2006a: 302). Of all the remaining studies, data indicates there are few and rather insignificant differences between the speed of processing of *sadness* or negative emotions and *happiness* or positive emotions, with a slight tendency for faster processing for *happiness* in German (Schirmer and Kotz 2003: 1138; Schirmer et

al. 2005: 446) and for *sadness* in other languages (Castro and Lima 2010: 77; Goerlich et al. 2011: 4; Kitayama and Ishii 2002: 49; Schirmer 2010: 3). All in all, regarding the Response Time data the results for emotional prosody processing are inconclusive.

There were only two studies wherein English emotional prosody was evaluated by non-English speakers (Pell et al. 2009; Sauter et al. 2009), and the results in terms of accuracy scores differed significantly. The recognition scores for Spanish speakers in Pell et al. 2009 mirrored the extremes presented by the English speakers in a variety of single language studies with 32% recognition of *happiness* and 74% recognition of *sadness*. The Himba speakers in Sauter et al. (2009) presented an entirely different pattern with 49,79% recognition of *amusement* (which was here interpreted as *happiness*) and 9,96% recognition of *sadness*. No response time data were reported in either of those studies. The cause of such marked differences cannot be ascertained form the data presented in the studies, but the East-West individualist-collective cultural divides might be a factor in here (see Markus and Kitayama 1991). This interpretation would classify the speakers of Spanish are representatives of Western culture with individualistic tendencies (much alike to English speakers), and the Himba tribesmen are a collectivist (albeit not Eastern) culture.

2.6. The design of the study for this dissertation

To summarize, the body of evidence on emotional prosody recognition suffers from a number of problems. It is overwhelmingly concerned with single language rather than cross-linguistic contexts, and is largely English-centric. The entanglement of prosody and semantics is still an unresolved problem, and each solution has its drawbacks. Though sentences appear to be generally accepted as the best compromise of stimulus length, the exact lengths in seconds or syllables are rarely reported, as are the exact transcripts of the sentences. *Happiness* and *sadness* are very consistently featured as target studied emotions, and acting is the preferred mode of expressing them. There is no uniform approach to the number of employed speakers/actors, with half the studies only employing one, and half employing multiple speakers/actors and balancing the number of speakers by gender. There is also very little consistency in whether or how to carry out validation studies. Regarding perception, the numbers of participants and the

composition of population samples varies greatly, though the response paradigms are by and large limited to forced choice out of basic emotions. Apart from above-chance recognition, the accuracy scores show little consistency across studies, and the response times are inconclusive, while the results for cross-linguistic recognition of English yields contradictory results.

The consensus in emotional prosody theory points to integrative paradigms as the way forward for research, and the existing research suffers from a number of consistency issues. Therefore, the method to be used in this dissertation was designed to both attempt to apply an integrative paradigm systematically, and to avoid the problems and inconsistencies preset in the existing research. The standard view procedure of forced choice out of basic emotion categories will be included for the sake of establishing a common methodological ground for comparisons between this dissertation and the existing literature. The dimensional procedure of evaluating valence and arousal will be included to investigate the recurring universal arousal effect in a more direct way than it has been done before, and to test once again for possible effects of valence. The free choice procedure, where participants name the feelings and emotions expressed in stimuli using words of their own choosing will be included to investigate how varied can the interpretations of emotional prosody can be. Combining those three types of procedures may not only extend the quality and quantity of data we have on emotional prosody processing in non-native speakers, but also reveal some of the dynamic mechanisms behind emotion processing on various levels.

2.6.1. Stimulation

The language of the study will be English, and the speakers will be native speakers of English, equal parts male and female. The speakers will be naive participants, not professional actors. They will contribute both natural and acted emotional expression samples, and they will be emotionally primed for both. The emotional priming will be conducted using *sad* and *happy* evocative film clips, which is a well-established emotion elicitation method (see Rottenberg et al. 2007). Natural expressions of emotion would be elicited in the course of a semi-structured dialogue between the speakers and the researcher following the viewing of each prepared clip. A session of acting out

emotions using prepared sentences will follow, whereby the speakers will be instructed to adopt a certain tone of voice (*happy* or *sad*) and say each sentence presented to them in that tone. The sentences will be taken from an existing spoken corpus of English, but they will be based on an existing set from the Velten technique of mood elicitation (Velten 1968). Throughout the procedure the speakers' mood and emotions will be monitored. Speakers will be randomly assigned to one of two study conditions, whereby each will only be primed for and perform one emotion. The language used throughout will be English, and prosody will be isolated using low band pass filters at 60-300Hz. Additionally, for the purposes of conducting a meticulous rating study, both video and audio samples of the speakers' expressions of emotions will be collected.

2.6.2. Validation

The validation planned for this dissertation will aim to obtain ratings and evaluations of the material recorded from the speakers in four modalities: (a) Audio-Visual Unfiltered which will contain video samples with normal, unfiltered audio, (b) Audio-Visual Filtered which will contain video samples with filtered audio, (c) Audio Unfiltered which will have samples of normal, unfiltered audio, and (d) Audio Filtered which will have samples of filtered audio. Although only the Audio Filtered (AF) stimuli would be used in the experiment proper, the ratings from other types of stimuli would help establish the relationship between the prosodic (the Filtered types), semantic (the Unfiltered types), and visual (the Visual types) cues to emotional expression in speech. The ratings will be obtained from a participants drafted from the same population as the speakers, and the types of rating tasks and procedures they would perform would be matched to the types of tasks and procedures to be performed by the participants in the experiment proper. Both male and female participants would be included, and efforts will be made to balance the male to female ratio.

2.6.3. Perception

Fluent bilingual speakers of English as a foreign language on two levels of proficiency will be the designated population samples for this dissertation. The low proficiency group estimated at level B1-B2 by Common European Framework of Reference for Languages (CEFR) will be freshmen at the Faculty of English, Adam Mickiewicz University in Poznań, Poland. The high proficiency group estimated at level C1-C2 by CEFR will be students of the later years (3rd year of BA program and MA program) at the Faculty of English, Adam Mickiewicz University. The participants will be evaluated for factors that might influence the data. An alexithymia scale will be administered to control for the potential significant developmental inability to recognize and name emotions, a Language History Questionnaire (LHQ) will be applied to filter out individuals not fitting the target linguistic profile of the population sample. An additional questionnaire administered after the experimental procedure will probe whether the participants could extract the speakers' gender and language from the filtered audio presented in the stimuli, and ask participants to rank the procedural tasks in order of difficulty. The details of the different stages of the empirical part of this dissertation including obtaining the stimuli (Stimulation), validating them (Validation), and performing perception experiments with them (Perception) are described in Chapter 3.

As the response time data is scarce and inconclusive in the existing body of evidence, the hypotheses to be tested in the course of the empirical work were all based on and targeted at accuracy measurements. Based on the previous research done in the field of emotional prosody reviewed here, and on what constitutes general consensus in the field, the following hypothesis are proposed to be tested in this dissertation:

> **Hypothesis 1:** Accuracy scores for *happiness* and *sadness* recognition will be lower for the participants of lower English language proficiency than for the participants of higher English language proficiency.
>
> **Hypothesis 2:** Accuracy scores for *sadness* will be higher than those for *happiness* for all participants regardless of their proficiency in English.
>
> **Hypothesis 3:** Accuracy scores for female speakers will be higher than those for male speakers regardless of emotion expressed.
>
> **Hypothesis 4:** The accuracy scores for acted emotion will be higher than that for natural emotion for all participants regardless of their proficiency in English.

Table 2. Basic summary of the studies discussed in the literature review – single language studies

No	Language(s)	Prosody isolated	Stimulus type	Emotion elicitation	Speakers	Validation	Response accuracy %	Response Times	Response mode	Participants
[1]	German	no	sentences	read as-if	1 GER (♀)	yes	98,82% happy	not reported	yes/no (word probe)	34 GER (18♀16♂) mean age=25,7; SD=3,0
[2]	German	no	words (verbs)	read as-if	2 GER (1♀1♂)	yes	≈93% positive ≈96% negative	≈910ms positive ≈915ms negative	forced choice: positive vs. negative v. neutral	64 GER (32♀32♂) mean age=24,5; SD=3,25
[3]	German	no	sentences	read as-if	1 GER (♀)	yes	≈88% happy ≈82% sad	≈1220ms happy 1225ms sad	LDT	20 GER (10♀10♂) mean age=24,0; SD=2,1
[4]	German	no	vocalizations & words	vocalize & read as-if	1 GER (♀) 1 BUL (♂)	no	"all participants correctly identified [the stimuli]"	not reported	VOCAL: oddball out task WORDS: congruency task	48 GER (22♀26♂) mean age=24,5; SD = ?
[5]	German	no	sentences	natural & acted	78 GER (naive) 42 GER (actors)	no	Acted identified as anger, natural as sadness; bias against identifying happiness.	"no sig. differences b-n emotions"	forced choice out of 4	24 GER (24♀) mean age=24,0; SD = ?
[6]	German	no	sentences	read as-if	1 GER (♀)	no	for all emotions = 73%; SD = 9%	not reported	forced choice out of 4	10 GER (10 ♂) mean age=25,0; SD = ?
[7]	German	no	sentences	read as-if	4 GER (2♀ 2♂)	no	63,05% sad 61,05% happy	not reported	forced choice out of 7	64 GER (32♀ 32♂) mean age=?; SD = ? age range=18-50
[8]	German	yes	sentences	read as-if	1 GER (♀)	yes	44,2% happy	not reported	forced choice out of 5	13 GER (?♀ ?♂) mean age=46,0; SD=11,85
[9]	German	yes	sentences	read as-if	1 GER (♀)	yes	for all emotions = 68,54%	not reported	forced choice out of 5	12 GER (1♀ 11♂) mean age=49,2;SD=?

[10]	English	no	passages	read as-if	4 ENG (2♀2♂)	yes	92,10% happy 77,63% sad	not reported	forced choice out of 6	19 ENG (11♀ 8♂) mean age=9,8; SD=1,8
[11]	English	no	senteces	read as-if	1 ENG (♀)	no	for all emotions = 71,88%	not reported	forced choice out of 6	69 ENG (19♀ 50♂) mean age=12,02;SD=2,49
[12]	English	no	sentences	read as-if	unspecified (different study referenced)	no	76,67% happy 83,3% sad	not reported	forced choice out of 4	18 ENG (?♀ ?♂) mean age=10,3; SD=1,5
[13]	English	no	numbers	read as-if	6 ENG (3♀3♂)	yes	73,92% happy 71,21% sad	not reported	forced choice out of 4	19 ENG (19♂) mean age=24,8; SD=8,79
[14]	English	no	sentences	read as-if	1 ENG (1♂)	yes	for all emotions = 94,55%; SD=6,36%	for all emotions = 2520ms; SD=290ms	forced choice out of 2	44 ENG (36♀ 8♂) mean age=18,7; SD=1,3
[15]	English	no	words	read as-if	1 ENG (1♂)	yes	85% happy 88% sad	≈1700ms happy ≈1200ms sad	recall task	112 ENG (56♀ 56♂) mean age=21,69; SD=1,6
[16]	English	yes	sentences	read as-if	4 ENG (2♀2♂)	yes	for all emotions = 72,5%	“no [sig.] differences”	forced choice out of 4	18 ENG (6♀ 12♂) mean age=44,4; SD=12,1
[17]	English	yes	sentences	read as-if	1 ENG (1♂)	yes	for all emotions = 81,5%	not reported	forced choice out of 2	28 ENG (22♀ 6♂) mean age=20,9; SD=3,1
[18]	English	yes	vocalizations & words	(uncertain) read as-if	unspecified	yes	for all emotions = 89,4%	not reported	forced choice out of 4	29 ENG (?♀ ?♂) mean age=23,3; SD=?
[19]	English	yes	sentences	read as-if	1 ENG (1♂)	no	"accuracy was positively correlated with bilateral activation of [selected brain areas]"	not reported	respond to happy	13 ENG (13♂) mean age=32,2; SD=0,93
[20]	English	yes	sentences	read as-if	1 ENG (1♂)	yes	for all emotions = 70% (SD=5,1%)	not reported	respond to happy	13 ENG (13♂) mean age=32,2; SD=3,6
[21]	English	yes	senteces	read as-if	6 ENG (3♀ 3♂)	yes	28% happy 63% sad	not reported	forced choice out of 6	24 ENG (12♀ 12♂) mean age=21,9; SD=2,4

[22]	English	yes	sentences	read as-if	4 ENG (2♀ 2♂)	yes	81% happy 87% angry	not reported	forced choice out of 3 + 1-5 certainty scale	26 ENG (12♀ 14♂) mean age=21,2; SD=2,6
[23]	English	yes	sentences	read as-if	4 ENG (2♀ 2♂)	yes	89,1% happy 94,4% sad	"faster from offset in happy no difference for sad"	forced choice out of 6	40 ENG (20♀ 20♂) mean age=25,0; SD=5,0
[24]	Portugese	yes	sentences	read as-if	2 POR (Eur.) (2♀)	yes	75% happy 84% sad	≈3000ms happy ≈2950ms sad	forced choice out of 7 + 1-7 adequacy rating scale	80 POR (72♀ 8♂) mean age=21,8; SD=6,1
[25]	Dutch	yes	words	read as-if	1 NLD (1♀)	yes	not reported	716ms sad 737ms happy	congruency with musical prime task	32 NLD (16♀ 16♂) mean age=23,8; SD=4,0
[26]	Japanese	no	phrases	read as-if	4 JAP (2♀ 2♂)	yes	≈65% happy ≈80% sad	not reported	forced choice out of 4	103 JAP (50♀ 53♂) mean age=12,33;SD=1,16
[27]	Japanese	yes	words	read as-if	26 JAP (13♀ 13♂)	yes	78% positive 82% negative	1280ms positive 1278ms negative	forced choice out of 2	110 JAP (87♀ 23♂) mean age=?; SD=?
	English	yes	words	read as-if	1 ENG (1♀)	yes	92,5% positive 96% negative	909ms positive 884ms negative	forced choice out of 2	38 ENG (24♀ 14♂) mean age=?; SD=?
	English	yes	sentences	read as-if	4 ENG (2♀ 2♂)	no	79,6% happy 90,5% sad	not reported	forced choice out of 7 + 5+point intensity scale	24 ENG (12♀ 12♂) mean age=24,9; SD=7,9
[28]	German	yes	sentences	read as-if	4 GER (2♀ 2♂)	no	59,6% happy 72,6% sad	not reported	forced choice out of 7 + 5+point intensity scale	24 GER (12♀ 12♂) mean age=24,2; SD=2,8
	Hindi	yes	sentences	read as-if	4 IND (2♀ 2♂)	no	67,1% happy 75,7% sad	not reported	forced choice out of 7 + 5+point intensity scale	20 IND (10♀ 10♂) mean age=21,55; SD=3,0

[31]	Arabic	yes	sentences	read as-if	4 SYR (2♀ 2♂)	no	59,9% happy 74,7% sad	not reported	forced choice out of 7 + 5+point intensity scale	19 SYR (9♀ 10♂) mean age=23,9; SD=5,1
	English	no	vocalizations	vocalize	4 ENG (2♀ 2♂)	yes	81% sadness 88,36% amusement	not reported	forced choice out of 2	51 ENG speakers 30♀ 21♂ mean age=28,85; SD=?
	Himba	no	vocalizations	vocalize	11 HIMBA (6♀ 5♂)	no	44,69% sadness, 19,86% amusement	not reported	forced choice out of 2	58 HIMBA speakers 32♀ 26♂ mean age=?; SD=?

The studies summarized above are as follows – the number in the table is given in brackets, study reference beside it: [1] Kotz and Paumlann 2007, [2] Schirmer and Kotz. 2003, [3] Schirmer et al. 2005, [4] Bostanov and Kotchoubey 2003, [5] Drolet et al. 2012, [6] Rota et al. 2008, [7] Paulmann et al. 2008a, [8] Paulmann et al, 2010, [9] Paulmann et al. 2008b, [10] Fujiki et al. 2008, [11] Schmidt et al. 2010, [12] Hopyan-Misakyan et al. 2009, [13] Alba-Ferrara et al. 2011, [14] Mitchell 2006b, [15] Schirmer 2010, [16] Dimoska et al. 2010, [17] Mitchell 2006a, [18] Sorocco et al. 2009, [19] Mitchell et al. 2003, [20] Mitchell et al. 2004, [21] Paulmann and Pell 2011, [22] Cornew et al. 2009, [23] Rigoulot et al. 2013, [24] Castro and Lima 2010, [25] Goerlich et al. 2011, [26] Fujisawa and Shinohara 2011, [27] Kitayama and Ishii 2002, [28] Pell et al. 2009b, [31] Sauter et al. 2009.

Table 3. Basic summary of the studies discussed in the literature review – single language studies

No	Language(s)	Prosody isolated	Stimulus type	Emotion elicitation	Speakers	Validation	Response accuracy %	Response Times	Response mode	Participants
[29]	Spanish (ARG), Arabic (SYR), English, German	yes	SENTENCES	read as-if	4 (2♀ 2♂) of each language	YES	happy: 89% SPA, 59% SYR, 32% ENG, 57% GER sad: 51% SPA, 77% SYR, 74% ENG, 65% GER all results are ≈	not reported	forced choice out of 7	61 SPA speakers 32♀ 29♂ mean age=27,0; SD=4,0
[30]	English, German, Chinese, Japanese, Tagalog	no	SENTENCES	read as-if	2 (?♀ ?♂) of each language	YES	happy: 99% ENG, 58% GER, 48% CHN, 58% JAP, 50% PHL sad: 90% ENG, 84% GER, 61% CHN, 79% JAP,98% PHL	not reported	forced choice out of 4	20 ENG speakers 12♀ 8♂ mean age=21,95; SD=?
[31]	English, Himba	no	VOCALIZATIONS	vocalize	English 4 (2♀ 2♂) Himba 11 (6♀ 5♂)	YES for English NO for Himba	sadness: 81% ENG, 44,69% HIMBA amusement: 88,36% ENG, 19,86% HIMBA achievement: 96,04% ENG, 33,14% HIMBA sensual pleasure: 51,84% ENG, 12,45% HIMBA relief: 67,24% ENG, ? HIMBA	not reported	forced choice out of 2	51 ENG speakers 30♀ 21♂ mean age=28,85; SD=? 58 HIMBA speakers 32♀ 26♂ mean age=?; SD=?

The studies summarized above are as follows – the number in the table is given in brackets, study reference beside it: [29] Pell et al. 2009a, [30] Thompson and Balkwill 2006, [31] Sauter et al. 2009.

Chapter 3: Stimulation – developing the experimental stimuli

3.1. Introduction

The first step towards testing the hypotheses driven by the research question and arising from the critical review of literature was the development of stimuli. To this end, video and audio recordings of native speakers of English expressing emotions of *happiness* or *sadness* were collected. Samples of audio and video were then extracted from the recordings and processed to become stimuli for the rating and experimental stages of this dissertation (Chapters 4-5). This stage was designed and carried out in collaboration with Dr Jeanette Altarriba with support from her team at the Cognition and Language Laboratory at University at Albany – SUNY, USA.

It was our intention to create a varied and multimodal set of stimuli, and to make the stimuli reach as high a level of ecological validity as was practicable. To this end, we have designed a new method of elicitation by combining a couple of existing ones, and introduced a number of control measures for the effects of the elicitation as well as the recruited speakers' idiosyncrasies. The materials used for the elicitation and control are described in the **3.3. Materials** section.

3.2. Participants

Participants were 8 individuals (4 male, 4 female; mean age = 18,63 years; *SD* = 0,48) drafted from the UAlbany Research Pool at University at Albany – SUNY. All participated for partial credit in their Psychology 101 course and gave written Informed Consent to the procedure. All were native speakers of English with minimal exposure to

or knowledge of other languages who identified most with American (US) culture (as indicated by measures of the Language Experience And Proficiency Questionnaire – LEAP-Q). The 8 participants constitute a subset of the Poznań-Albany Induced Emotion (PAIE) database, which consists of a cohort of 22 individuals (11 male, 11 female; mean age = 19,64 years; *SD* = 3,26) recorded at the University at Albany – SUNY. The subset of 8 participants used here was selected arbitrarily from the original pool of 22. The participants were randomly assigned to either *happy* or *sad* condition of emotion elicitation (see section **3.2.3. Procedure**), so that two male and two female participants were in the *happy* condition, two male and two female in the *sad* condition.

3.2.1. Alexithymia

Alexithymia is usually defined as a sub-clinical condition whereby the affected have difficulty identifying, naming and processing emotional stimuli (Maruszewski and Ścigała 1998: 134). It is measurable and can exist in mild forms affected by factors such as age, gender, and education (see Mattila et al. 2006). In extreme cases it can result in a complete inability to comprehend emotions, an "emotional illiteracy" as it were (Maruszewski and Ścigała 1998: 133). An alexithymia measure was implemented here to filter out individuals with very high or extreme levels of alexithymia, which we believed might confound the ultimate results of the elicitation, rating and experiment proper.

Participants' alexithymia scores presented the normal and expected trends for the population on all factors of the TAS-20. On "Difficulty Identifying Feelings" male speakers scored higher (M = 25,00; SD = 5,24) than female speakers (M = 23,50; SD = 3,84); on "Difficulty Describing Feelings" male speakers scored higher (M= 15,50; SD = 1,80) than female speakers (M = 11,75; SD = 1,30); on "Externally-Oriented Thinking" male speakers scored higher (M = 21,00; SD = 1,41) than female speakers (M = 19,75; SD = 1,64). Overall scores for male speakers (M = 61,5; SD = 6,02) also exceeded those of female speakers (M = 55; SD = 6,20) and exceeded slightly the cutoff point for positive alexithymia diagnosis (scores $\geq$ 61). That score is not extreme, and appears to be consistent with the comparatively young age of the speakers (Mattila et al. 2006: 634) and did not, therefore, constitute a study exclusion criterion.

3.3. Materials

There were two major concerns in the stimulus development procedure. One was the procedure of eliciting natural emotional expressions using evocative film clips and controlling for the emotion thus induced. The other was the procedure of eliciting acted emotional expressions through instruction and using linguistic material that would be adequate both in the light of the literature review (see Chapter 2) and the demands of the acting procedure. Described below are the materials used both for the elicitation of natural emotional speech and of acted emotional speech, as well as the materials used as control measures. To control for the effects of elicitation a variation on Rottenberg et al.'s (2007) Post-Film Questionnaire was used, and to control for speaker idiosyncrasies the Language Experience And Proficiency Questionnaire (LEAP-Q) and the Toronto Alexithymia Scale (TAS-20) was used.

The camera used to collect the recordings was SONY HDR-CX210E, producing a video resolution of 720×576, at bitrate 9356kb/s and 25 frames/second; the audio was recorded in stereo, at bitrate of 256kb/s and sampling rate of 48kHz.

3.3.1. Natural emotion elicitation materials

Film clips were used to induce emotions and serve as a topic for a semi-structured conversation with the researcher during which natural expressions of emotion were elicited. The clips were selected on the basis of previous research involving emotion elicitation using films. The clips from *The Champ* (1979) and *When Harry Met Sally* (1989) were selected after Rottenberg et al. (2007); the clips from *The Hangover* (2009), *Remember the Titans* (2000), *It's a Wonderful Life* (1946), *Saving Private Ryan* (1998), *Up* (2009), *My Girl* (1991), and *Dead Poets Society* (1989) after Bartolini (2011); the clips from *Benny and Joon* (1993), *There's Something About Mary* (1998), and *Shawshank Redemption* (1994) after Schaefer et al. (2010).

The clips from *Dead Poets Society* and *Shawshank Redemption* were excluded from the procedure in *sadness* condition to avoid potential adverse effects on the participants due to recent traumatic events around the UAlbany campus at the time. The clips from *Benny and Joon* and *There's Something About Mary* were excluded from the

procedure in the *happiness* condition to keep the procedure lengths comparatively even between the conditions. The selection of the clips to exclude from the *happiness* condition was arbitrary. The clip from *Frozen* (2013) was selected arbitrarily (see Procedure). The clips were used under Fair Use provisions for research and educational purposes. The details of the source films and the clips can be found in Table 4:

Table 4. Movie clips used for emotion elicitation – summary.

Movie (source)	Year	Director	Clip START	Clip END	Clip LENGTH	Emotion induced
When Harry Met Sally	1989	Rob Reiner	00:42:39	00:45:15	02:36	*happiness*
The Hangover	2009	Todd Phillips	00:22:41	00:28:28	05:47	*happiness*
Remember the Titans	2000	Boaz Yakin	01:39:02	01:45:10	06:08	*happiness*
It's a Wonderful Life	1946	Frank Capra	02:01:20	02:07:58	06:38	*happiness*
Benny and Joon	1993	Jeremiah S. Chechik	00:26:05	00:28:15	02:10	*happiness*
There's Something About Mary	1998	Bobby Farrelly and Peter Farrelly	01:40:51	01:44:37	03:46	*happiness*
The Champ	1979	Franco Zeffirelli	01:50:29	01:55:11	02:53*	*sadness*
My Girl	1991	Howard Zieff	01:23:14	01:25:47	02:33	*sadness*
Saving Private Ryan	1998	Steven Spielberg	00:28:43	00:33:08	04:25	*sadness*
Up	2009	Pee Docter and Bob Peterson	00:07:19	00:11:39	04:20	*sadness*
Dead Poets Society	1989	Peter Weir	01:43:20	01:47:47	04:27	*sadness*
Shawshank Redemption	1994	Frank Darabont	01:00:49	01:05:03	04:14	*sadness*
Frozen	2013	Chris Buck and Jennifer Lee	00:31:07	00:34:44	03:37	*happiness*

*The clip from The Champ was edited according to the directions given in Rottenberg et al. 2007.

3.3.2. Acted emotion elicitation materials

At the point in the elicitation procedure when they were asked to act out prepared sentences in an emotional tone of voice, the participants were also already primed for the required emotion by the film clips of the natural emotion elicitation procedure. What they needed were sentences to act out that would convey the same emotions they were primed for. The acting sessions were based on a set of sentences developed from an original set of sentences used for mood induction in what is known as the Velten technique (Velten 1968). The original Velten sentences were used fairly effectively (Westermann et al. 1996: 559) to induce a very general positive or negative mood, and

having been developed in the 1960s are somewhat dated. The speakers recruited for this procedure used a vernacular markedly different from that of the 1960s. Therefore the sentences had to be redesigned to comply to the contemporary vernacular that would be more familiar to the recruited speakers.

To this end the key emotional phrases of the Velten sentences were extracted and used as key words to search for new sentences containing those phrases in a corpus of contemporary spoken English. The corpus of choice was the spoken corpus within the Corpus of Contemporary American English – COCA (Davis 2008). The spoken COCA corpus consists of transcripts of interviews and news reports which were all originally spoken, and therefore lend themselves better to the acting task at hand than the original Velten technique set. The search for new sentences was limited to the period between 1990 and 2012, roughly corresponding to the ages of the target populations at various stages of this study. Thus, for example, from an original "negative" Velten sentence "I've had important decisions to make in the past, and I've sometimes made the wrong ones" the phrase "[be] wrong" was extracted, and a new sentence containing that phrase was found in the COCA: "I don't know what I was thinking. I was wrong. I shouldn't have done it." In another example, from an original "positive" Velten sentence "Today is neither better nor worse than any other day. I do feel pretty good today, though" the phrase "I feel good" was extracted and a new sentence containing that phrase was found in the COCA: "Well, I'm proud of what I've accomplished. I really am and I feel good." The full set of the original Velten sentences used, emotional phrases used to find new sentences in the spoken corpus as well as the resulting new sentences can be found in the Appendix H.

3.3.3. Control measures

For different variables that could potentially influence the results at this and later stages of the study, different control measures were applied. Regarding speaker idiosyncrasies we were interested in the speakers' linguistic backgrounds, their genders, and inherent alexithymia levels. For linguistic background, participants were screened with the Language Experience and Proficiency Questionnaire (LEAP-Q) (Marian et al. 2007) to make sure only native speakers of English who have spent all their lives in an English-

speaking country were included as speakers. Regarding gender, a gender-balanced sample of speakers arbitrarily selected from a larger database of recordings. Regarding alexithymia, the Toronto Alexithymia Scale (TAS-20) (Bagby et al. 1994) was administered to exclude individuals with very high or extreme levels of the condition. Exemplars of the LEAP-Q and the TAS-20 can be found in the Appendix (LEAP-Q in Appendix A, TAS-20 in Appendix B).

The effects of emotion elicitation procedure was controlled using a modified version of the Post-Film Questionnaire (PFQ) used by Rottenberg et al. (2007). After watching each and every film clip, each speaker additionally filled out a questionnaire which combined a Self-Assessment Manikin (Bradley and Lang 1994: 51) and the PFQ questionnaire as developed by Rottenberg et al. (2007: 17). An exemplar of the PFQ questionnaire as used in this study can be found in Appendix C. The results are reported in the 3.5. Results section.

3.4. Procedure

At the beginning of the procedure speakers read and signed the Informed Consent. Only speakers who agreed to the terms of the study were included in it. Speakers then filled out first the LEAP-Q and then the TAS-20 questionnaires. Following that, they were presented with four emotion elicitation trials. Each speaker was assigned randomly to either of two emotion conditions: *happiness* or *sadness*, so that for each speaker expressions of only one of these emotions were recorded. Emotions were induced through emotionally charged clips from various movies – *sad* clips for the *sadness* condition and *happy* clips for the *happiness* condition. Each speaker went through four trials, each starting with an emotionally evocative clip, followed by a semi-structured dialogue with the researcher pertaining to the speakers' feelings about the clip and its contents. During this conversation samples of naturally emotional speech were collected. The speakers then filled out a Post-Film Questionnaire. Following that, each speaker was presented with a series of sentences which were semantically *sad* for the *sad* condition and *happy* semantics for the *happy* condition. Each sentence had to be spoken in a *happy* or *sad* tone of voice – congruent with both the semantics of the sentence and the emotion a given participant was primed for. The *sadness* condition was

additionally followed up by a clip from the movie Frozen (the "Let it go" sequence) designed to relieve the *sadness* induced over the course of the procedure. At the conclusion of the procedure, the speakers were presented with a Debriefing Form, awarded credit for their participation, thanked and released. Throughout the procedure all speakers' emotional expressions were recorded on camera. The Informed Consent and the Debriefing form for this stage can be found in the Appendix (Informed Consent in Appendix L, Debriefing Form in Appendix M).

The setup of the room in which recordings were done was based on the setup proposed by Quiros-Ramirez et al. (2012: 3). Recordings were collected from each participant individually. Each participant was seated in front of a computer screen on which emotion elicitation clips, procedural prompts, and sentences used for the acting sessions were presented. A video camera was positioned right above the screen angled in such a way that the participants were visible on screen from their knees up while seated. The researcher conducting the procedure was seated at a slight angle to the participant, so that face-to-face communication was comfortable, while the researcher had constant access to the control panels of both the computer screen and the camera, and could watch the clips along with the participants.

3.5. Results

The Self-Assessment Manikin incorporated in the PFQ yielded two types of data that allowed to make an overall assessment of the effectiveness of emotion induction. First, the Self-Assessment Manikin yielded arousal and valence data which allowed to assess those broad dimensions of feeling in the speakers as influenced by the film clips. Second, the built-in emotion term list where participants indicated which emotions and to what degree of intensity they felt while watching the film clips allowed for a finer assessment of which specific emotions surfaced as a result of watching the film clips.

The speakers' self-assessments of valence and arousal differed for male and female speakers and for the emotions of *sadness* and *happiness* that were induced in them. *Happiness* was felt to be of higher arousal/intensity than *sadness*, and male speakers assessed themselves as experiencing lower emotional arousal than female speakers. The valence was very clearly and definitively defined for both genders, with

sadness assessed unequivocally as negative and *happiness* as positive. With respect to valence the manipulation of emotion could thus be said to have been successful. The speakers primed for *happiness* indicated experiencing emotions of positive valence, albeit only female speakers felt positive at a correspondingly high level of arousal. The speakers primed for *sadness* felt indicated experiencing emotions of negative valence and corresponding low arousal in both genders. Figure 4 indicates where each speaker pair would fit on a circumplex model:

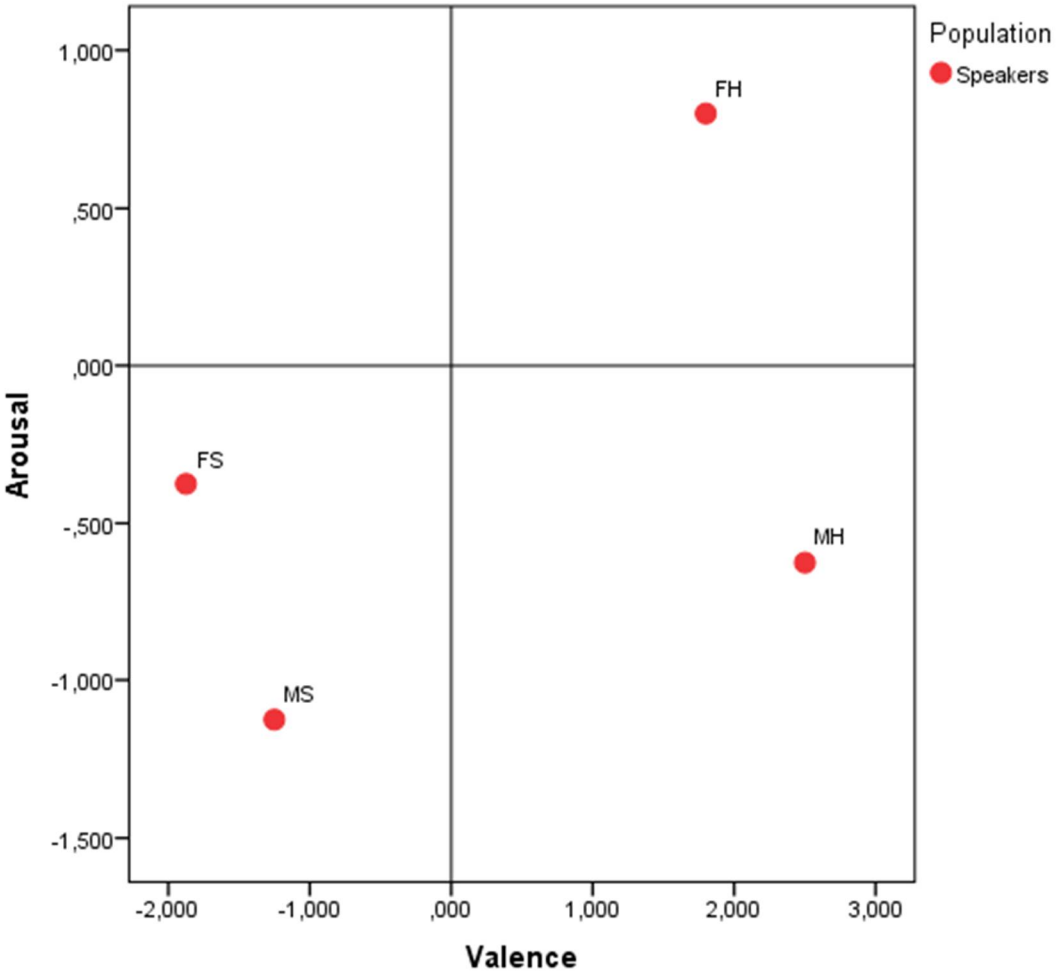

Fig. 4. The speakers' self-assessment of arousal and valence averaged for all the film clips watched. FH stands for "female *happy*", FS stands for "female *sad*", MH stands for "male *happy*", and MS stands for "male *sad*".

The Post-Film Questionnaire also contained a section very similar in principle to the PANAS questionnaire (see Chapter 4), where the speakers could choose from among 18 emotion terms and indicate on a 7-point Likert scale to what degree of intensity they

experienced a given emotion. In other words, participants would select the emotion words that described their own emotions best and which were the most powerfully experienced. The pattern of emotion terms selected was markedly different between the speakers primed to feel *happy* and those primes to feel *sad*. Additionally there was some differentiation between what self-assessments male and female speakers made when primed to feel *sad*, with female speakers, who indicated experiencing stronger *sadness* and un*happiness*. Figures 5 and 6 below illustrate the mean values for each of the 18 emotion words indicated by each speaker pair in each emotion condition.

The speakers in the *happy* condition indicated that the most often and most strongly experienced emotions were *amusement*, *happiness*, *joy*, and *interest*. The other registered emotions (in this condition: anxiety, confusion, contempt, *disgust*, embarrassment, *fear*, guilt, love, pride, *sadness*, shame, *surprise*, and un*happiness*) may have appeared due to the varied and variously socially acceptable scenes in the clips presented to the participant. For example the emotions of *disgust*, *embarrassment* and *shame* could be the result of watching the clip from *When Harry Met Sally*, wherein the script demands that the actress Meg Ryan fakes an orgasm in a crowded diner. On the other hand, the feelings of *sadness* and *unhappiness* may be due to both being conveyed in the first half of the clip from *It's a Wonderful Life*, and *pride* due to the overall plot of the clip from *Remember the Titans*.

More of a gender effect can be seen in the results from the speakers in the *sad* condition, where the female speakers appeared to register many more emotions and at higher levels than did male speakers. The emotions indicated most often and experienced most strongly in this condition were *sadness*, *unhappiness*, and *interest*. Here as well the other registered emotions can be explained by the contents of the film clips presented. Emotions such as *anger*, *fear* and *anxiety* could have been caused by the scene of the main hero's meltdown at the funeral of her childhood friend in *My Girl*. On the other hand, emotions such as *amusement*, *joy* and *love* might have been evoked by the first half of the clip from *Up*, which is on the whole a story of a *happy* lifelong relationship of two people.

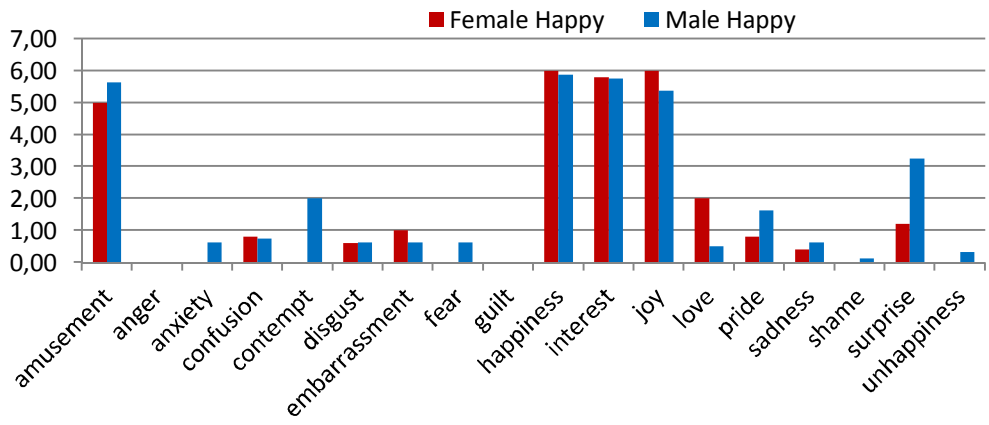

Fig. 5. Emotion term scores for the *happiness*-eliciting film clips in the *happy* condition. FH stands for "female *happy*", MH stands for "male *happy*."

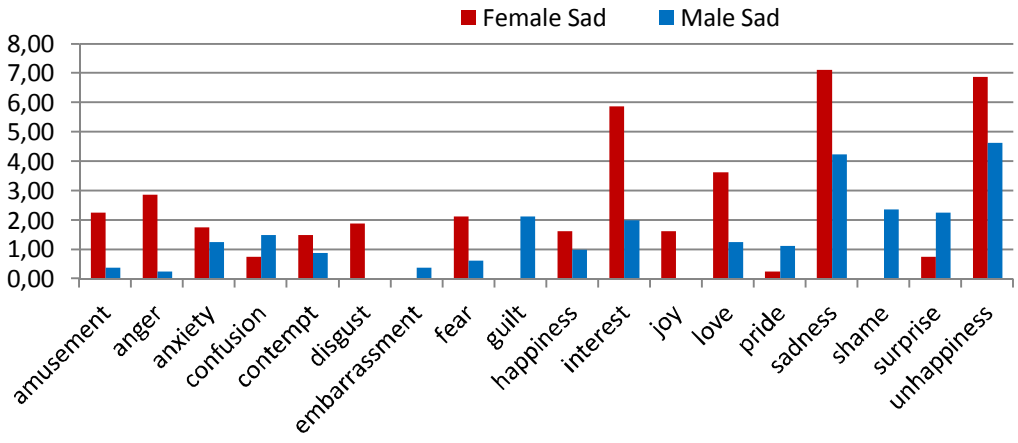

Fig. 6. Emotion term scores for the *sadness*-eliciting film clips in the *sad* condition. FS stands for "female *sad*", MS stands for "male *sad.*"

To control for repeated exposure to the film clips, one of the questions on the Post-Film Questionnaire asked the speakers whether they had seen the movies. Within the *happy* condition one female and both male speakers had seen the movie *Hangover* before, one female and both male speakers had seen the movie *Remember the Titans*, and one male speaker had seen the movie *When Harry Met Sally*. None of the speakers had seen the movie *It's a Wonderful Life*. Within the *sad* condition both female speakers had seen the movie *My Girl*, one of the female speakers had seen *Up*, and *Saving Private Ryan*, none of the male speakers had seen any of the four movies presented in the *sad* condition. All of the participants within the *sad* condition had seen the movie *Frozen*.

3.5.1. The recordings

In the course of the natural and acted emotion elicitation procedure the speakers' emotional expressions were recorded in both audio and video format. The raw recordings for each participant had a mean length of 38min 52s. Samples which would later be developed into natural stimuli were cut from the recordings of the semi-scripted dialogues with the researcher following each clip viewing. Samples which would later be developed into acted stimuli were cut from the recordings of the acting sessions. Noise pollution and audio artifacts constituted first order exclusion criteria for the samples. Second order exclusion criteria differed between the acted and natural condition. For the acted samples only the examples of sentences acted out by all four speakers for a given condition were selected, resulting in a total of 12 samples for each speaker, and a total of 48 samples of average length of 4,9s per emotion condition (*happy*/*sad*). For the natural samples the utterances shorter than 3 seconds and longer than 9 seconds were excluded, resulting in a total of 33 samples per emotion condition (due to speaker idiosyncrasies some speakers are better represented in the natural samples subset than others). The number of samples was thus 96 acted (12 samples × 4 speakers × 2 emotions) and 66 natural (33 samples × 2 emotion conditions; counterbalanced for gender and emotion) for a total of 162 samples. A full inventory of acted sentences and natural utterances transcription can be found in Appendix I.

3.5.2. Processing of the recordings into emotional prosody

The original format of the recordings was HD video. Audio was extracted from the samples using Adobe Premiere Pro CC software. The volume levels were matched and noise reduction applied across all samples using Adobe Audition CC software prior to any further operations. A low band pass filter was then applied to the samples using Praat software. The audio was filtered at 60-300Hz. The effect of the filter was that the semantic content was impossible to discern, but the general prosodic features were retained. Using video, unfiltered and filtered audio samples four types of stimuli were created for the rating (Chapter 4) and experimental (Chapter 5) procedures. The resulting four modalities of developed stimuli varied with respect to the presence of

video and the filtering of audio. The Audio-Visual Unfiltered (AVU) stimuli were video samples with normal unfiltered audio; Audio-Visual Filtered (AVF) were video samples with filtered audio; the Audio Unfiltered (AU) samples were unfiltered audio samples with no video; the Audio Filtered (AF) were filtered audio samples with no video. All those types of stimuli were then used in the rating study to determine how emotional prosody relates to other manifestations of emotion such as facial expressions and semantic content. The AF stimulus type was then used in both the rating and experimental studies. The four different modalities of stimulus were then used in the rating study to ascertain that emotions can be recognized from emotional prosody whether or not accompanied by visual and semantic cues.

3.6. Conclusions for the Stimulation stage

The aim at the first stage of this study was to create stimuli to use in further empirical steps. Our intention was to develop stimuli that would be as ecologically valid as was possible to make them in a controlled laboratory setting without compromising research ethical concerns as well. For this reason low-arousal *happiness* and *sadness* were selected as target emotions to be induced alongside a well-established method of emotion induction using films. For the same reason naive native speakers of English with no background in acting were employed as speakers and allowed to use regular English rather than a pseudo-language. I attempted, through the semi-structured dialogues following each film clip viewing to elicit some natural material, while the acting sessions were included as it is a safe and established method of obtaining stimuli for emotional prosody research. To avoid possible researcher bias in assessing the material produced by the speakers, I included both self-assessment by the speakers as well as a rating procedure in this study. The results of the ratings are reported in Chapter 4.

The results of the speakers' self-assessment indicate that the induction of emotions was, on the whole, successful. Speakers primed to feel *happy* clearly indicated experiencing positive emotions, specifically exemplified by *amusement*, *joy* and *happiness*. Speakers primed to feel *sad*, on the other hand, clearly indicated experiencing negative emotions, most prominent of those being *sadness* and

un*happiness*. The high scores for interest indicated by speakers in both *happy* and *sad* conditions I believe to indicate the continuous engagement of the speakers in the procedure. All in all, at this stage, based on the methodology applied and the speakers' self-assessments, the speakers primed to feel *happy* felt *happy* and the speakers primed to feel *sad* felt *sad*. In other words, the emotion manipulation at this stage was successful.

Chapter 4: Validation – verifying the effectiveness of stimuli

4.1. Introduction

The validation study was designed and conducted in collaboration with Dr Jeanette Altarriba at her the Cognition and Language Laboratory at the University at Albany – SUNY. The grand majority of the validation/rating data was collected by Gabrielle Roy, with help from Catherine G. Payano, both dedicated Research Assistants at the Cognition and Language Laboratory.

The aim of this study was to validate the stimuli developed for this dissertation. The stimuli were created using methods previously shown to be highly effective (see Gross and Levenson 1995), and the speakers' self-assessments indicated they indeed felt the emotions they were primed to feel. However, it was necessary to verify that the stimuli as created would be perceived and assessed consistently with their design and the speakers' own assessments by other individuals. Because emotions are, as shown by evidence form anthropology and partial evidence from psychology, a matter of social in-group communication, such assessments would have to come from members of the same community as the speakers. Therefore a validation study was designed to collect ratings on the stimuli from members of the same population the speakers were recruited from.

The rating study was additionally designed to investigate how emotional prosody is assessed when it is processed in isolation or alongside semantic and visual cues. To make such comparison four types of stimuli were created containing four combinations of video, filtered and unfiltered audio as described in detail in Chapter 3. Manipulating how much of the emotional expression the participants could see and hear

would simulate a variety of real-life situations: (a) where we might see and hear the expression clearly (the AVU stimulus condition); (b) where we can see but not hear clearly (the AVF stimulus condition); (c) where we can only hear clearly (the AU stimulus condition); and (d) where we can nether see nor hear clearly but still perceive the emotion expressed (the AF stimulus condition).

Furthermore, the rating was designed as an integrative paradigm, and included: (a) a Dimensional Paradigm wherein raters were asked to assess stimuli for valence and arousal/intensity; (b) a Categorical Paradigm, wherein raters were asked to categorize stimuli as *happy* or *sad*, and (c) a Free Label Paradigm wherein raters could use words of their choosing to describe the emotional content of the stimuli. Implementing all those three paradigms would allow for an in-depth description of how raters understood and assessed the stimuli on various levels of complexity and would allow to ultimately determine whether the stimuli fulfil their purpose of conveying the intended emotions of *sadness* and *happiness*.

4.2. Participants

Because the main task of the participants here was rating the stimuli described in Chapter 3 and for purposes of clarity, the participants at this stage will be referred to as "raters". Total number of raters was 45, 16 male, 29 female (mean age = 19,02 years; SD = 2,05), all drafted from the UAlbany Research Pool at University at Albany – SUNY. All participated for partial credit in their Psychology 101 course and gave written Informed Consent to the procedure (the Informed Consent can be found in Appendix N, the Debriefing form for this stage in Appendix O). Due to a coding error, data from 9 participants had to be discarded[13]. The raters were a heterogeneous group, largely composed of native speakers of English (see **4.2.1. Native cohort** section below for details), with a number of English-dominant bilinguals (see **4.2.2. Bilingual cohort** section below for details). It was decided not to exclude raters on grounds of linguistic background, as the linguistic and ethnic diversity is the norm of the social context for this population sample. Additionally, all the bilingual raters have spent all their lives in

[13] Population profile corrected after discarding the data with coding errors: total number of participants 36, 14 male, 22 female (mean age = 19,14 years; SD = 2,24).

an English-speaking country, and for most of them that country was the United States of America. The only two exceptions on this account included one from an English-speaking region of Haiti, one from an English-speaking region of India.

4.2.1. Native cohort

28 raters, 12 male, 16 female (mean age = 18,64; SD = 0,97), constituting 77,78% of the population sample. These participants lived all their lives in an English-speaking country (USA), used the English language exclusively in family, professional, and social contexts, and for the most part identify with the American (US) culture. Four raters indicated some level of identification with the Hispanic culture, two with the Dominican culture, one with the Latino culture, one with the Japanese culture, one with the Middle-Easter culture, one with the French culture, one with the Cape Verden culture, one with the Trinidadian culture, one with the Arabic culture, one with the Chinese culture, and one with the African-American culture.

4.2.2. Bilingual cohort

8 raters, 2 male, 6 female (mean age = 20,88; SD = 3,92), constituting 22,22% of the population sample. These participants varied in their linguistic backgrounds. In this group the shortest length of stay in the USA was 2,5 years (for an 18-year-old rater originally from India), and the longest was 23 years (for a 30-year-old rater originally from the Philippines). All the bilingual raters identified most with the American (US) culture, scoring on average 7,43 on a 10-point-scale for US American cultural identification and 4,73 on a 10-point-scale on identification with other cultures. The bilingual raters often listed more than one cultural identification in addition to the US American and the culture of their declared second language. The other cultures were: Haitian Creole, French, Gujarati, Spanish, Filipino, Polish, Indian, Muslim, Chinese, Japanese, and Latino. With the exception of one rater indicating Spanish cultural identification and Spanish bilingual status, all bilingual raters used both English and their other languages in family, professional and social contexts.

4.2.3. Alexithymia scores for the raters

Participants' alexithymia scores presented normal trends for the population on all factors of the TAS-20. There were very slight differences between male and female populations, which may owe more to the fact that the female raters were more numerous than to actual levels of population-wide alexithymia. On "Difficulty Identifying Feelings" male raters scored lower (M = 28,21; SD = 6,20) than female raters (M = 29,05; SD = 5,13); on "Difficulty Describing Feelings" male speakers scored higher (M= 16,36; SD = 2,72) than female speakers (M = 16,32; SD = 2,83); on "Externally-Oriented Thinking" male speakers scored lower (M = 21,21; SD = 3,57) than female speakers (M = 23,36; SD = 3,98). Overall scores for female speakers (M = 68,73; SD = 8,71) also exceeded those of male speakers (M = 65,86; SD = 8,26) and exceeded slightly the cutoff point for positive alexithymia diagnosis (scores $\geq$ 61), though that score is consistent with the young age of the speakers and did not, therefore, constitute a study exclusion criterion.

4.2.4. PANAS-X scores – measuring the impact of the procedure

Positive and Negative Affect Schedule (PANAS-X) was administered before and after the rating procedure to control for the overall emotional effects of the study (see 4.4. Procedure). The PANAS-X questionnaire is composed of a list of 60 emotion terms and a 5-point scale of intensity of experience of a given emotion, and it is used to assess emotional state of the responder at any given moment. To describe their emotional condition, raters assigned intensity of experience scale numbers to those emotion terms which described their emotions best right before and immediately after the rating procedure. The emotion terms which ranked within the top 10 before and after the rating procedure are listed in Table 5 below along with their mean scores:

Table 5. Top ten items on the PANAS-X questionnaire before and after the rating procedure.

BEFORE	mean	rank	mean	AFTER
calm	3,58	1	3,19	*tired*
attentive	3,50	2	3,17	*attentive*
relaxed	3,44	3	3,14	*calm*
concentrating	3,36	4	3,14	*sleepy*
tired	3,11	5	2,94	*relaxed*
sleepy	3,06	6	2,89	*concentrating*
at ease	2,97	7	2,86	*at ease*
interested	2,78	8	2,64	*alert*
cheerful	2,75	9	2,47	*drowsy*
confident	2,75	10	2,44	*confident*

The complete ranking of all 60 PANAS-X items can be found in Appendix J. The top 10, however, illustrates the general trend in the data well. On the whole, the results indicate that, apart from slight fatigue (indicated by the climbing ranks of items such as tired, sleepy, and drowsy), the procedure had no adverse effects on the raters. The procedure also seems to have held the raters' attention throughout as indicated by the consistently high scores of attentive and concentrating both before and after, though they also appeared to have lost some confidence in the aftermath of the procedure.

4.3. Materials

Materials at this stage included questionnaires and audio-visual stimuli. The questionnaires were: the LEAP-Q administered to investigate the linguistic backgrounds of the participants, the TAS-20 administered to control for the potential effects of alexithymia, as well as the Positive And Negative Affect Schedule (PANAS-X) administered before and after the experimental task to control for the influence of the emotional content of the task. The audio-visual materials included the stimuli developed and described in Chapter 3. The stimuli were organized into sets of 28-30 samples of each of the four stimulus types: (a) the Audio-Visual Unfiltered (AVU) stimuli, which were video samples with normal unfiltered audio; (b) Audio-Visual Filtered (AVF) which were video samples with filtered audio; (c) the Audio Unfiltered (AU) samples were unfiltered audio samples with no video; (d) the Audio Filtered (AF) which were filtered audio samples with no video. For the experimental tasks 4 sets of samples, one from each type of stimulus, were arranged into blocks for the raters to evaluate in

accordance with the experimental tasks assigned to them. Experimental task sets were organized so that each rater would evaluate samples of all four types of stimuli in equal proportions. The selection of stimuli in each set was counterbalanced for the speakers' gender (male × female), emotions expressed (*sad* × *happy*), and voice condition (*acted* × *natural*). In each experimental task as prepared raters would evaluate a total of 112-120 stimuli.

4.4. Procedure

All raters took part in the study in individual sessions. Each gave a written Informed Consent to participate in the study, and only raters who had agreed to all the terms of the study took part. At the start, raters filled out the LEAP-Q and the first PANAS-X questionnaires. Following this, they performed a computer-based experimental task composed of four blocks composed of stimuli of various modalities. At the end of the procedure, raters filled out the second PANAS-X, and the TAS-20 questionnaires. Finally, they were given the Debriefing Form, awarded credit, thanked, and released. The Informed Consent, Debriefing Form, and the PANAS-X questionnaire can be found in the Appendix (PANAS-X in Appendix D, Informed Consent in Appendix N, Debriefing Form in Appendix O). During the computer-based task, raters evaluated first the AVU stimuli, followed by AVF stimuli, followed by AU stimuli, and finally AF stimuli. The raters were randomly assigned to one of three experimental procedures. The procedures differed in what type of rating/evaluation was required of the raters. Each of these procedures will therefore be described separately.

Because of procedural limitations such as time limits set to prevent emotional fatigue, counterbalancing and randomization, the stimuli to be rated had to be divided into smaller sets to be rated. These considerations combined with the study design meant that although each of the original source samples was rated by four raters, each stimulus modality (AVU, AVF, AU, AF) only had one rater. For example, an original source video sample from a female speaker coded F1HA10 was processed into four types of stimulus by modality: F1HA10-AVU, F1HA10-AVF, F1HA10-AU, F1HA10-AF. Each of these four stimulus modalities was rated by one rater, though on the whole the original source sample was rated in total by four raters.

4.4.1. The Dimensional Procedure

In this procedure raters were asked to listen and/or watch each stimulus and rate it on two scales. The participants used the first scale to rate the emotional content of the stimuli on how *positive* or *negative* it was. The scale ranged from (-3) for *negative* through (0) for *neutral*, to (3) for *positive*. Using the second scale, participants rated how *intense* the emotion expressed was. This scale ranged from (-3) for *low intensity*, through (0) for *moderate intensity*, to (3) for *high intensity*. The participants responded by typing the appropriate numbers from the scales into the provided response window using the number pad on the computer keyboard. Participants would type in the scalar value of their choosing and hit "Enter" to proceed to the next scale and on to the next stimulus.

4.4.2. The Categorical Procedure

In this procedure participants were asked to assign each stimulus they heard and/or saw into one of three categories: *happy*, *sad*, or *neutral*. For this task strips of paper with emoticon-type faces were attached to three keys on the keyboard. Participants were instructed to hit the key with a smiling face (☺) for *happy* categorization, the key with a *sad* face (☹) for *sad* categorization, and the key with a level face (😐) for *neutral* categorization. The keys used were "v" for *happy*, "b" for *neutral*, and "n" for *sad*. Despite the fact that there was no *neutral* stimuli in the set, the option was included as an alternative to allow participants to relegate there the stimuli too hard to clearly classify as either *happy* or *sad*.

4.4.3. The Free Label Procedure

In this procedure participants were asked to name the emotion in each stimulus they heard and/or saw using just one word. The participants were expressly allowed to use any words that would describe any internal state – including bodily and mental states in addition to feeling and emotional states. They were allowed to use any part of speech

that would relate to or describe the internal state of the speakers but had to limit their responses to a single word to each stimulus. In this task the participants were allowed to use the entire keyboard including the backspace to correct their entries. They would type in their responses and hit "Enter" to move on to the next stimulus. To alleviate the potential stress of committing spelling errors in this experimental task, participants were advised that spelling was not an issue, and not to focus on it, but rather on naming the feelings and emotions in the stimuli.

4.5. Results

Because of the differences in the rating procedures, the results of each procedure will be discussed separately. For all procedures, however, two kinds of manipulation were of significance. First, the speaker manipulation, that is the differences in the composition and contents of the stimuli dependent on the speaker variables. Accordingly, speaker manipulation included the following variables: two genders (male × female), two emotions (*happiness* × *sadness*), and two voice conditions (natural × acted), resulting in eight combinations: Female Happy Acted (FHA), Female Happy Natural (FHN), Female Sad Acted (FSA), Female Sad Natural (FSN), Male Happy Acted (MHA), Male Happy Natural (MHN), Male Sad Acted (MSA), Male Sad Natural (MSN). The other kind of manipulation was stimulus modality manipulation, that is the differences in the composition and contents of the stimuli dependent on the audio and video modalities included in them. Accordingly, the stimulus modality resulted in the following types of stimuli: Audio-visual Unfiltered (AVU), Audio-Visual Filtered (AVF), Audio Unfiltered (AU), and Audio Filtered (AF). It was expected that both types of manipulation could influence the raters' perceptions of the speakers' emotional expressions.

4.5.1. The Dimensional Procedure

The overall ratings from the dimensional procedure indicate that both kinds of manipulation (speaker and stimulus modality) had an effect on how the stimuli were

evaluated, though the modality manipulation exerted the greater influence on ratings. To reiterate, in the Dimensional Procedure raters assigned valence and arousal/intensity ratings on scales ranging from (-3) to (3), and the scores reported here are means calculated from the ratings given to various types of stimuli. Table 6 lists the mean scores of arousal/intensity and valence across both kinds of manipulation, while Figure 7 illustrates how the different types of stimuli would fit onto a circumplex model.

Table 6. Mean scores of valence and arousal across speaker manipulation and stimulus modality manipulation.

	AVU		AVF		AU		AF	
	valence	**arousal**	**valence**	**arousal**	**valence**	**arousal**	**valence**	**arousal**
FHA	2,057	1,852	0,663	1,084	2,525	1,800	0,895	1,107
FHN	1,045	0,409	0,917	0,417	1,040	0,520	0,292	0,043
FSA	-2,111	-0,189	-1,098	0,098	-1,961	0,275	-1,471	0,412
FSN	-0,667	-0,208	-0,680	-0,083	-1,240	0,280	-0,500	0,115
MHA	2,500	1,700	0,692	0,731	2,519	1,393	0,609	0,870
MHN	0,879	0,576	0,500	0,344	0,839	0,871	0,129	0,677
MSA	-2,217	-0,217	-1,354	0,063	-1,894	0,277	-1,170	0,511
MSN	-1,533	-0,233	-1,296	0,333	-1,429	0,321	-1,536	0,731

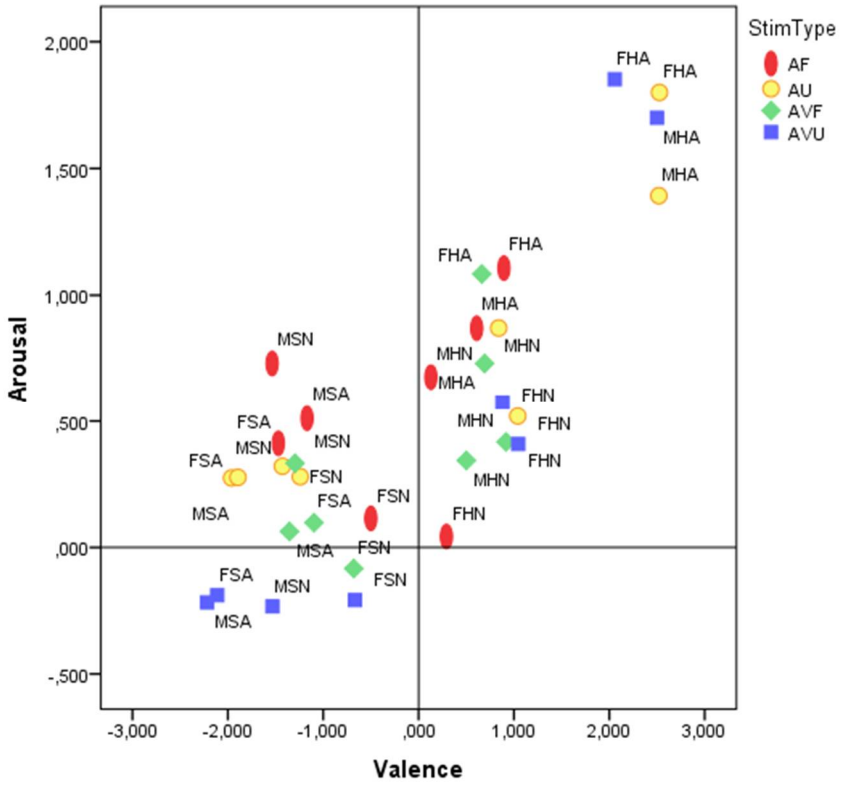

Fig. 7. Valence and Intensity ratings of all stimuli by the stimulus modality and the speaker manipulations.

Several tendencies are apparent in the ratings with respect to both kinds of manipulation (speaker and stimulus modality). One, that the stimuli types containing semantics (AVU, AU) yield very similar results and scatter patterns regardless of the gender of the speakers. Two, that the stimuli types without semantics (AVF, AF) also yield very similar results regardless of the gender of the speakers. Three, that the acted stimuli tend to be rated as more clearly defined in terms of valence (more extreme positions on the *x* axis) and arousal/intensity (more extreme positions on the *y* axis). Fourth, that contrary to the overall consensus in the field of emotional prosody research, regardless of any kind of manipulation, valence is very unambiguously defined across the different types of stimuli. Each of these tendencies yielded additional smaller-scale patterns of data distribution, each of which will be discussed separately.

The highest ratings for both valence and arousal/intensity were given to the stimuli which contained semantics and acted expressions of *happiness*. Within the AVU stimulus modality the Male Happy Acted (MHA) speakers (valence M = 2,500; arousal/intensity M = 1,700) were rated as slightly more positive, but less intensive in their expressions than Female Happy Acted (FHA) speakers (valence M = 2,057; arousal/intensity M = 1,852). Within the AU stimulus modality there was hardly any difference in valence, but a marked difference in arousal/intensity, with Male Happy Acted (MHA) speakers (valence M = 2,519; arousal/intensity M = 1,393) rated as much less intensive in their expressions than their Female Happy Acted (FHA) counterparts (valence M = 2,525; arousal/intensity M = 1,800).

The natural expressions of *happiness* were generally rated much lower in terms of both valence and arousal/intensity than the acted expressions. Within the AVU stimulus modality the Female Happy Natural (FHN) speakers (valence M = 1,045; arousal/intensity M = 0,409) were rated as slightly more positive, but less intensive in their expressions than Male Happy Natural (MHN) speakers (valence M = 0,879; arousal/intensity M = 0,576). The Same trend held within the AU stimulus modality, with the Female Happy Natural (FHN) speakers (valence M = 1,040; arousal/intensity M = 0,520) were rated as slightly more positive, but less intensive in their expressions than Male Happy Natural (MHN) speakers (valence M = 0,839; arousal/intensity M = 0,871).

The tendency towards more strongly defined ratings for acted rather than natural stimuli held for the *sad* expressions of emotion in the stimuli modalities containing

semantics, though it was much less pronounced. Within the AVU stimulus modality for the acted expressions of *sadness* the differences between Female Sad Acted (FSA) speakers (valence M = -2,211; arousal/intensity M = -0,189) and Male Sad Acted (MSA) speakers (valence M = -2,217; arousal/intensity M = -0,217) were negligible. The same trend held within the AU condition with negligible differences between the Female Sad Acted (FSA) speakers (valence M = -1,961; arousal/intensity M = 0,275) and the Male Sad Acted (MSA) speakers (valence M = -1,894; arousal/intensity M = 0,277).

The natural expressions of *sadness* in the stimuli modalities containing semantics were rated remarkably similar to the acted expressions in terms of intensity, but slightly lower in negative valence. Within the AVU stimulus modality for the natural expressions of *sadness*, Male Sad Natural (MSN) speakers (valence M = -1,533; arousal/intensity M = -0,233) were rated as markedly more negative than Female Sad Natural (FSN) speakers (valence M = -0,667; arousal/intensity M = -0,208)1 though the differences in intensity ratings for both were negligible. It is also worth noting, that for the *sad* stimuli there was a difference in intensity ratings between the AVU and AU stimulus modalities. The AU scoring consistently so high in intensity their mean ratings were positive, as opposed to the AVU modality wherein the mean intensity was negative.

The pattern of distribution of ratings for the stimulus modalities without semantics (AVF, AF) is much less differentiated and less clearly defined than the distribution for stimulus modalities which contain semantics. The main differentiation appears to be along the *y* axis of arousal/intensity rather than the *x* axis of valence, though ratings still yield a fairly clear effect of valence. All expressions of *happiness* in the non-semantic stimulus modalities appear to be distributed vertically, with very slight differences in valence ratings, though with that in mind, the overall pattern of better definition of the acted vs. natural expressions holds here as well. Thus within the AVF modality the speakers were rated as roughly equivalent in valence, though the Female Happy Acted (FHA) speakers (valence M = 0,663; arousal/intensity M = 1,084) were rated markedly higher on arousal/intensity than did Male Happy Acted (MHA) speakers (valence M = 0,692; arousal/intensity M = 0,731).

For the natural expressions of *happiness* in the non-semantic conditions the trends were quite different. Within the AVF modality, the Female Happy Natural (FHN)

speakers (valence M = 0,917; arousal/intensity M = 0,417) were rated as both more positive and slightly more intensive in their expressions of *happiness* than the Male Happy Natural (MHN) speakers (valence M = 0,500; arousal/intensity M = 0,344). Within the AF modality, the Female Happy Natural (FHN) speakers (valence M = 0,292; arousal/intensity M = 0,043) were rated as more positive and distinctly less intensive in their expressions of *happiness* than did Male Happy Natural (MHN) speakers (valence M = 0,129; arousal/intensity M = 0,1677).

The expressions of *sadness* in the non-semantic material has a slightly more horizontal differentiation with interesting one trends in the AF condition, which broke the overall trend towards better definition of the acted vs. natural expressions of emotion. Regarding the acted expressions of *sadness*, within the AVF modality the Male Sad Acted (MSA) speakers (valence M = -1,354; arousal/intensity M = 0,063) were rated as more negative though marginally less intensive in expression than were Female Sad Acted (FSA) speakers (valence M = -1,098; arousal/intensity M = 0,098). Within the AF modality the trend was reversed with Female Sad Acted (FSA) speakers (valence M = -1,471; arousal/intensity M = 0,412) rated as more negative and slightly less intense in their expressions than Male Sad Acted (MSA) speakers (valence M = -1,170; arousal/intensity M = 0,511).

For the natural expressions the trend was very strong and quite different than all others. Within the AVF modality Male Sad Natural (MSN) speakers (valence M = -1,296; arousal/intensity M = 0,333) were rated as twice as negative, and more than three times more intensively so than Female Sad Natural (FSN) speakers (valence M = -0,680; arousal/intensity M = -0,083). This trend was even stronger in the AF condition, wherein the ratings for Male Sad Natural (MSN) speakers (valence M = -1,536; arousal/intensity M = 0,731) indicated threefold stronger negativity and sixfold higher intensity than for Female Sad Natural (FSN) speakers (valence M = -0,500; arousal/intensity M = 0,115). Both of the non-semantic modalities but especially in the AF modality the general trend appears to be that of arousal/intensity constituting a more differential feature than valence.

Overall, semantic, visual, as well as prosodic cues appear to have had a significant impact on how the stimuli were rated. It seems that the less semantic and visual cues are available the more the ratings differentiated the emotions in terms of arousal rather than valence. This may partially explain the strong effect of arousal but

not of valence in the existing research (see Chapter 2). However, what is significant for this dissertation and this rating study, is that across all stimulus modalities raters consistently rated the *sad* stimuli as negative and *happy* stimuli as positive in agreement with both the design and the speakers' self-assessment. Figure 8 illustrates the mean ratings of valence and arousal/intensity collapsed across all four stimulus modalities against speakers' self-assessments:

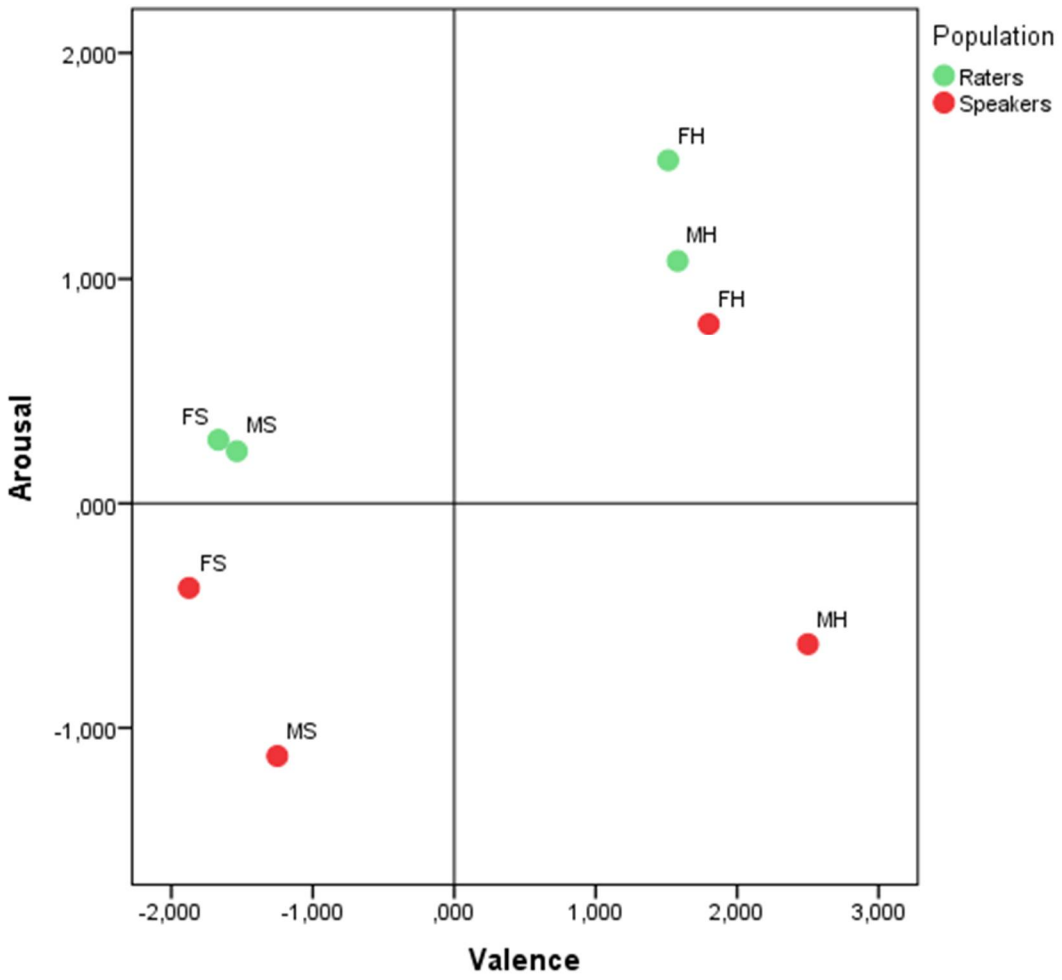

Fig. 8. Mean rating valence and arousal/intensity scores against speakers' self-assessments of valence and arousal.

On the whole, when averaged across stimulus modalities, the ratings are an echo of the speakers' self-assessments. The crucial difference between the speakers' self-assessments and the ratings appears to be in the arousal/intensity rather than valence. The ratings collapsed across different stimulus modalities show the same, albeit less differentiated pattern than the self-assessments by the speakers. The Female Happy

(FH) speakers (valence M = 1,512; arousal M = 1,525) were generally rated as slightly less positive but more intensive than Male Happy (MH) speakers (valence M = 1,579; arousal M = 1,079). The Female Sad (FS) speakers (valence M = -1,667; arousal M = 0,282) on the other hand were rated as slightly more negative and intensive than the Male Sad (MS) speakers(valence M = -1,537; arousal M = 0,232). All in all, in terms of valence and arousal/intensity the ratings indicate that the stimuli fulfill their intended purpose.

4.5.2. The Categorical Procedure

The response options the raters had to choose from in this procedure were based on *the standard view* categories of *happiness* and *sadness* with an added category of *neutral* for those stimuli the raters judged too indistinct to categorize as either *happiness* or *sadness*. Based on the assumption that the speakers primed to feel *happy* felt *happy* and those primed to feel *sad* felt *sad*, the ratings in this procedure were calculated as a percentage of correct *happy/sad* categorizations. In other words, the prediction was that the raters would categorize all *sad* speakers as *sad*, and all *happy* speakers as *happy*. The violations of this prediction were coded as errors, while categorizations fulfilling the prediction were coded as correct responses, which reflected the general level of agreement between the raters' ratings and speakers' self-assessments. This algorithm yielded rating data patterns which differed with respect to both the speaker manipulation (FHA, FHN, FSA, FSN, MHA, MHN, MSA, MSN) as well as the stimulus modality manipulation (AVU, AVF, AU. AF). In this procedure specifically the way different modalities of stimulus were processed appears to have been dependent more on the speaker manipulation (who the speakers were, what emotions they expressed and how). These patterns are discussed in detail below. Table 7 lists the percentages of agreement between ratings and speakers' self-assessments, while Figure 9 illustrates them.

Table 7. The percentages of agreement between the ratings and speakers' self-assessments.

	AVU	AVF	AU	AF
FHA	66,70%	77,80%	90,00%	28,60%
FHN	28,60%	25,00%	50,00%	7,70%
FSA	77,80%	90,00%	100,00%	89,50%
FSN	50,00%	53,30%	60,00%	64,30%
MHA	57,90%	35,00%	84,20%	55,00%
MHN	46,70%	47,40%	22,20%	23,50%
MSA	91,70%	52,40%	95,50%	65,20%
MSN	64,30%	50,00%	33,30%	56,30%

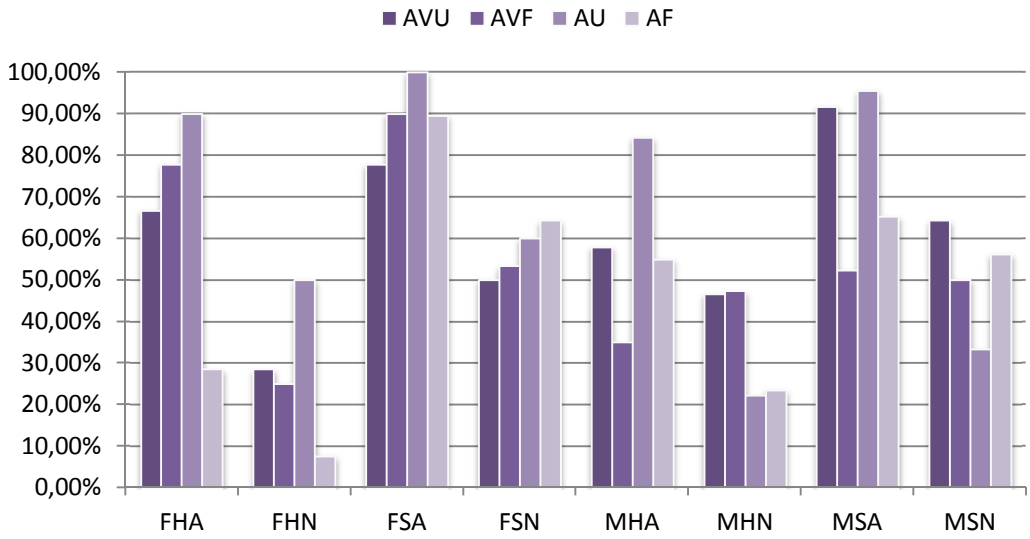

Fig. 9. The agreement between the ratings and speakers' self-assessments.

For female *happy* speakers expressing both acted and natural emotions the highest percentage of agreement was achieved for the AU stimulus modality, though it was markedly higher for the Female Happy Acted (FHA) at 90,00% than for Female Happy Natural (FHN) at 50,00%. The lowest percentage of agreement was achieved for the AF stimulus modality, again with the higher percentage for the Female Happy Acted (FHA) at 28,60% than for Female Happy Natural (FHN) at 7,70%. The visual stimulus modalities (AVU, AVF) differed slightly. For the Female Happy Acted (FHA) speakers the agreement was slightly higher for the AVF stimulus modality at 77,80% than for the AVU stimulus modality at 66,70%. For the Female Happy Natural (FHN) the agreement was slightly higher for the AVU stimulus modality at 28,60% than for the AVF stimulus modality at 25,00%.

For female *sad* speakers the pattern was slightly different. For the Female Sad Acted (FSA) the highest percentage of agreement was in the AU stimulus modality with agreement at ceiling of 100,00%, followed by the AVF stimulus modality at 90,00%, followed by the AF stimulus modality at 89,50%, and the AVU stimulus modality at 77,80% of agreement. For the Female Sad Natural (FSN) the highest agreement between ratings and speakers' self-assessments was achieved in the AF stimulus modality with 64,30% agreement, followed by the AU stimulus modality with 60,00% agreement, followed by the AVF stimulus modality with 53,30% agreement, and the AVU stimulus modality with 50% agreement. These patterns are unique both for how high an agreement was reached within the AF stimulus modality as well as for the fact that the percentages were higher than the AVU stimulus modality, which yielded some of the best valence and arousal/intensity differentiation in the Dimensional Procedure.

For male *happy* speakers the patterns of which stimuli types achieved best agreement differed quite significantly from the pattern for female speakers. For the Male Happy Acted (MHA) speakers the highest percentage of agreement between ratings and speakers' self-assessments was achieved in the AU stimulus modality with 84,20% agreement, followed by the AVU stimuli with 57,90% agreement, followed by AF stimulus modality with 55,00% agreement, and the AVF stimulus modality with 35% agreement. For the Male Happy Natural (MHN) speakers the pattern of rating was quite different, as the visual stimuli modalities (AVU, AVF) achieved much better agreement than did the audio-only stimuli modalities (AU, AF). The agreement was highest in the AVF stimulus modality with 47,40%, followed closely by the AVU stimulus modality with 46,70% agreement, followed by the AF stimulus modality with 23,50% agreement and the AU stimulus modality with 22,20% agreement.

For the male *sad* speakers the pattern for the acted *sadness* echoed that of Male Happy Acted (MHA) speakers, while the pattern for natural expressions of *sadness* resembled it. For the Male Sad Acted (MSA) speakers the highest percentage of agreement between ratings and speakers' self-assessments was achieved in the AU stimulus modality with 96,50% agreement, followed by the AVU stimuli with 91,70% agreement, followed by AF stimulus modality with 65,20% agreement, and the AVF stimulus modality with 52,40% agreement. For the Male Happy Natural (MHN) speakers the pattern of rating was the same except for the AU stimulus modality, which was here at the lowest level of agreement with 33,30%. The highest agreement was

achieved for the AVU stimulus modality with 64,30%, followed by AF at 56,30%, and AVF at 50,00%. On the whole it could be said that for male speakers acting out emotions the semantic cues had more of an impact on correct classifications than any other, while for the natural expressions the visual cues appeared to be more decisive.

There are some stable overall trends in the rating data resulting from this procedure. One is that comparing the pairs of speakers (female *happy*, male *happy*, female *sad*, male *sad*), the acted expressions of emotion yielded higher percentages of agreement with speakers' self-assessments than did the natural expressions of emotion. The trend held regardless of emotion (*happy*, *sad*), or stimulus modality (AVU, AVF, AU, AF). Another is that the expressions of *sadness* for each speaker gender (male, female) were rated at higher percentage of agreement than the expressions of *happiness* regardless of the speakers' manner of expression (acted, natural), or stimulus modality (AVU, AVF, AU, AF). The patterns of agreement between ratings of different stimulus modalities and speakers' self-assessments also differ with respect to speakers' gender.

And finally, it is worth noting, that an interesting pattern emerged for the natural expressions of *happiness* for both male and female speakers, in that for multiple stimulus modalities the agreement was below the chance level for this task. With three response options the chance level for this procedure was 33,33%. for the Female Happy Natural (FHN) only the ratings for AU stimulus modality exceeded chance at 50,00% agreement. For Male Happy Natural (MHN) the non-visual stimulus modalities (AU, AF) failed to rise above chance. Additionally, the Female Happy Acted (FHA) in the AF stimulus modality, and the Male Sad Natural (MSN) in the AU modality, at 28,60% and 33,30% respectively, also failed to rise above chance agreement. On the whole, it may be observed that within the AF stimulus condition it is hardest to classify emotions of *happiness*, while *sadness* is still fairly easy to categorize, regardless of the amount of semantic, visual, and prosodic cues available.

4.5.3. The Free Procedure

In this procedure the raters were asked to identify the emotions conveyed by the stimuli and name them using a single word. This procedure was the least arbitrarily structured of the three and produced the greatest variety of responses. Therefore the analysis

required some principle that would help make sense of the patterns. Based on Paul Ekman's proviso of emotion families, a single trained judge tagged all the rating responses with one of seven tags: H for *happy*, S for *sad*, A for *angry*, F for *fearful*, D for *disgusted*, WH for *surprised* and O for *other*. Every raters' response that was judged to belong to one of the basic emotion families was tagged with the letter tag for that basic emotion. Every response that could not be classified as one of the basic emotions was tagged with O for *other* feeling states. Judging by the tagging, the ratings overwhelmingly showed that raters were able to recognize various emotions in the stimuli presented to them. Tables 8-11 list the top 10 words ranked by frequency of occurrence used by the raters to describe the stimuli in each stimulus modality (basic emotions only included, the *other* tags were omitted). The tags assigned by the judge are reported, as well as sums of total occurrences for each term used. In all Tables below the three-letter abbreviations stand respectively for the following types of stimuli: FHA – Female Happy Acted, FHN – Female Happy Natural, MHA – Male Happy Acted, MHN – Male Happy Natural, FSA – Female Sad Acted, FSN – Female Sad Natural, MSA – Male Sad Acted, MSN – Male Sad Natural.

Table 8. Audio-Visual Unfiltered stimulus modality – top 10 most frequent items tagged as "basic emotion."

Items	tag	FHA	FHN	FSA	FSN	MHA	MHN	MSA	MSN	sum
sad	S	-	-	4	6	-	-	4	4	18
upset	S	-	-	1	1	-	-	1	3	6
overwhelmed	S	-	-	2	-	-	-	1	1	4
depressed	S	-	-	2	-	-	-	2	-	4
down	S	-	-	1	1	1	-	-	-	3
happy	H	7	4	-	-	3	4	-	-	18
excited	H	2	1	-	-	1	-	-	-	4
cheerful	H	-	1	-	1	2	-	-	-	4
optimistic	H	2	-	-	-	1	-	-	-	3
content	H	-	-	-	-	2	1	-	-	3
joyful	H	2	-	-	-	-	-	-	-	2
stressed	F	-	-	3	-	-	-	3	-	6
worried	F	-	-	1	-	-	-	-	1	2

Table 9. Audio-Visual Filtered stimulus modality – top 10 most frequent items tagged as "basic emotion."

Items	tag	FHA	FHN	FSA	FSN	MHA	MHN	MSA	MSN	sum
sad	S	1	1	5	5	2	1	4	2	21
upset	S	-	1	3	-	-	-	2	1	7
lonely	S	-	-	2	-	-	-	2	1	5
depressed	S	-	-	1	-	-	-	1	2	4

blue	S	-	-	-	1	-	-	1	-	2
unhappy	S	-	-	-	-	1	-	1	-	2
happy	H	8	1	-	2	4	1	-	-	16
content	H	2	3	-	-	-	-	-	-	5
excited	H	-	2	-	-	-	1	-	1	4
elated	H	-	-	-	-	-	2	-	-	2
joyful	H	1	-	-	1	-	-	-	-	2
scared	F	-	-	2	1	-	-	2	1	6
annoyed	A	-	-	-	1	-	-	1	1	3

Table 10. Audio Unfiltered stimulus modality – top 10 most frequent items tagged as "basic emotion."

Items	tag	FHA	FHN	FSA	FSN	MHA	MHN	MSA	MSN	sum
sad	S	-	-	4	5	-	-	7	6	22
depressed	S	-	-	4	1	-	-	3	1	9
upset	S	-	-	1	2	-	1	2	2	8
down	S	-	-	-	2	-	-	-	1	3
overwhelmed	S	-	-	2	-	-	-	1	-	3
alone	S	-	-	1	-	-	-	-	-	1
happy	H	9	2	-	-	5	1	-	1	18
joyful	H	3	2	-	1	-	1	-	-	7
cheerful	H	4	-	-	-	1	-	-	-	5
optimistic	H	-	-	-	-	5	-	-	-	5
enthusiastic	H	1	-	-	-	1	1	-	-	3
excited	H	-	-	-	-	2	1	-	-	3
accomplished	H	-	1	-	-	-	-	-	-	1
amused	H	-	-	-	-	-	1	-	-	1

Table 11. Audio Filtered stimulus modality – top 10 most frequent items tagged as "basic emotion."

Items	tag	FHA	FHN	FSA	FSN	MHA	MHN	MSA	MSN	sum
sad	S	5	3	7	5	2	-	10	3	35
depressed	S	1	1	4	3	-	-	1	2	12
upset	S	1	1	2	-	-	-	-	-	4
lonely	S	1	-	-	-	-	1	1	-	3
overwhelmed	S	-	-	1	-	1	1	-	-	3
dreary	S	-	-	-	-	-	1	1	-	2
sorrowful	S	-	-	-	1	-	-	-	1	2
unhappy	S	1	-	-	-	-	-	1	-	2
happy	H	4	2	-	1	4	1	1	-	13
joyful	H	1	-	-	-	3	-	-	-	4
excited	H	-	-	-	-	-	3	-	-	3
cheerful	H	-	-	1	-	1	-	-	-	2
content	H	-	-	-	-	1	-	-	1	2
concerned	F	-	1	-	-	1	-	-	-	2
scared	F	1	-	1	-	-	-	-	-	2
angry	A	2	1	-	-	3	-	-	-	6
mad	A	1	-	-	-	1	1	-	1	4
annoyed	A	-	-	-	-	-	-	2	1	3

On the whole, the judge classified 63,88% of all raters' responses to AVU stimulus modality as basic emotions, as well as 61,82% of the responses to AVF stimulus modality, 74,56% of responses to AU stimulus modality, and 70,00% of responses to stimulus modality. The tagging of responses enabled the calculation of agreement percentages using the same algorithm used in the Categorical Procedure. The raters' responses tagged with S for *sadness* given to *sad* stimuli were marked as correct, while all the remaining responses tagged otherwise – as errors. All things considered, the agreement between the ratings and the speakers' self-assessments are remarkably high. The percentages Table 12 lists the percentages of agreement, while Figure 10 illustrates them.

Table 12. The percentages of agreement between the ratings and the speakers' self-assessments.

	AVU	AVF	AU	AF
FHA	78,26%	63,64%	82,61%	60,87%
FHN	53,33%	53,33%	47,06%	46,67%
FSA	60,87%	54,55%	58,33%	72,73%
FSN	55,56%	58,82%	66,67%	58,82%
MHA	63,64%	45,83%	78,26%	57,69%
MHN	42,86%	40,00%	45,00%	36,36%
MSA	42,31%	48,15%	69,23%	55,56%
MSN	50,00%	44,44%	72,22%	44,44%

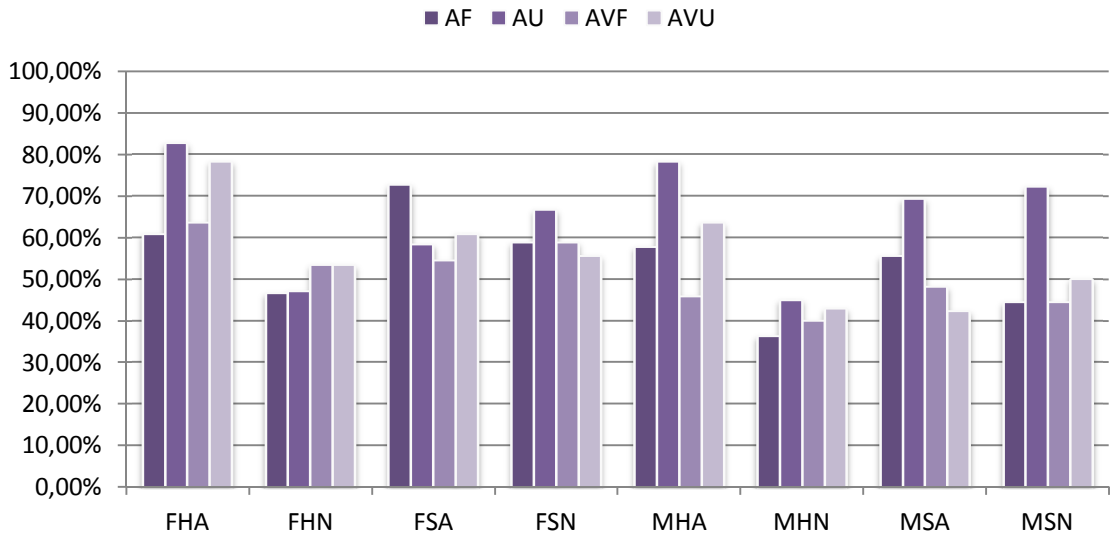

Fig. 10. The agreement between the ratings and the speakers' self-assessments.

For the Female Happy Acted (FHA) speakers the highest agreement between the ratings and the speakers' self-assessments was achieved for the stimuli modalities containing semantics, with the AU stimulus type at 82,61% agreement, and the AVU stimulus type at 78,26% agreement. The non-semantic modalities followed with the AVU stimulus modality achieving 63,64% agreement, and the AF stimulus modality achieving 60,87% agreement. For all modalities for the Female Happy Natural (FHN) speakers the agreement was lower than for the acted stimuli. Here the visual conditions were rated at higher agreement with speakers' self-assessments at 53,33% agreement for both the AVU and the AVF stimulus modalities, followed by the AU stimulus modality with 47,06%, and the AF stimulus modality at 46,67% agreement.

For the Female Sad Acted (FSA) speakers the pattern of agreement was quite different. The highest agreement here was achieved for the AF stimulus modality at 72,73% agreement, followed by the AVU stimulus modality at 60,87% agreement, followed by the AU stimulus modality at 58,33% agreement, and the AVF stimulus modality at 54,55% agreement. For the Female Sad Natural (FSN) speakers the highest percentage of rating to speakers' self-assessment agreement was achieved within the AU stimulus modality at 66,67% agreement, followed by the AVF and AF stimulus modalities, both at 58,82% agreement, and the AVU stimulus modality at 55,56% agreement. For all female speakers in this procedure the most remarkable trend appears to be that of comparatively high agreement regardless of emotion expressed (*happy*, *sad*) or the manner of expression (acted, natural).

For the Male Happy Acted (MHA) speakers the stimulus modalities conveying semantic cues achieved the highest agreement, with 78,26% agreement within the AU stimulus modality, and 63,64% within the AVU stimulus modality. The agreement for the AF stimulus modality here also was comparatively high at 57,69%, followed by the AVF stimulus modality with 45,83%. For the Male Happy Natural (MHN) speakers the overall agreement was lower, but the pattern similar, with the AU stimulus modality reaching highest agreement at 45,00%, followed by the AVU stimulus modality at 42,86% agreement, followed by the AVF stimulus modality at 40,00%, and the AF stimulus modality at 36,36% agreement. The ratings here indicate that for the male speakers the semantic cues are the decisive factor in recognizing *happiness*.

For the Male Sad Acted (MSA) speakers the AU stimulus modality achieved the highest agreement between ratings and speakers' self-assessments at 69,23% agreement,

followed by the AF stimulus modality with 55,56%, followed by the AVF stimulus modality at 48,15%, and the AVU stimulus modality at 42,31% agreement. For the Male Sad Natural (MSN) the pattern is very similar, with the AU stimulus modality achieving the highest agreement at 72,22%, followed by the AVU stimulus modality with 50,00% agreement, and followed by the AVF and the AF stimulus modalities, both at 44,44% agreement. For the male speakers the tendencies are less clearly defined, but on the whole the semantic cues appear to be more decisive than are any other cues across emotions and stimulus modalities.

All in all, the Free Label procedure of rating yielded relatively high and very undifferentiated patterns of agreement. This task shows that on the whole semantic cues appear to be best guides to recognition of emotions, though in the naturally expressed emotions the visual and prosodic cues appear to be equally important. The most interesting tendency in the ratings in this procedure was the high level of agreement between the ratings of the AF stimulus modality ratings and the speakers' self-assessments. The tendency indicates that given a less restrictive and less structured response paradigm even the most degraded stimuli can be recognized accurately.

4.6. Conclusions for the Validation stage

This rating study was designed to verify that the stimuli developed according to an established method and produced by speakers who self-assessed themselves as feeling the emotions they were primed to feel are also perceived and rated accordingly. On the whole it appears that it is indeed so, and the stimuli fulfill the purpose they were designed for. The raters in the Dimensional Procedure evaluated the arousal in the stimuli as higher compared to the speakers' self-assessments, but they evaluated valence the same way the speakers did. In the Categorical Procedure the recognition of some types of stimuli did not exceed chance levels, while the recognition of others showed gender- and emotion-specific biases. However, the agreement was still relatively high and points to and overall effectiveness of the stimuli, especially for the expressions of *sadness*. In the Free Label Procedure, the agreement levels were unexpectedly high across the board pointing again to the overall effectiveness of the stimuli in terms of conveying the emotions of *happiness* and *sadness*.

In general it appears that the less structured the response options the more accurate the ratings become. The broad assessments of positivity/negativity and levels of intensity as well as marginally limited freedom of naming yielded the highest levels of agreement between the raters' ratings and the speakers' self-assessments. The highly structured task of sorting the stimuli into very specific categories yielded both the weakest and most highly differentiated ratings with respect to speakers' genders (male, female) and emotions expressed (*sad*, *happy*), as well as voice condition (acted, natural). Based on the ratings obtained we concluded the stimuli were effective in that they conveyed the emotions they were intended to convey. Therefore they would all be used in the experiment designed for this study, which is reported in the following chapter 5.

Chapter 5: Testing the experimental hypotheses

5.1. Introduction

The experiment designed to test the hypotheses presented in Chapter 2 was carried out at the Language and Communication Laboratory (LCL), at the Faculty of English, Adam Mickiewicz University in Poznań, Poland. Guided by the research question at the heart of this dissertation, two populations at the Faculty of English were targeted. First population sample was recruited from freshmen at the Faculty of English, second from older students (3rd year of BA program and MA program students).

Several concerns had to be considered in designing this proper experimental stage. First, although their English majors defined much of their proficiency in the language, the participants linguistic background and the history of learning it had to be inspected, which is why the Language History Questionnaire was administered. Second, the potential influence of alexithymia had to be controlled here as well, which is why the TAS-20 questionnaire was administered. Third, I wanted to control for the subjective effects of the difficulty of the different experimental tasks and determine whether they could detect that the audio samples they were listening to were in English. To measure those, an additional REC (short for "Recognition") questionnaire was constructed and administered at the conclusion of the experimental procedure. The REC questionnaire asked the participants to assess the number and gender(s) of speakers in the stimuli, the language(s) they spoke, and to rank the experimental tasks in order of difficulty from the hardest to the easiest.

The questionnaires can be found in Appendices A-F, while the results of the questionnaires are reported alongside Participant information. The empirical data

collected in the course of the experiment are reported in the Results section. Based on existing literature only hypotheses regarding accuracy data could be developed, as response times data was too scarce and contradictory to make any meaningful predictions. Therefore only accuracy data were taken into consideration in the statistical analysis. Repeated measures ANOVA statistical analyses were performed on the accuracy data, and are reported separately for each of the experimental tasks: first the analysis for the Dimensional Task, second the analysis for the Categorical Task, and third the analysis for the Free Task. The results are shortly summarized at the end of this chapter, and discussed in detail, with references to existing literature, theory, and the assumptions of this dissertation in Chapter 6.

5.2. Participants

Total number of participants was 139, 25 male, 114 female (mean age = 21,4 years; SD = 1,9). All were students at the Faculty of English of Adam Mickiewicz University in Poznań and had all participated for partial credit for various courses. The participants were all fluent Polish-English bilinguals, and they were sorted into two groups based on their English language proficiency. By the standards of the Common European Framework of Reference for Languages (CEFR) the group of lower proficiency (LoPro) was between B1 and B2 level, while the higher proficiency group (HiPro) was between C1 and C2 levels. The LoPro group consisted of 68 participants, 14 male, 54 female (mean age = 19,9 years; SD = 1,4). The HiPro group consisted of 71 participants, 11 male, 60 female (mean age = 22,8 years; SD = 1,2). Data from six participants, 2 male and 1 female in the LoPro group and 3 female in the HiPro group were discarded as the participants did not fit the population profile of fluent English-Polish bilinguals (they were Erasmus exchange students from Spain, Morocco, China, Ukraine, and Russia)[14].

[14] Population profile after discarding the data from exchange students is as follows: total number of participants 133, 23 male, 110 female (mean age = 21,4 years; SD = 2,0); the HiPro group consisted of 71 paticipants, 9 male, 59 female (mean age = 22,9 years; SD = 1,2); Lo Pro group consisted of 68 participants, 14 male, 51 female (mean age = 19,9 years; SD = 1,3).

5.2.1. LoPro participants' linguistic profile

The participants in the LoPro group all spoke on average three languages, with Polish as their first (native) language, English as their second (mean length of formal education in English = 11,4 years; SD = 2,61), and a variety of languages as their third. The most prominent of the third languages were German (21 participants, mean length of formal education in German = 6,5 years; SD = 2,87), Russian (13 participants, mean length of formal education in Russian = 1,92 years; SD = 1,68), Dutch (11 participants, mean length of formal education in Dutch = 6,66 years; SD = 6,49), and French (9 participants, mean length of formal education in French = 3,67 years; SD = 1,15). Some participants also indicated some knowledge of Bulgarian, Japanese, Italian, and Spanish. Only 4 participants in the LoPro group reported spending a significant (defined as 3 months or more) amount of time in English-speaking countries – two in Ireland, one in Scotland, one in the United States.

5.2.2. HiPro participants' linguistic profile

The participants in the HiPro group spoke on average four languages, with Polish as their first (native) language, English as their second (mean length of formal education in English = 13,4 years; SD = 2,91), and a variety of languages as their third and fourth. The most prominent of the third languages were Spanish (28 participants, mean length of formal education in Spanish = 2,65 years; SD = 1,93), German (17 participants, mean length of formal education in German = 8,19 years; SD = 4,28), French (17 participants, mean length of formal education in French = 4,85 years; SD = 1,98), and Russian (8 participants, mean length of formal education in Russian = 3,88 years; SD = 2,2). Some participants also indicated knowledge of French, Arabic, Dutch, Norwegian, Welsh, and Hindi. 10 participants in the HiPro group reported spending a significant (defined as 3 months or more) amount of time in English-speaking countries – six in the United Kingdom, two in the United States, one in Ireland, and one in Wales.

5.2.3. Alexithymia scores

An independent-samples t-test was conducted to compare alexithymia scores in LoPro and HiPro groups of participants. There was no significant difference in the scores for LoPro (M = 53,08; SD = 12,98) and for HiPro (M = 49,25; SD = 11,97) group; t(131) = 1,769, p = .079. Because there was no significant difference between the groups, their scores were collapsed for analysis. Participants' alexithymia scores revealed the normal and expected trends for the population on all factors of the TAS-20. As a group, however, the participants scored well below the cutoff point for positive alexithymia diagnosis (scores ≥ 61), with a mean score of M = 51,12; SD = 12,52. On "Difficulty Identifying Feelings" the participants scored M = 18,65; SD = 6,26; on "Difficulty Describing Feelings" the participants scored M = 14,24; SD = 4,81; on "Externally-Oriented Thinking" the participants scored M = 18,23; SD = 4,71. Overall the scores fit in well with the largely female and well educated population involved here (Mattila et al. 2006: 634), and they did not constitute exclusion criterion.

5.3. Materials

Audio samples of emotional speech processed through a low band pass filter – the AF portion of the PAIE database subset described at Stage 1 – constituted the stimuli for the three experimental tasks. The stimuli were sorted into three fixed sets of 54 items, counterbalanced for gender (male × female), emotion (*happy* × *sad*), and voice (natural × acted). The experimental tasks were programmed using E-Prime 2.0. Participants listened to the stimuli over Sennheiser HD 201 headphones and used standard PC DELL computer keyboards to give their responses. Pen and paper versions of the TAS-20, Language History questionnaire (LHQ) (Li et al. 2013), and a questionnaire pertaining to the perception of the stimuli (henceforth: REC questionnaire) were also used. Exemplars of all these questionnaires can be found in the Appendix (LHQ in Appendix E, REC questionnaire in Appendix F).

5.4. Procedure

Participants were tested individually. At the start, the participants were informed of the nature of the study and consented to participate on terms declared. Each participant first filled out the LHQ questionnaire, followed by performing three computer-based tasks, and finished by filling out the TAS-20 and REC questionnaires. Upon completing the procedure participants were presented with participation certification and a sweet treat. The entire procedure, from instruction, through questionnaires to computer-based tasks was carried out in English The tasks performed by the participants were as follows:

5.4.1. The Dimensional Task

The procedure was exactly the same as in the Dimensional Procedure described in Chapter 4 (see section **4.4.1. The Dimensional Procedure** for details).

5.4.2. The Categorical Task

The procedure was the same as in the Categorical Procedure in the rating at Stage 2 with one major change. The raters had the options of *happy* (☺), *sad* (☹), and *neutral* (😐) at their disposal. However, guided by the results of the rating study, the *neutral* option was changed to 'other' to reduce the restrictions on the procedure further. The participants in the experiments would therefore make their categorizations using the options *happy* (☺), *sad* (☹), and *other* (○), wherein *other* stood for whatever could not be classified as either *happiness* or *sadness*. All other aspects of the procedure were the same as in the Categorical Procedure in the rating at Stage 2 (see section **4.4.2. The Categorical Procedure** for details).

5.4.3. The Free Label Task

The procedure was exactly the same as in the Free Label Procedure described in Chapter 4 (see section **4.4.3. Free Label Procedure** for details).

5.4.4. The order of presentation of the tasks

The order in which the participants performed the tasks was counterbalanced across the population sample. In all three tasks participants were instructed not to over-think their responses bur rather enter the first response they thought of. Across the three tasks each participant was confronted with all 162 stimuli divided into 3 sets of 54 between the tasks. In other terms, each participant only heard each stimulus once, rating one third in the Dimensional Task, categorizing another third in the Categorical Task, and naming the final third in the Free Task. Each task was preceded by a practice session designed to let the participants familiarize themselves with the character of the filtered audio stimuli and with the changing response key combinations. For each participant, three constant procedural aspects for all three tasks were (1) a 17-item practice session preceding the tasks proper, (2) no time limit for responses, (3) every participant performed the same three tasks (albeit in different orders). It took each participant on average 70 minutes to complete the entire procedure from entering the lab to leaving it.

5.5. Results

In the experiment proper, because of the procedural differences between the experimental tasks, the results for each will be reported separately. For all results reported Bonferroni correction has been applied. All results reported are summarized additionally in Tables 9, 10, and 11 below the reported results for each task. Differences between the LoPro and HiPro groups are reported when they occur.

5.5.1. The results of the Dimensional Task

The data from this task were analyzed in three different ways. The main analysis was based on the accuracy scores, while the secondary analyses were based on qualitative analyses of the responses. The accuracy scores were determined by tagging the responses of (-3), (-2), and (-1) given to *sad* stimuli as well as the responses of (1), (2), and (3) given to *happy* stimuli as correct. The responses of (-3), (-2), and (-1) given to *happy* stimuli, the responses of (1), (2), and (3) given to *sad* stimuli, and the responses of (0) given to both emotions were tagged as incorrect. One of the secondary qualitative analyses was based on percentages of correct, incorrect, and 'zero' responses, and the other on the average valence and intensity scores calculated from the responses to various types of stimuli. The analysis of the main effects was carried out using repeated measures ANOVA statistical analysis on the accuracy data.

A one-way repeated measures ANOVA was conducted to compare the effects of speaker manipulation on the accuracy of emotional prosody recognition by listeners with respect to gender (male vs. female), emotion (*happy* vs. *sad*), and voice condition (acted vs. natural). There was a significant main effect of gender, $F(1,131) = 12,760$, $p = 0,000$, $\eta^2 = 0,089$; with responses to female speakers (M = 0,496; SD = 0,012) being significantly more accurate than responses to male speakers (M = 0,450; SD = 0,012). There was a significant main effect of emotion, $F(1,131) = 53,929$, $p = 0,000$, $\eta^2 = 0,292$; with responses to *sad* emotions (M = 0,550; SD = 0,015) being significantly more accurate than to *happy* emotions (M = 0,396; SD = 0,014). There was no significant effect of voice condition, $F(1,131) = 0,299$, $p = 0,586$, $\eta^2 = 0,002$; with responses to acted stimuli (M = 0,476; SD = 0,013) not significantly more accurate than to natural stimuli.(M = 0,470; SD = 0,011). There was a significant interaction between emotion and voice condition $F(1,131) = 6,736$, $p = 0,011$, $\eta^2 = 0,049$; with responses to acted *sad* emotions (M = 0,567; SD = 0,017) being more accurate than those to natural *sad* emotions (M = 0,533; SD = 0,017) at $p = 0,022$. There was also an overall significant difference in accuracy between the LoPro and the HiPro groups, $F(1,131) = 4,589$, $p = 0,034$, $\eta^2 = 0,034$; with the LoPro group (M = 0,495; SD = 0,015) reaching higher accuracy overall than HiPro group (M = 0,450; SD = 0,015). In other words, on the whole the LoPro group performed better in terms of accuracy than the HiPro group on this task. The gender of the speakers and the emotion they expressed influenced how

accurately the emotion in their voice was identified, but whether the emotions were acted out or natural only mattered for the *sad* emotions. The Tables 13-15 below give a summary of the results. The asterisks mark the significant results:

Table 13. Accuracy analysis summary for the Dimensional Task. I. Main effects – significant main effects marked with an asterisk.

Main Effects	df	F	Sig.	η2	Comparison of means	
Gender*	(1,131)	12,760	0,000	0,089	FEM (M = 4,96; SD = 0,012)	MALE (M = 0,450; SD = 0,012)
Emotion*	(1,131)	53,929	0,000	0,292	*sad* (M = 0,550; SD = 0,015)	*happy* (M = 0,396; SD = 0,014)
Voice	(1,131)	0,299	0,586	0,002	act (M = 0,476; SD = 0,013)	nat. (M = 0,470; SD = 0,011)

Table 14. Accuracy analysis summary for the Dimensional Task. II. Significant interactions.

Interactions	F	Sig.	η2		Comparison of means		
Emotion × Voice*	6,736	0,011	0,045	sad	act: (M = 0,567; SD = 0,017)	nat.: (M = 0,533; SD = 0,017)	p = 0,022

Table 15. Accuracy analysis summary for the Dimensional Task. III. Between-subject effects.

Between-subjects effects	df	F	Sig.	η2	Comprison of means	
Proficiency*	(1,131)	4,589	0,034	0,034	LoPro (M = 0,495; SD = 0,015)	HiPro (M = 0,450; SD = 0,015)

The data indicates that the gender of the speakers and the emotions they expressed had the greatest impact on how accurate the recognition of prosody was in terms of valence. The participants found it significantly easier, to recognize the emotions when the speakers were female, and recognized *sadness* with significantly more ease than *happiness*. Whether the emotion was acted or natural only mattered for the expressions of *sadness*, wherein the recognition was much better for the acted rather than natural *sadness*. In other words, the non-native speakers on English showed a very specific tendency for emotion recognition in English prosody: they understood emotions better when they were expressed by women, and specifically when the emotion expressed was a stereotypical, acted *sadness*. This effect is all the more interesting

because the overall accuracy shows that the non-native speakers of lesser English language proficiency and experience were better at identifying the valence of emotional prosody than the speakers of higher proficiency.

One of the secondary qualitative analyses investigated the percentages of correct, incorrect and "zero" responses given to each stimulus type by gender and emotion. Figures 11-14 illustrate the percentages of these three types of response given to each stimulus type by gender and emotion (Female Happy, Female Sad, Male Happy, Male Sad). For the *happy* stimuli the responses coded as correct were (1), (2), and (3), while the incorrect were (-1), (-2), and (-3), with the zero (0) constituting a separate class. For the *sad* stimuli the responses coded as correct were (-1), (-2), and (-3), while the incorrect were (1), (2), and (-3), with the zero (0) constituting a separate class.

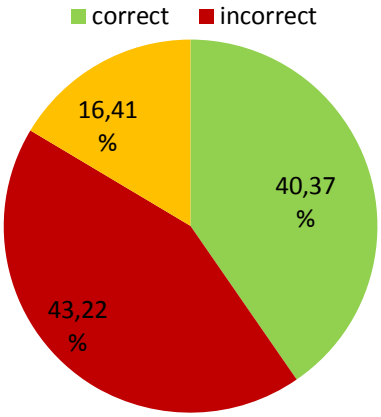

Fig. 11. Responses to Female Happy speakers – error pattern.

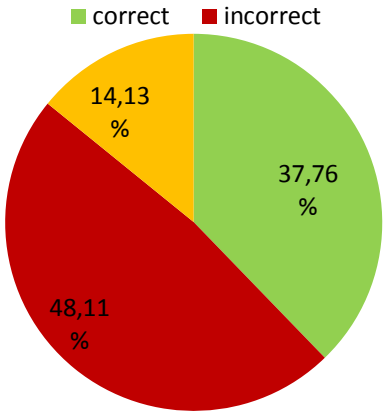

Fig. 12. Responses to Male Happy speakers – error pattern.

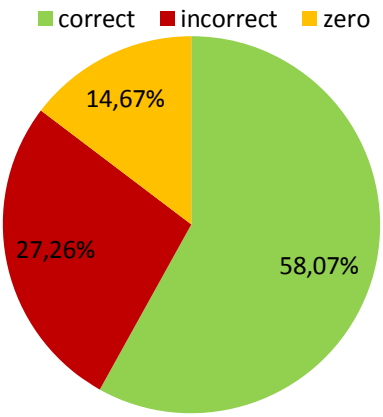

Fig. 13. Responses to Female Sad speakers – error patterns.

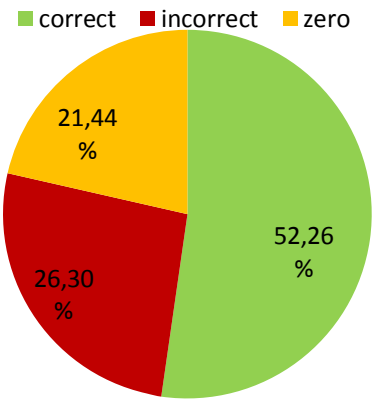

Fig. 14. Responses to Male Sad speakers – error patterns.

These figures go some way to explain what is happening with the recognition of emotions in the male speakers. Namely, participants misread the expressions of *happiness* as *sadness* by male speakers much more often than those by female speakers. *sadness* expressed by male speakers, on the other hand, was often assigned a "zero", which stood for level, emotionally *neutral* tone on the scale. The misidentification of *happiness* as *sadness* on the whole was much more pronounced an effect than the reverse. The recognition of emotions by valence was far from the clarity shown by the speakers of the raters, hinting at a possible effect of processing the emotional signals in L2. This effect hints at a possibility of negativity bias influencing the data, though whether or not it is will be discussed in Chapter 6.

The other qualitative analysis of the data yielded an additional insight into how the emotional prosody was perceived by the non-native speakers of English. Here the mean scores of valence and intensity/arousal were plotted onto a circumplex model in contrast to the speakers' self-assessment of experienced emotions and the raters' assessment of the AF modality. Figure 15 below illustrates the contrast of valence and arousal/intensity (acting and natural stimuli collapsed) for the speakers, raters (all stimulus modalities collapsed), and non-native listeners.

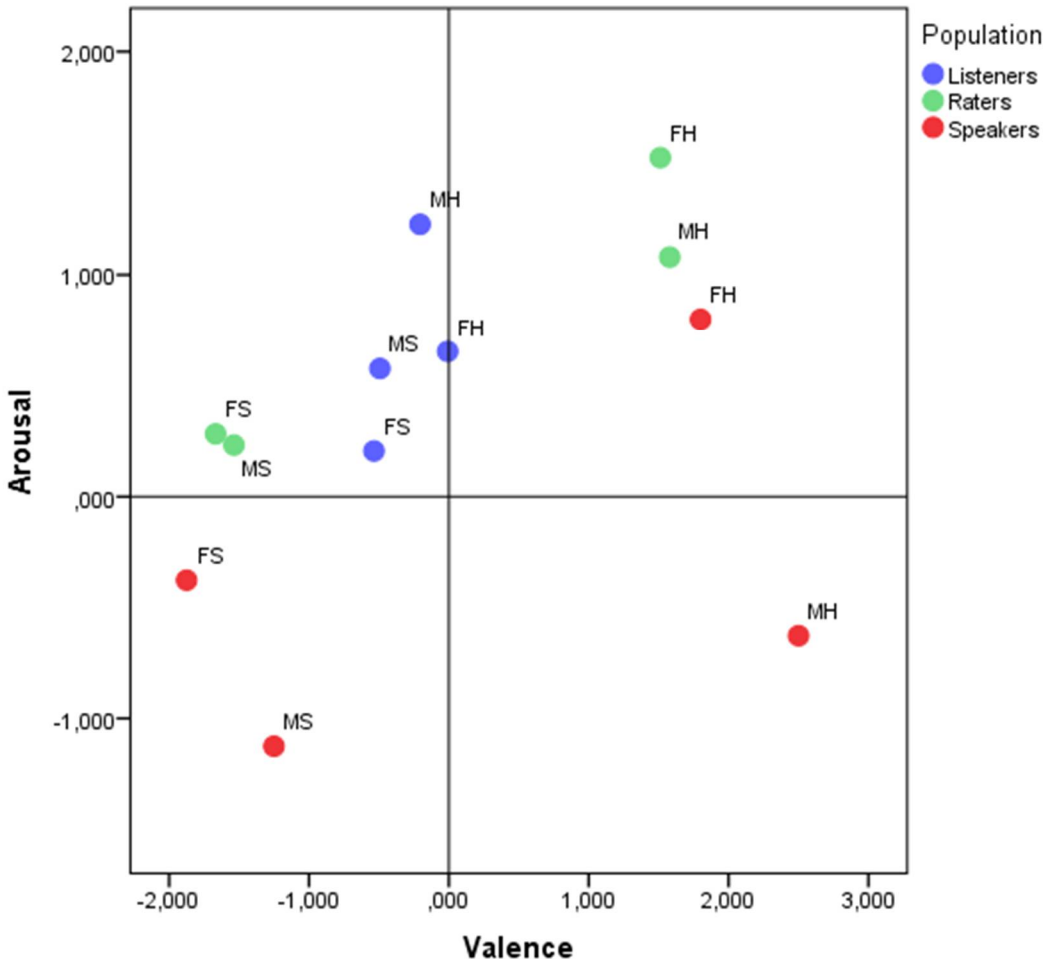

Fig. 15. Contrast of speakers' self-assessment, raters' evaluation, and non-native listeners' perceptions of emotion for valence and intensity.

The distribution of the data points here is possibly the most telling. Whatever the accuracy scores, the non-native speakers of English could only just differentiate between the expressions of *happiness* and *sadness* by valence or arousal/intensity alone. While they generally evaluated the expressions of *happiness* as slightly more positive and intensive than the expressions of *sadness*, the differences in evaluations were very slight. Although visible in here is one interesting effect of gender. While the overall pattern of *happiness* being evaluated as more intense and more positive than *sadness* for both speaker genders, for the emotional prosody recognition by non-native speakers the male speakers appear to be rated as the more intense in expressions. The tendency is reversed with respect to speakers and raters. However this reversal could be the result of the largely female population of the experiment proper.

5.5.2. The results of the Categorical Task

Accuracy in this task was determined by attributing 'correct' scores to responses congruent with stimulus classification: *sad* (☹) responses were scored as 'correct' when they were given to *sad* stimuli, while *happy* (☺) responses were scored as 'correct' when they were given to *happy* stimuli. The *other* (○) responses were scored as errors for both *sad* and *happy* stimuli, likewise *sad* responses to *happy* stimuli, and *happy* responses to *sad* stimuli were also scored as errors. In this task, as in the Dimensional Task, the main analysis of accuracy scores was done using repeated measures ANOVA, while a complementary analysis focused on the task-specific error patterns.

A one-way repeated measures ANOVA was conducted to compare the effects of speaker variables on the accuracy of emotional prosody recognition by listeners with respect to gender (male vs. female), emotion (*happy* vs. *sad*), and voice condition (acted vs. natural). There was a significant main effect of gender, $F(1,131) = 53,284$, $p = 0,000$, $\eta^2 = 0,289$; with responses to female speakers (M = 0,446; SD = 0,011) being significantly more accurate than responses to male speakers (M = 0,359; SD = 0,011). There was a significant main effect of emotion, $F(1,131) = 145,322$, $p = 0,000$, $\eta^2 = 0,526$; with responses to *sad* speakers (M = 0,503; SD = 0,012) being significantly more accurate than responses to *happy* speakers (M = 0,301; SD = 0,014). There was a significant main effect of voice condition, $F(1,131) = 40,158$, $p = 0,000$, $\eta^2 = 0,235$; with responses to acted stimuli (M = 0,437; SD = 0,011) being significantly more accurate than responses to natural stimuli (M = 0,368; SD = 0,011). There was a significant interaction between gender and emotion $F(1,131) = 21,386$, $p = 0,000$, $\eta^2 = 0,140$; with responses to female speakers being significantly more accurate for *sadness* (M = 0,587; SD = 0,016) than for *happiness* (M = 0,304; SD = 0,016) at $p = 0,000$; similarly, responses to male speakers were significantly more accurate for the expressions of *sadness* (M = 0,420; SD = 0,017) rather than *happiness* (M = 0,298; SD = 0,017), $p = 0,000$. There was a significant interaction between gender and voice condition $F(1,131) = 10,691$, $p = 0,001$, $\eta^2 = 0,075$; with responses to female speakers being significantly more accurate for the acted stimuli (M = 0,462; SD = 0,013) rather than natural stimuli (M = 0,429; SD = 0,014) at $p = 0,042$; likewise for male speakers, listeners scored significantly greater accuracy for acted (M = 0,412; SD = 0,013) rather than natural stimuli (M = 0,306; SD = 0,014) at $p = 0,000$. There was a significant

interaction between gender, voice condition, and proficiency $F(1,131) = 10,811$, $p = 0,001$, $\eta^2 = 0,076$. In LoPro group responses to male speakers acting out emotion (M = 0,628; SD = 0,020) were significantly more accurate than responses to male speakers expressing natural emotion (M = 0,291; SD = 0,020) at $p = 0,000$. In HiPro group this significant trend held up for both female and male speakers, with female speakers' acted emotion (M = 0,473; SD = 0,018) yielding significantly larger accuracy scores than natural emotion (M = 0,404; SD = 0,020) at $p = .002$, and male speakers' acted emotion (M = 0,391; SD = 0,019) yielding significantly higher accuracy scores than natural emotion (M = 0,321; SD = 0,019) at $p = 0,001$. There was a significant interaction between gender, emotion, and voice condition, $F(1,131) = 6,474$, $p = .012$, $\eta^2 = 0,047$. For female speakers expressing *sadness* in acted sentences (M = 0,628; SD = 0,020) response accuracy was significantly greater than in natural utterances (M = 0,545; SD = 0,020) at $p = 0,001$. This trend held up for male speakers for both *happiness* and *sadness*, with responses to *happy* acted stimuli (M = 0,355; SD = 0,021) being significantly more accurate than to *happy* natural stimuli (M = 0,242; SD = 0,017) at $p = 0,000$, and responses to *sad* acted stimuli (M = 0,469; SD = 0,020) being significantly more accurate than to *sad* natural stimuli (M = 0,371; SD = 0,021) at $p = 0,000$. There was no overall significant difference in accuracy between the LoPro and the HiPro groups, $F(1,131) = 0,288$, $p = 0,592$, $\eta^2 = 0,002$; with the LoPro group (M = 0,407; SD = 0,014) achieving roughly equivalent accuracy to the HiPro group (M = 0,397; SD = 0,013). Overall the participants from the LoPro and HiPro proficiency groups did not differ significantly on their response accuracies. Tables 16-18 present a summary of the results of the statistical analysis of accuracy.

This task, also rated by both groups of participants as the easiest to do also yielded the best-defined and strongest results of all three experimental tasks. Somewhat significantly as well, the difference between how the emotions were recognized by the high and low proficiency participants was smallest in this task. And the trends were very clear. Regardless of their proficiency in English, the participants had the least problems recognizing emotions in female speakers, they recognized *sadness* much better than *happiness*, and acted expressions of both emotions better than natural ones. In female speakers the acted expressions of *sadness* were much better recognized than natural, and the same was true for male speakers expressing both *happiness* and *sadness*. Interestingly the recognition rates for stereotypical, acted expressions was

significantly higher for both male and female speakers in the group of higher English language proficiency. The lower proficiency participants only favored acted expressions for the male speakers.

The one strong trend appears to have most to do with the speakers' gender and the manner of emotional expression. The natural expressions of emotions tend to be more nuanced, less clearly defined and harder to recognize, and this tendency is most robust in this task for the male speakers. It appears that for the non-native speakers of English the correct recognition of emotions in men means looking for the kind of well-defined and straightforward cues that come with acting rather than naturally expressing emotions. For women it does not seem to matter quite so much, as the differences in how well the emotions were recognized whether acted or natural were much smaller, and for the recognition *happiness* there were no significant differences at all. Interestingly in the older and more proficient group the reliance on acted rather than natural cues was much stronger and significant for both speaker genders. It therefore appears that the increasing proficiency in English does not help greatly with the comprehension of the more nuanced natural expressions of emotions.

Table 16. Accuracy analysis summary for the Categorical Task. I. Main effects – significant main effects marked with an asterisk.

Main Effects	df	F	Sig.	η^2	Comparison of means	
Gender*	(1,131)	53,284	0,000	0,289	FEM (M = 0,446; SD = 0,011)	MALE (M = 0,359; SD = 0,011)
Emotion*	(1,131)	145,322	0,000	0,526	*sad* (M = 0,503; SD = 0,012)	*happy* (M = 0,301; SD = 0,014)
Voice*	(1,131)	40,158	0,000	0,235	act: (M = 0,437; SD = 0,011)	nat.: (M = 0,368; SD = 0,011)

Table 17. Accuracy analysis summary for the Categorical Task. II. Significant interactions.

Interactions	F	Sig.	η^2		Comparison of means		
Gender × Emotion	21,386	0,000	0,140	FEM	*sad*: (M = 0,587; SD = 0,016)	*happy*: (M = 0,304; SD = 0,016)	p = 0,000
				MALE	*sad*: (M = 0,420; SD = 0,017)	*happy*: (M = 0,298; SD = 0,017)	p = 0,000
Gender × Voice	10,691	0,001	0,075	FEM	act: (M = 0,462; SD = 0,013)	nat.: (M = 0,429; SD = 0,014)	p = 0,042

Gender × Emotion × Voice	6,474	0,012	0,047	MALE	act: (M = 0,412; SD = 0,013)	nat: (M = 0,306; SD = 0,.014)	p = 0,000
				FEM sad	act: (M = 0,628; SD = 0,020)	nat: (M = 0,545; SD = 0,020)	p = 0,001
				MALE *happy*	act: (M = 0,355; SD = 0,021)	nat: (M = 0,242; SD = 0,017)	p = 0,000
				MALE sad	act: (M = 0,469; SD = 0,020)	nat: (M = 0,371; SD = 0,021)	p = 0,000
Gender × Voice × Proficiency	10,811	0,001	0,076	LoPro MALE	act: (M = 0,433; SD = 0,019)	nat: (M = 0,291; SD = 0,020)	p = 0,000
				HiPro FEM	act: (M = 0,473; SD = 0,018)	nat: (M = 0,404; SD = 0,020)	p = 0,002
				HiPro MALE	act: (M = 0,391; SD = 0,019)	nat: (M = 0,321; SD = 0,019)	p = 0,001

Table 18. Accuracy analysis summary for the Categorical Task. III. Between-subject effects.

Between-subjects effects	df	F	Sig.	η^2	Comparison of means	
Proficiency	(1,131)	0,288	0,592	0,002	LoPro (M = 0,407; SD = 0,014)	HiPro (M = 0,397; SD = 0,013)

This task, also rated by both groups of participants as the easiest to do, also yielded the best-defined and strongest results of all three experimental tasks. Somewhat significantly as well, the difference between how the emotions were recognized by the high and low proficiency participants was smallest in this task. And the trends were very clear. Regardless of their proficiency in English, the participants had the least problems recognizing emotions in female speakers, they recognized *sadness* much better than *happiness*, and acted expressions of both emotions better than natural ones. In female speakers the acted expressions of *sadness* were much better recognized than natural, and the same was true for male speakers expressing both *happiness* and *sadness*. Interestingly the recognition rates for stereotypical, acted expressions was significantly higher for both male and female speakers in the group of higher English language proficiency. The lower proficiency participants only favored acted expressions for the male speakers.

The one strong trend appears to have most to do with the speakers' gender and the manner of emotional expression. The natural expressions of emotions tend to be more nuanced, less clearly defined and harder to recognize, and this tendency is most robust in this task for the male speakers. It appears that for the non-native speakers of English the correct recognition of emotions in men means looking for the kind of well-defined and straightforward cues that come with acting rather than naturally expressing emotions. For women it does not seem to matter quite so much, as the differences in how well the emotions were recognized whether acted or natural were much smaller, and for the recognition *happiness* there were no significant differences at all. Interestingly in the older and more proficient group the reliance on acted rather than natural cues was much stronger and significant for both speaker genders. It therefore appears that the increasing proficiency in English does not help greatly with the comprehension of the more nuanced natural expressions of emotions.

The three possible responses in this task – "correct", "incorrect" and "other" formed patterns specific for the speakers, emotions the expressed and the manner of the expressions. These patterns are represented by percentage of total responses in Figures 16-23.

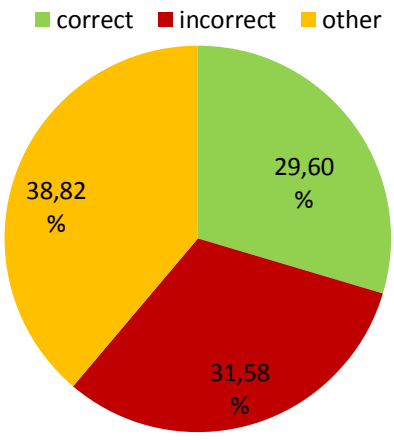

Fig. 16. Responses to Female Happy Acted speakers – error pattern.

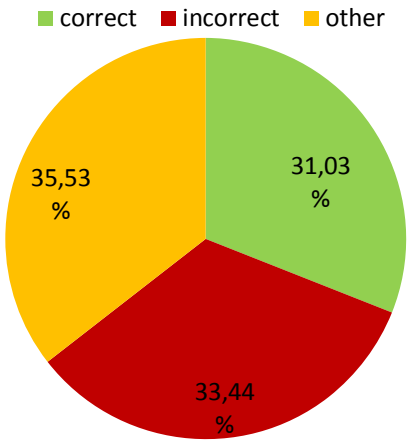

Fig. 17. Responses to Female Happy Natural speakers – error pattern.

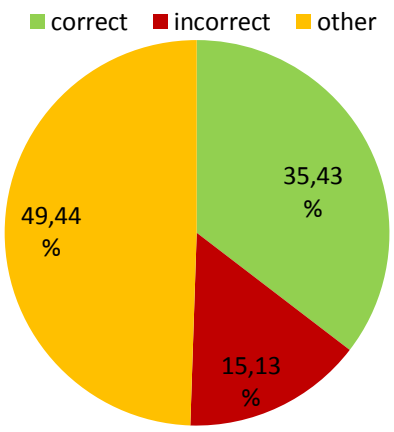

Fig. 18. Responses to Male Happy Acted speakers – error pattern.

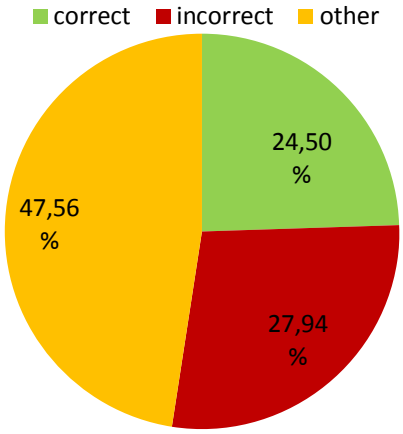

Fig. 19. Responses to Male Happy Natural speakers – error pattern.

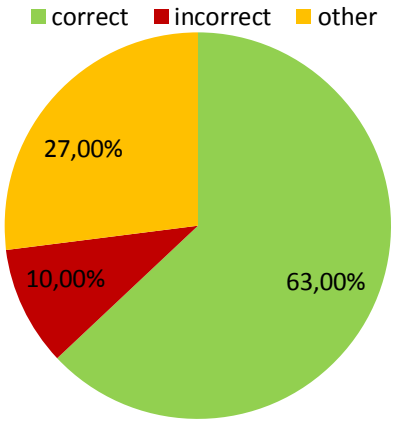

Fig. 20. Responses to Female Sad Acted speakers – error pattern.

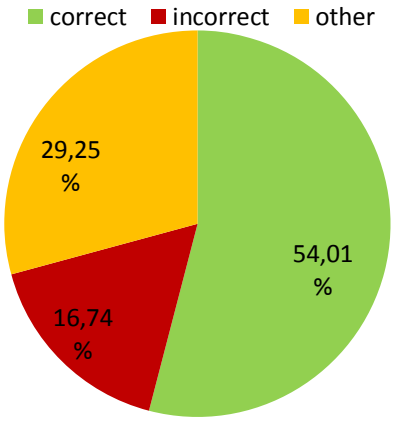

Fig. 21. Responses to Female Sad Natural speakers – error pattern.

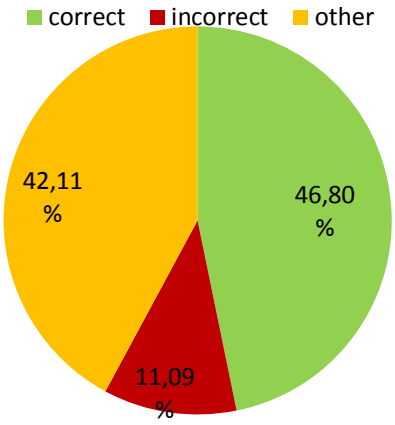

Fig. 22. Responses to Male Sad Acted speakers – error pattern.

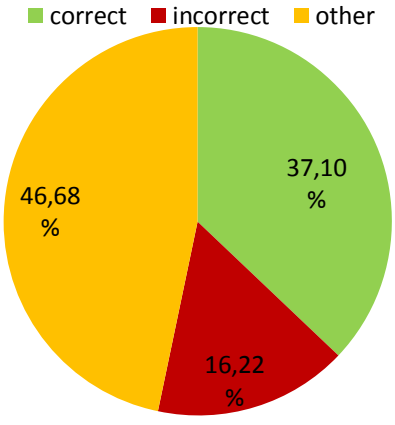

Fig. 23. Responses to Male Sad Natural speakers – error pattern.

The patterns of errors are again more revealing, as they point to the direction the participants' understanding might be going. The lower recognition rates of emotions for the male speakers came to the greatest extent from them being categorized as expressing emotions other than *happiness* and *sadness*. In every single instance of *happy* and *sad*, acted and natural expressions from men nearly half of all categorizations put those expressions in the 'other' response category. For the female speakers the pattern was quite different, with almost an even split of responses among the three options in both natural and acted expressions of *happiness*, and an interesting drop in misidentifications of *sadness* as *happiness* in the expressions of *sadness*. Indeed, where the non-native speakers of English misidentify and hesitate in their recognition of *happiness*, they are markedly more clear and decisive in classifying *sadness*. As these stimuli were presented to them, the participants apparently found the expressions of the negative emotion of *sadness* much less ambiguous than the positive emotion of *happiness*.

5.5.3. The results of the Free Label Task

The accuracy in this task was determined by assigning an informed rater to tag the participants' responses with six labels corresponding to Ekman's basic emotions: *happiness*, *sadness*, *anger*, *fear*, *disgust*, and *surprise*. The rater went over all of the responses twice tagging each word which semantically could be classified as Ekman's "emotion family" members and shared a core semantic meaning with one of the basic six labels. Because participants were allowed a great freedom regarding words they responded with, not all responses fitted semantically with the six basic emotion categories. Responses tagged as *happiness* given to *happy* stimuli were marked as "correct"; responses tagged as *sadness* given to *sad* stimuli were likewise marked as correct. All entries that could not be tagged as either *happy* or *sad* were marked as "incorrect". A one-way repeated measures ANOVA was conducted to compare the effects of speaker variables of the accuracy of emotional prosody recognition by listeners with respect to gender (male vs. female), emotion (*happy* vs. *sad*), and voice condition (acted vs. natural). There was a significant main effect of gender, $F(1,131) = 52{,}687$, $p = 0{,}000$, $\eta^2 = 0{,}287$; with responses to male speakers being significantly more accurate (M = 0,203; SD = 0,010) relative to female speakers (M = 0,279; SD = 0,013).

There was a significant main effect of emotion, $F(1,131) = 114,787$, $p = 0,000$, $\eta^2 = 0,467$; with responses to *sad* stimuli being significantly more accurate (M = 0,332; SD = 0,015) relative to responses to *happy* stimuli (M = 0,150; SD = 0,011). There was a significant main effect of voice condition, $F(1,131) = 12,564$, $p = 0,001$, $\eta^2 = 0,088$; with responses to acted stimuli being significantly more accurate (M = 0,260; SD = 0,012) relative to natural stimuli (M = 0,222; SD = 0,011). There was a significant interaction of gender and emotion, $F(1,131) = 44,302$, $p = 0,000$, $\eta^2 = 0,253$; with respect to female speakers *sadness* (M = 0,411; SD = 0,020) was recognized with significantly more accuracy than *happiness* (M = 0,146; SD = 0,014) at $p = 0,000$. With respect to male speakers *sadness* (M = 0,252; SD = 0,016) was recognized with significantly more accuracy than *happiness* (M = 0,154; SD = 0,012) at $p = .000$. There was a significant interaction of emotion and voice condition, $F(1,131) = 14,645$, $p = 0,000$, $\eta^2 = 0,101$; with responses to *sad* acted stimuli being significantly more accurate (M = 0,371; SD = 0,017) relative to *sad* natural stimuli (M = 0,292; SD = 0,017) at $p = 0,000$. There was also a significant difference between the LoPro and HiPro groups in terms of the overall accuracy, $F(1,131) = 8,049$, $p = 0,005$, $\eta^2 = 0,058$, with LoPro group scoring a significantly higher accuracy (M = 0,269; SD = 0,014) than the HiPro group (M = 0,212; SD = 0,014).

There was an overall difference in how well the emotions were recognized by the participants of high and low proficiency, as the higher proficiency group was somewhat better at this task. Once again the speakers' gender, the emotion they expressed as well as the manner of expression mattered. Interestingly, it was the male speakers whose emotions would be recognized better in this task. However the tendency to recognize *sadness* better, and to favor the simple and straightforward acted expressions over the understated natural ones was still present. For the non-native speakers of English the good definition of the stereotypical expressions of *sadness* and *happiness* in English seems to be the one consistently well recognized type of emotional expression.

Table 19. Accuracy analysis summary for the Free Label Task. I. Main effects – significant main effects marked with an asterisk.

Main Effects	df	F	Sig.	Eta	Comparison of means	
Gender*	(1,131)	52,687	0,000	0,287	FEM (M = 0,203; SD = 0,010)	MALE (M = 0,279; SD = 0,013)

Emotion*	(1,131)	114,787	0,000	0,467	*sad* (M = 0,332; SD = 0,015)	*happy* (M = 0,150; SD = 0,011)
Voice Condition*	(1,131)	12,564	0,001	0,088	act: (M = 0,260; SD = 0,012)	nat.: (M = 0,222; SD = 0,011)

Table 20. Accuracy analysis summary for the Free Label Task. II. Significant interactions.

Interactions	F	Sig.	η^2	Comparison of means		
Gender × Emotion	44,302	0,000	0,253	FEM	*sad*: (M = 0,411; SD = 0,020)	*happy*: (M = 0,146; SD = 0,014) p = 0,000
				MALE	*sad*: (M = 0,252; SD = 0,016)	*happy*: (M = 0,154; SD = 0,012) p = 0,000
Emotion × Voice	14,645	0,000	0,101	sad	act: (M = 0,371; SD = 0,017)	nat.: (M = 0,292; SD = 0,017) p = 0,000

Table 21. Accuracy analysis summary for the Free Label Task. III. Between-subject effects.

Between-subjects effects	df	F	Sig.	η^2	Comparison of means	
Proficiency*	(1,131)	8,049	0,005	0,058	LoPro (M = 0,269; SD = 0,014)	HiPro (M = 0,212.; SD = 0,014)

All the responses in this task were tagged with one of seven tags: *happy*, *sad*, *angry*, *fearful*, *disgusted*, *surprised*, and *empty*. The empty tag represented all the responses that could not be classified as one of the basic emotions by the informed judge. It was hoped that by analyzing the specific error patterns in this task would throw light on the results of the Categorical Task with its multiple miscategorizations of emotions expressed by the speakers as "other". The percentage of the general and specific distinctions in the responses to male and female speakers expressing *sadness* and *happiness* are listed in Table 22 below and represented in Figures 24-31 below.

Table 22. Percentages of responses by specific basic emotions and 'empty' category tags.

	happy	sad	*angry*	*fearful*	*disgusted*	*surprised*	empty
FHA	14,38%	24,81%	18,42%	5,45%	0,75%	0,38%	35,81%
FHN	14,84%	25,97%	4,52%	6,29%	0,48%	0,32%	47,58%
FSA	5,64%	46,52%	1,41%	5,55%	0,38%	0,00%	40,51%
FSN	14,27%	35,59%	3,67%	5,65%	0,14%	0,99%	39,69%
MHA	15,13%	8,27%	39,66%	4,14%	0,28%	1,03%	31,48%
MHN	15,30%	17,20%	16,13%	4,63%	0,47%	1,19%	45,08%
MSA	7,61%	27,54%	10,06%	3,57%	0,56%	0,19%	50,47%
MSN	9,54%	22,38%	14,97%	3,18%	0,40%	0,26%	49,27%

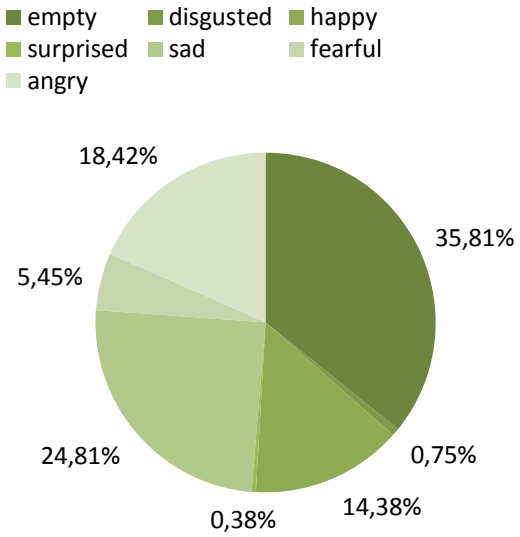

Fig. 24. Responses to Female Happy Acted speakers – by tag.

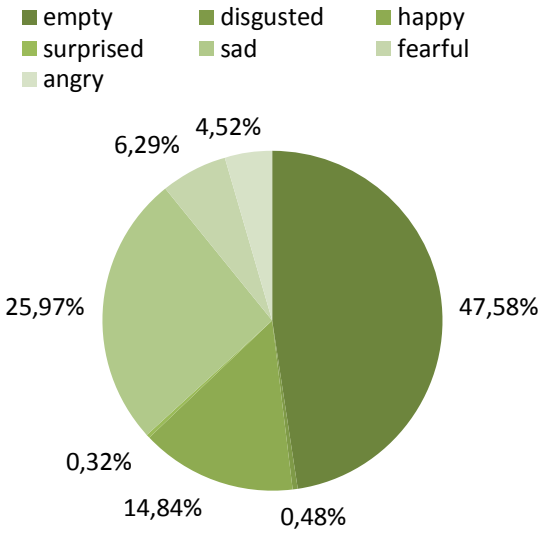

Fig. 25. Responses to Female Happy Natural speakers – by tag.

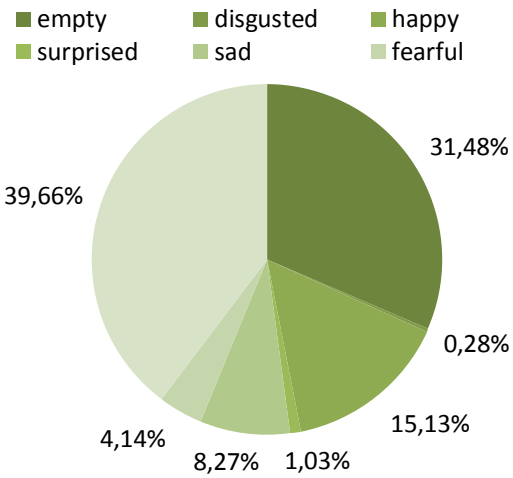

Fig. 26. Responses to Male Happy Acted speakers – by tag.

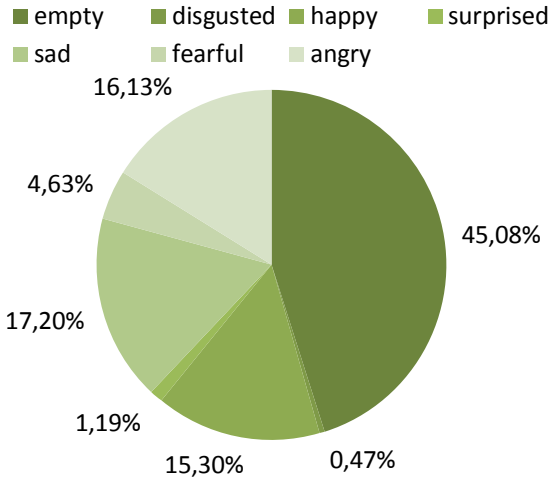

Fig. 27. Responses to Male Happy Natural speakers – by tag.

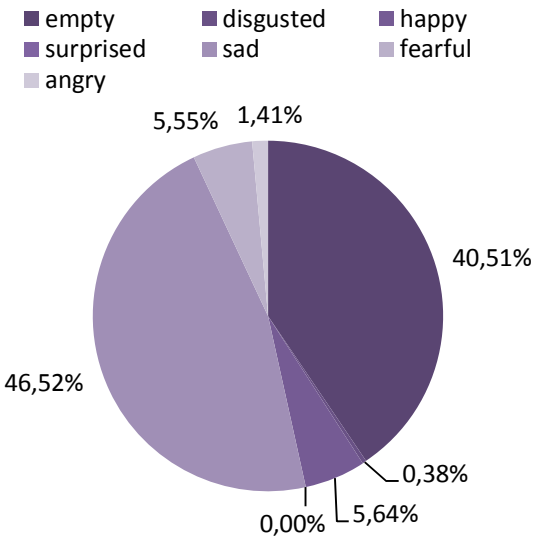

Fig. 28. Responses to Female Sad Acted speakers – by tag.

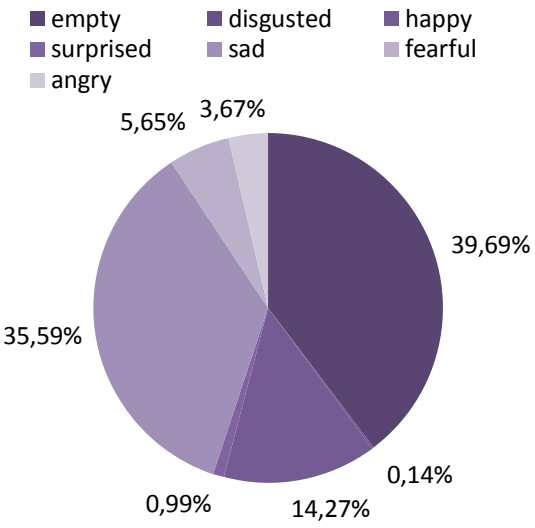

Fig. 29. Responses to Female Sad Natural speakers – by tag.

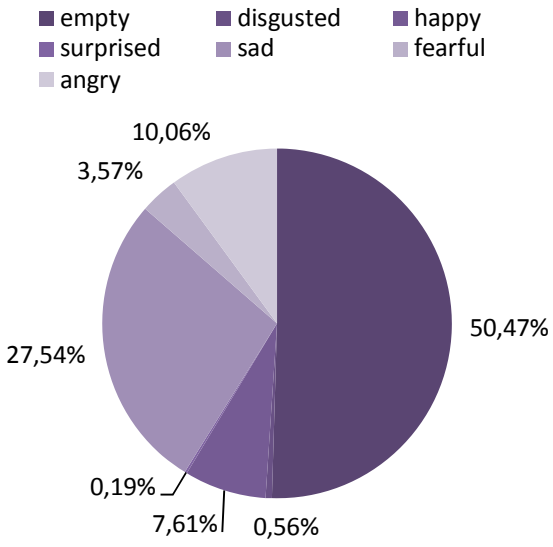

Fig. 30. Responses to Male Sad Acted speakers – by tag.

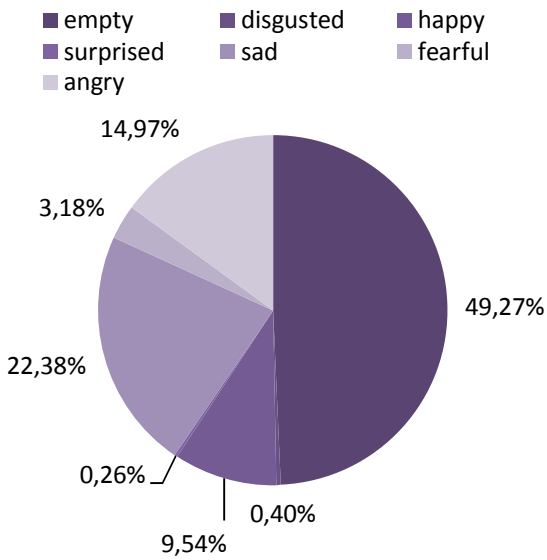

Fig. 31. Responses to Male Sad Natural speakers – by tag.

The differences in the correct identifications of *happiness* for female speakers hardly differed here with 14,38% of correct recognitions for the acted and 14,84% for natural expressions. There was also hardly any difference in the pattern of misidentifying *happiness* as *sadness* (24,82% for acted, 25,97% for natural), *fear* (5,45% for acted, 6,29% for natural), *disgust* (0,75% for acted, 0,48% for natural), and *surprise* (0,38% for acted, 0,32% for natural). There were some telling differences,

however, in the proportion of misidentifications of *happiness* for *anger*, with 18,42% for the acted, and 4,52% for the natural expressions. There was also a difference in the percentages of misidentification for the *empty* category with 35,81% for the acted and 47,58% for the natural expressions. In other words, the female speakers expressing *happiness* were most often misidentified as expressing something different from any basic emotion or as expressing *anger*.

Correct identifications of male speakers expressing *happiness* were likewise very much alike, with 15,13% of correct identifications for the acted expressions and 15,30% for the natural ones. There were also hardly any differences between the misidentifications of the male expressions of *happiness* as *fear* (4,14% for acted, 4,63% for natural), *disgust* (0,28% for acted, 0,47% for natural), or *surprise* (1,03% for acted, 1,19% for natural). There were some differences, however in the patterns of misidentifications for *happiness* as *sadness*, *anger*, and the internal states other than basic emotions. *Happiness* was misidentified as *sadness* 8,27% of the times when the expression were acted, but 17,20% when they were natural; as *anger* 39,66% of the times when the expressions were acted and 16,13% when they were natural; as something other than a basic emotion 31,48% of the times for the acted expressions and 45,08% for the natural expressions. The male speakers expressing *happiness* were thus most often misidentified as expressing *anger*, especially so when the expressions were acted. When the expressions were natural, the *happy* male speakers were most likely to be misidentified as expressing something other than a basic emotion.

The expressions of *sadness* presented a rather different picture. For the female speakers expressing *sadness* the proportion of correct identifications was much higher than in the case of *happiness*, but there were some differences, with 46,52% correct recognitions for the acted expressions but 35,59% for the natural expressions. There were also slight differences in the misidentification of *sadness* as *happiness* with 5,64% for the acted and 14,27% for the natural expressions, and misidentifications as *anger* with 1,41% for the acted and 3,67% for the natural expressions. There was hardly any difference between the recognition rates between natural and acted *sadness* recognition for *fear* (5,55% for acted, 5,65% for natural), *disgust* (0,38% for acted, 0,14% for natural), *surprise* (0,00% for acted, 0,99% for natural), and states other than basic emotions (40,51% for acted, 39,69% for natural). In short, the female speakers

expressing *sadness* the accuracy was comparatively high, and what misidentificaitons there were mostly fell into the category of emotions and feelings other than basic.

For the male speakers expressing *sadness* the pattern was, again, different. *sadness* expressed by men was most often misidentified as an internal state other than basic emotion at similar levels for acted and natural expressions (50,47% for acted, 49,27% for natural). The misidentifications of *sadness* as *fear* (3,57% for acted, 3,18% for natural), *disgust* (0,56% for acted, 0,40% for natural), and *surprise* (0,19% for acted, 0,26% for natural) were also very similar and very small. There was a slightly greater proportion and difference for the misidentifications of *sadness* as *anger* (10,06% for acted, 14,97% for natural) and *happiness* (7,61% for acted, 9,54% for natural). The correct recognition of *sadness* as such in male speakers was markedly lower than it was in female speakers with 27,54% for the acted and 22,38% for the natural expressions. In other words, *sadness* was much harder to recognize when expressed by men, and was most often described as a variety of states different from basic emotions.

A further insight into the nature of misidentification of the expressed emotion for another can be gained by a qualitative analysis of the specific responses given by the participants. The variety of responses given, especially those tagged as 'empty', that is other than one of the basic emotions, was immense. Therefore only an illustrative sample of the responses is given here, while the full inventories of responses can be found in Appendix K. In total of various responses given, the empty category was the largest and the most variable, with 448 items, 221 of them appearing more than once. Among the basic emotions, the most varied numerous were the items tagged as *sadness* with 68 different items (46 items appeared more than once), followed by *happiness* with 42 items (27 items appeared more than once), followed by *anger* with 41 items (25 items appeared more than once), followed by *fear* with 25 items (17 items appeared more than once), followed by *disgust* with 8 items (4 items appeared more than once), and *surprise* with 3 items (2 items appeared more than once).

For the most numerous categories (empty, *sadness*, *happiness*, *anger*, *fear*) only the top 15 items ranked by the frequency of occurrences among the responses are given, and the less numerous categories (*disgust*, *surprise*) are given in full. Tables 23-29 below list the response items, separate tallies of occurrences among responses to different types of stimulus (FH - Female Happy, MH - Male Happy, FS - Female Sad, MS - Male Sad), as well as totals for each emotion expressed (Happy speakers total, Sad

speakers total) and in general (Total). The patterns of occurrences of different categories and specific items are discussed below. As there were no significant differences between the variability or amount of specific responses to acted vs. natural expressions of emotions, the results for the qualitative analysis were collapsed.

Table 23. Top 15 terms tagged as *empty* in the Free Label condition.

No	TAG: EMPTY	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*neutral*	85	110	76	155	195	231	426
2	*tired*	25	36	97	98	61	195	256
3	*bored*	33	45	46	100	78	146	224
4	*calm*	32	25	41	35	57	76	133
5	*curious*	36	34	14	8	70	22	92
6	*interested*	16	29	7	9	45	16	61
7	*normal*	15	15	9	20	30	29	59
8	*confused*	13	9	16	18	22	34	56
9	*complaining*	24	15	6	9	39	15	54
10	*explaining*	18	15	7	14	33	21	54
11	*shy*	11	1	31	6	12	37	49
12	*confident*	7	24	2	11	31	13	44
13	*sleepy*	10	4	16	13	14	29	43
14	*unsure*	0	6	18	14	6	32	38
15	*guilty*	12	3	11	6	15	17	32

In the responses categorized and tagged as internal states other than basic emotions both the emotions expressed by the speakers and the speakers' gender appear to have had an impact on how the emotions were misidentified. Overall the themes surfacing in the top-ranking responses are those of non-emotionality (indicated by terms such as *neutral* and *normal*), weariness (*tired*, *sleepy*), and various states of cognitive discomfort (*bored*, *confused*, *unsure*) or activation (*curious*, *interested*), though some complex emotions appear here as well (*guilty*). Male speakers were most often misread as expressing *neutrality* or *normality* rather than either *happiness* or *sadness*, they were more likely to be called *interested* rather than *curious*, and were fairly often called *bored* and *confident*. Female speakers were more likely to be called calm and *curious*, but also *complaining*, *shy*, *unsure*, or *guilty*. From another angle, *sadness* was most often misidentified as *tired*, *sleepy*, *calm*, *shy*, *unsure* and *bored*. *Happiness* could like as not be mistaken for curiosity as well as for complaining.

Table 24. Top 15 emotion terms tagged as *sadness* in the Free Label condition.

No	TAG: SADNESS	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*sad*	240	71	439	214	311	653	964
2	*negative*	27	56	43	49	83	92	175
3	*disappointed*	47	24	42	41	71	83	154
4	*depressed*	12	13	57	34	25	91	116
5	*crying*	11	7	34	2	18	36	54
6	*unhappy*	10	9	18	7	19	25	44
7	*bad*	7	12	6	14	19	20	39
8	*upset*	5	8	11	7	13	18	31
9	*regretful*	3	5	7	9	8	16	24
10	*resigned*	5	3	4	12	8	16	24
11	*sorry*	6	1	8	3	7	11	18
12	*dissatisfied*	2	4	3	5	6	8	14
13	*miserable*	5	2	7	0	7	7	14
14	*hopeless*	3	0	5	2	3	7	10
15	*sorrow*	1	2	3	4	3	7	10

Sadness was, all things considered, relatively well recognized, although the pattern and distribution of responses was much less differentiated. Just within the top 15 responses, simply naming the emotions perceived in the stimuli *sadness* was the most frequent response, which at 964 instances outstripped all the other responses combined (the remaining items together counted a total of 727). At the same time female speakers, whether they were expressing *happiness* of *sadness* were called *sad* nearly twice as often as male speakers. The female speakers were also much more likely to be called *unhappy*, *depressed*, *crying*, *miserable* and *hopeless*. The male speakers, on the other hand, were likely to be called *negative*, *bad*, or *resigned*. In other words, the participants found it much more appropriate to use the words denoting *sadness* and similar emotions with respect to women expressing the emotions rather than men. For men the preferable words were more broad and not necessarily strictly emotional, such as *negative* and *bad*, though even for men *sad* was the most frequent term used.

Table 25. Top 15 emotion terms tagged as *happiness* in the Free Label condition.

No	TAG: HAPPINESS	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*happy*	73	87	42	26	160	68	228
2	*positive*	54	43	45	38	97	83	180
3	*excited*	44	63	9	7	107	16	123
4	*relaxed*	7	11	12	21	18	33	51
5	*good*	13	10	13	9	23	22	45
6	*fine*	9	7	4	9	16	13	29
7	*satisfied*	6	8	5	4	14	9	23

8	*amused*	3	9	4	6	12	10	22
9	*content*	9	4	4	2	13	6	19
10	*hopeful*	6	2	3	3	8	6	14
11	*cheerful*	5	5	2	1	10	3	13
12	*enthusiastic*	1	8	2	1	9	3	12
13	*joy*	1	4	4	0	5	4	9
14	*self-confident*	0	5	0	4	5	4	9
15	*glad*	1	5	2	0	6	2	8

Across the experimental tasks *happiness* was consistently hard to recognize correctly for the participants, or at least harder than *sadness* was. In the Free Label task the responses tagged as *happiness* were much less numerous, but the distribution, unlike the distribution for virtually all other responses was very egalitarian. Only the items *happy* and *excited* show any real differentiation in that they were much more often correctly used in response to *happy* stimuli than they were incorrectly used in response to *sad* stimuli. Other than that no gender- or emotion specific patters of item distribution can be found. In other words, when actually recognized, *happiness* was recognized and named the same in male and female speakers.

Table 26. Top 15 emotion terms tagged as *anger* in the Free Label condition.

No	TAG: ANGER	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*angry*	94	296	12	122	390	134	524
2	*irritated*	52	70	10	26	122	36	158
3	*annoyed*	22	44	3	12	66	15	81
4	*mad*	11	24	2	12	35	14	49
5	*pissed off*	4	26	3	8	30	11	41
6	*arguing*	7	21	0	3	28	3	31
7	*furious*	2	18	0	2	20	2	22
8	*frustrated*	9	6	0	6	15	6	21
9	*aggressive*	0	11	0	2	11	2	13
10	*impatient*	5	6	0	2	11	2	13
11	*accusing*	1	9	0	1	10	1	11
12	*threatening*	1	1	3	6	2	9	11
13	*bitchy*	7	1	0	2	8	2	10
14	*scolding*	2	8	0	0	10	0	10
15	*reproachful*	2	2	1	0	4	1	5

The responses tagged as *anger* show a strong effect of the speakers' gender. With the exception of the item *bitchy*, which was preferably attributed to female speakers, the grand majority of terms were attributed to men, specifically to men expressing *happiness*. This tendency was very robust throughout the dataset of

responses tagged as *anger*. From *angry*, *irritated* and *annoyed* down to *aggressive* and *impatient*, the majority of *anger* terms were preferentially assigned to male speakers expressing *happiness*. This result, more than any other, points to exactly what emotion was read from the stimuli designed to convey *happiness* and performed by male speakers. Rather than participants simply being unable to recognize *happiness* for what it was, they by and large confused it for *anger*.

Table 27. Top 15 emotion terms tagged as *fear* in the Free Label condition.

No	TAG: FEAR	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*nervous*	23	44	10	14	67	24	91
2	*worried*	21	10	25	15	31	40	71
3	*anxious*	12	6	16	7	18	23	41
4	*scared*	9	3	14	6	12	20	32
5	*afraid*	10	1	6	3	11	9	20
6	*insecure*	2	2	8	1	4	9	13
7	*stressed*	6	2	2	3	8	5	13
8	*agitated*	3	6	1	0	9	1	10
9	*shocked*	2	7	0	1	9	1	10
10	*fearful*	2	0	4	1	2	5	7
11	*frightened*	2	1	1	3	3	4	7
12	*apprehensive*	0	0	3	1	0	4	4
13	*self-conscious*	1	0	2	0	1	2	3
14	*terrified*	1	0	2	0	1	2	3
15	*unsafe*	0	0	3	0	0	3	3

The responses tagged as *fear* were far less numerous and largely denoted feelings of no great intensity, though here as well the effects of speakers' gender is apparent. On the whole it appears that regardless of emotion expressed, female speakers were much more likely to be understood to be expressing some form of *fear*. Items such as *worried*, *anxious*, *scared*, *afraid*, and *insecure* were preferentially attributed to female rather than male speakers. The only exception appears to be the item *nervous*, which was not only attributed more often to the expressions of *happiness* but also to male speakers more often than to female speakers. In all, however, as *nervousness* is not an emotionally intense feeling, it appears to fall into the category of vaguely emotional low-intensity emotions preferably used for male speakers' expressions of emotion that has been found across the body of data.

Table 28. Top 15 emotion terms tagged as *disgust* in the Free Label condition.

No	TAG: DISGUST	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*fed up*	4	2	6	5	6	11	17
2	*bitter*	4	0	0	1	4	1	5
3	*disgusted*	1	1	1	1	2	2	4
4	*resentful*	0	2	0	2	2	2	4
5	*dissatisfied*	1	0	0	0	1	0	1
6	*nasty*	1	0	0	0	1	0	1
7	*repulsed*	0	1	0	0	1	0	1
8	*spiteful*	0	1	0	0	1	0	1

There were very few responses tagged as *disgust*, and what little there was showed few differences in the patterns of distribution. The only two small tendencies point to *sad* speakers being more often described as *fed up* and *happy* speakers as *bitter*. The numbers here are so small, however, that these tendencies might be no more than flukes.

Table 29. Top 15 emotion terms tagged as *surprise* in the Free condition.

No	TAG: SURPRISE	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*surprised*	6	17	7	4	23	11	34
2	*amazed*	0	3	0	0	3	0	3
3	*astonished*	0	1	0	0	1	0	1

The results for the responses tagged as *surprise* were fewer still, and the only point of interest might be the fact that male speakers expressing *happiness* were somewhat more often understood to be *surprised* rather than *happy*.

5.5.4. REC questionnaire

The REC questionnaire administered at the endo of the experimental procedure constituted a check of how many speaker variables were the participants able to extract from the audio filtered stimuli, and which tasks were the hardest for them to perform. In the LoPro group 70,77% of the participants found the Categorical Task the easiest to do, for 23,08% the Dimensional Task was easiest, and for 13,79% the Free Task was the easiest of all three. On the other hand, 64,62% of the participants found the Free Task

the hardest, while for 32,31% the hardest task was the Dimensional Task, and for 3,08% it was the Categorical Task. In the HiPro group the pattern was roughly the same, with the Categorical Task being easiest for 57,35% of the participants, the Dimensional Task for 26,47% of the participants, and the Free Task for 16,18% of the participants. 55,88% of all participants found the Free Task to be the hardest, while for 30,88% it was the Dimensional Task, and for 13,24% it was the Categorical Task.

In the LoPro group, 29,23% of all participants were unable to determine what the language the speakers in the stimuli spoke, and 44,62% of them could not call the number of languages in the stimuli. When the participants could name the language they most often named English and Polish, with a few cases of Spanish, German, Russian, and Dutch. All participants were able to distinguish between male and female speakers, and on average judged there to be four speakers.

In the HiPro group, 36,76% of all participants were unable to determine what language the speakers in the stimuli spoke, and 35,29% of them could not call the number of languages in the stimuli. When the participants could name the language they most often named English and Polish. All participants were able to distinguish between male and female speakers, and on average judged there to be four speakers

5.6. Summary of the results

The results of the analyses of the data collected indicate that there was no significant difference in emotion recognition between the high and low proficiency groups. Though the participants of lower proficiency appeared overall to score better from those of higher proficiency, the differences were largely not significant. The recognition of *sadness* was significantly better than recognition of *happiness* and the errors committed in recognition occurred in gender-specific patterns. There were also significant differences in how emotions were recognized in male and female speakers, and the errors in recognition occurred here in emotion-specific patterns. In the majority of cases the differences in the recognition of acted and naturally expressed emotions were also significant. The results, their relations to the experimental hypotheses and the existing body of evidence in emotional prosody research are all discussed in detail in Chapter 6.

Chapter 6: Discussion

6.1. Introduction

Successful communication of ideas, resolving conflicts, coordinating actions of multiple parties – all those rely on reaching a common understanding, and that is mediated by language. Emotions are the staple of interpersonal communication, and language is suffused with them. To know a language without being able to communicate or understand emotions expressed in it is not to know it fully. In the modern world, with the globalization of English and the vastly growing number of non-native but highly proficient English speakers such deficit in emotional communication competence becomes a problem of growing insistence. Without understanding emotional expressions of a language, the most proficient speaker's communicative competence will be imperfect. The programs of teaching English as a foreign language are geared towards maximum competence in the structure of language: the correct grammar, the correct pronunciation, the rich vocabulary, the grasp of idioms and metaphors, etc. The focus on perfecting the students' competence in the structure of language is so great that the idea that language is meant for communication, and that one of the crucial aspects of communication is emotion seems to be lost on English as a foreign language programs. Therefore by and large the students of English, driven by the need to improve their communication skills on top of their language skills, are forced to forge an understanding of emotions in English for themselves. The empirical evidence collected in the course of research for this dissertation offers a glimpse into what the results of such self-teaching practices are.

The integrative approach developed for this dissertation combined three research paradigms to create a comprehensive image of how two specific emotions (*happiness* and *sadness*) are recognized in English by non-native speakers of the language. All three paradigms have been variously implemented in emotion research in general and emotional prosody research in particular, but combined they all echo the great debate between anthropology and psychology over the universality of emotions. The debate has been the main theoretical axis in the development of empirical frameworks for both disciplines, with the universalist positions of psychology on the one hand and relativistic positions of anthropology on the other. As has been shown in Chapter 1, the debate ultimately brought out more similarities than differences between the two disciplines. Anthropology sought evidence of diversity and found it, but gave testament to universality of the human understanding of emotions by effectively describing and explaining the rich variety of emotional lives of other peoples. Psychology sought universality of emotional concepts and found it, but alongside its objective it found a variability in recognition levels of these emotional concepts that could only be explained by mechanisms of relativity. In a manner of speaking, both sides appear to agree that relativistic differences are in the forms emotional expressions take, but disagree on the nature of universality. Psychology seeks for universality of emotion concepts and mechanisms, while anthropology sees it in the universal human capacity for understanding those concepts and mechanisms. Both of these ideas appear to come into play in the processing of emotional prosody in a language that is foreign, but known well. A language learned to near perfection but not in the sense of communicating emotions in speech.

The main research question for this dissertation inquired how emotional prosody of English is processed in the mind of a non-native English speaker. Four hypotheses were developed on the basis of existing empirical literature and related theoretical considerations to answer that research question. And the evidence collected to support or disprove these hypotheses speak to some of the confounds in the existing body of evidence on emotional prosody in general. Each of the hypotheses with the evidence for and/or against it will be discussed in turn here along with possible explanations for the effects discovered.

The differences in the data discussed for Hypothesis 1 are not statistically significant. All the statistical differences discussed for Hypotheses 2-4 are significant.

6.2. Hypothesis 1 - Discussion

> **Hypothesis 1:** Accuracy scores for *happiness* and *sadness* recognition will be lower for the participants of lower English language proficiency than for the participants of higher English language proficiency.

The first hypothesis was based on the assumption that the better proficiency and longer exposure to English would make the non-native speakers of higher proficiency better at recognizing emotions in that language. It was expected that those participants would develop an English "habit of the heart" as Wierzbicka would put it (Wierzbicka and Harkins 2001: 17). However it turned out that there was very little difference between how the two proficiency groups processed English emotional prosody. The participants of lower proficiency showed consistently higher overall accuracy scores in every single task, even though the difference was not significant in the categorical task. The accuracy scores were still comparatively low and did not show any significant tendencies in the responses to *sadness* or *happiness* specifically. Proficiency only played a differentiating role in the categorical task wherein the participants of higher proficiency classified the emotions they perceived better when both men and women were acting them out rather than expressing them naturally. For the participants of lower proficiency the same was true only for the male speakers. In other words, the younger and less proficient non-native speakers of English were somewhat better overall at recognizing emotions in English than their older and more proficient counterparts. I found no support for Hypothesis 1.

There are two possible reasons for such an outcome. One is that the length of exposure to English and the resultant differences in proficiency between the groups were not large enough to make a difference. There was an average of just 2 years' difference between the length of formal education in the English language between the groups, and an average of just 3 years' difference in their mean ages. The groups did not differ greatly in their linguistic backgrounds, though for some of the lower proficiency group their knowledge of other foreign languages led them to believe they heard those languages in the experimental stimuli. For the group of higher proficiency it was the same but the only language they thought they heard in the stimuli apart from English was Polish, a conclusion likely to be drawn from previous experience of participating in experiments on bilingualism at the Language and Communication Laboratory. Hence it

is at least plausible that there was simply not enough difference between the groups for any significant impact on the results to occur. Another, even more likely reason for the lack of differentiation between the high and low proficiency groups are their respective scores of alexithymia. There was no significant difference between the overall levels of alexithymia between the groups, meaning that participants had roughly the same competence in identifying and naming emotions regardless of their ages and English language proficiency levels. The TAS-20 is a tested and effective measure, and its predictive power is good (see Bagby et al. 1994). The lack of meaningful differences between the groups of higher and lower English language proficiency on the individual factors as well as the overall scores of alexithymia appear to explain best why Hypothesis 1 found no support.

The overall scores of accuracy of recognition of emotions were also comparatively low across all three tasks. In the Dimensional task the group of lower proficiency only achieved a mean score of M = 0,495 accuracy, the higher proficiency a mean of M = 0,450; in the Categorical task the lower proficiency group scored M = 0,497, the higher proficiency group M = 0,397; in the Free Label task the lower proficiency group scored M = 0,269, and the higher proficiency group scored M = 0,212 accuracy. The less specific the demands of emotion identification tasks the better the participants fared, scoring highest in the least specific Dimensional task and the lowest in the most specific Free Label task. This tendency of accuracy dropping along with the rising demand for exactitude and specificity in recognizing emotion fits in with the previously reported comparisons of this sort (Russell et al. 2003: 333). Figure 32 illustrates how the rates of recognition between the native speakers of English as reported in previous literature and the results from this study would compare (the percentages for *happiness* and *sadness* from Figure 3 in Chapter 2 were averaged and recalculated in raw accuracy scores instead of percentages):

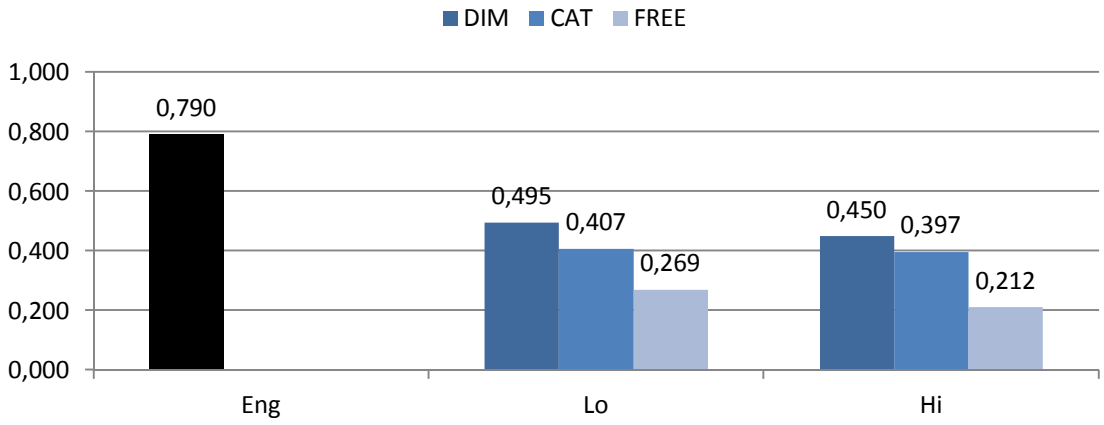

Fig. 32. Mean accuracy scores for native English speakers vs. low proficiency (LoPro) vs. high proficiency (HiPro) non-native English speakers. Mean scores for *happiness* and *sadness* are collapsed.

The degree of emotion recognition by comparison to the overall recognition rates from native English speakers interpreting other native English speakers (see Figure 3, Chapter 2) is markedly lower. A proper comparison of native to non-native speakers' emotional prosody recognition capabilities will require a proper cross-linguistic study in a bilingual framework. However, the comparison obtained in the present study allows to at least make a prediction that the non-native speakers will be markedly worse than native speakers at recognizing emotions in emotional prosody. The comparatively low scores of accuracy across the board could also be explained by the fact that however proficient, the participants were not native speakers of English, hence they were not subject to in-group advantage effects (Elfenbein and Ambady 2002b: 245). All the participants were educated rather than raised in the English language, which does not entail the kind of emotionally rich social learning that comes with growing up in a specific language.

All in all, non-native speakers of English could recognize emotions conveyed by emotional prosody and produced by native speakers, but at markedly lower rates than it would be predicted for native speakers by the existing literature. This effect is probably largely due to the fact that however well trained, individuals taught English in formal environments lack the advantage of emotional growth and socialization in the language that native speakers habitually enjoy. They are, to turn the term around, at an in-group disadvantage. They know enough of language fit in conversationally with native speakers, but they know too little of emotional communication to reap its potential

benefits in interpersonal interactions. What is more, although divided by an entire degree of proficiency by CEFR, two years of advanced and intensive language training, and three years of age, the participants here did not differ greatly in their ability to recognize emotional prosody in English. The lack of differentiation in how well they recognized foreign emotional prosody can be explained by their undifferentiated scores on the alexithymia measure. The slight excess of the scores over the cutoff point for alexithymia diagnosis for the group as a whole could in this context be explained not only as a result of the participants' comparatively young age, their level of education and gender (Mattila et al. 2006: 634), but also of the exclusively English language environment created for the duration for the experiment. As TAS-20 is based on a definition of alexithymia focused on emotion identification and naming, doing it and the experimental tasks in English which is not the native language of the participants might negatively have influenced the scores.

6.3. Hypothesis 2 – Discussion

> **Hypothesis 2:** Accuracy scores for *sadness* will be higher than those for *happiness* for all participants regardless of their proficiency in English.

The second hypothesis was based in part on a review of existing literature which usually points to *sadness* as the better recognized emotion of the two, and in part on the assumption that the effect known as the negativity bias would apply to the perception of emotional prosody as well. Negativity bias is a general perceptual sensitivity to negative emotions such as *sadness*, which is significantly greater than the general sensitivity to positive emotions such as *happiness* (Ito et al. 1998: 887). It was assumed that an inherent heightened sensitivity to negative emotions should entail higher rates of perception and recognition for *sadness* across the experimental tasks. This assumption as well as the second hypothesis was supported by the data. Across all three experimental tasks *sadness* was recognized consistently better than *happiness*. Figure 33 below illustrates the accuracy levels for both in all three tasks (averaged and recalculated in raw accuracy scores instead of percentages):

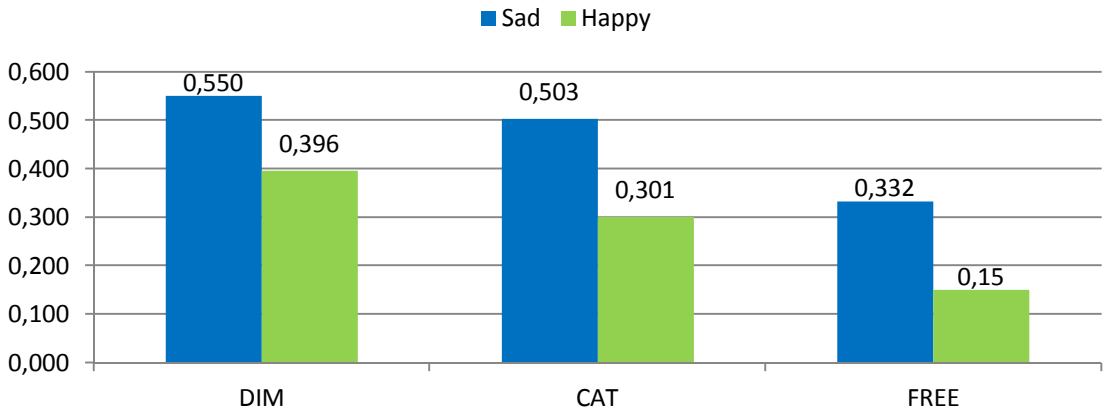

Fig. 33. *Sadness* vs. *happiness* accuracy across the three experimental tasks. DIM stands for the Dimensional Task, CAT for the Categorical Task, FREE for the Free Label Task.

In the Dimensional task, the mean accuracy for *sadness* was M = 0,550, for *happiness* it was M = 0,396; in the Categorical task it was M = 0,503 for *sadness* and M = 0,301 for *happiness*; in the Free Label task it was M = 0,332 for *sadness* and M = 0,150 for *happiness*. The differences in accuracy were not just plain to see, but also significant in every instance. Negativity bias in the form of negative differentiation could also explain the large variety of terms used to name the emotion in the Free Label task. The stimuli in each task were counterbalanced for emotion, but the responses given differed between the emotions. For *sadness* 68 different terms were used, 46 of them more than once, for *happiness* a total of 42 different terms were used, 27 of them more than once. There is another property of negativity called negative differentiation which explains this variability. Negative differentiation is a general principle which states that humans construct more negative concepts of emotion, concepts which are better differentiated and more complex than any positive concept ever conceived (Rozin and Royzman 2001: 299). Negative differentiation makes good evolutionary sense even in the case of emotions such as *sadness*, which have little to do with the no-nonsense reality of survival and promotion of fit. Human is a pack animal with an elaborate social structure maintained on the assumption of vicariousness and reciprocity (Janney 1996: 269). A *sad* member of one's community might need help and support, and helping behavior towards such an individual will be adaptively promoted in tightly knit groups such as are formed by humans. It therefore pays off to be able to identify the type of *sadness*, its level of severity and thus quickly determine the way to deal with the

situation. Thus it would make sense that even when interpreting the *sadness* expressed in a foreign language the negative differentiation would become apparent. After all, at least according to some interpretations, it is *sorrow* that is the only truly universal human emotion (Wierzbicka 2004: 34).

Negativity bias could also explain the error patterns in the Free Label task, especially in the large ratio of responses misidentifying *happiness* as *anger*. This specific tendency has been observed before and has been attributed to the similar general levels of arousal in prototypical forms both of these emotions (Scherer et al. 2003: 444). In the Free Label task the responses tagged as *anger* were indeed more numerous (total responses = 1041) than those tagged as *happiness* (total responses = 847) in general. Considering the expressions of *happiness* alone, they were more often misidentified as *anger* (total responses = 782) than identified correctly as *happiness* (total responses = 534). It may be that this particular effect was so strong in this task and in this study because emotional prosody seems to be differentiated much more by arousal alone rather than valence, as indicated by the results of the Dimensional procedure – both at the rating and experimental stages. In the recognition of emotions by emotional prosody the differentiation by arousal combined with the negativity bias as well as with the open interpretation allowed by the Free Label task have all probably contributed to the robustness of this particular misinterpretation effect. The same reasoning might well be applied to the weaker, but still prominent result of misinterpreting *happiness* as *fear*.

The degraded audio recordings of emotional speech the participants had to attend to in the course of the experiment might also have triggered the Relevance Mechanisms. There are cognitive benefits to reap from successful recognition of emotion, and the effort put in inferring emotional meanings from degraded signals perpetuates the subconscious mechanism assessing the costs and benefits of processing (Wilson and Sperber 2012: 6). These processes might play up the effects of the inherent sensitivity to negativity by a series of Relevance-Theoretic steps: effortful comprehension is only worth it if it is beneficial, it is usually beneficial to notice and process quickly the negative rather than the positive stimuli and emotions. Within the laboratory setting such a mechanism might have indeed amplified the effects of negativity bias in the patterns of emotion recognition and misinterpretation across the different experimental tasks. In summary, Hypothesis 2 was confirmed.

6.4. Hypothesis 3 – Discussion

> **Hypothesis 3:** Accuracy scores for female speakers will be higher than those for male speakers regardless of emotion expressed.

The third hypothesis was based largely on the existing neuroscientific literature which points to women having a higher perceptual sensitivity to emotional stimuli (see Bradley et al. 2001; Koch et al. 2007). In emotional prosody research the only difference between men and women was found in the perception of emotional expressions, and it came down to a small effect of women integrating the prosodic and semantic information better than men (Schirmer and Kotz 2003: 1146). The very same source which reported that effect, however, showed that the gender of the speaker performing emotional speech does not matter in emotional prosody processing (Schirmer and Kotz 2003: 1144). The third hypothesis proposed the contrary, that what gender the speaker is matters for how emotions conveyed by prosody are recognized. In the course of this study I found evidence that largely supports this hypothesis. Figure 34 illustrates the accuracy scores across the three experimental tasks for expressions of emotion performed by Male and Female speakers (averaged and recalculated in raw accuracy scores instead of percentages):

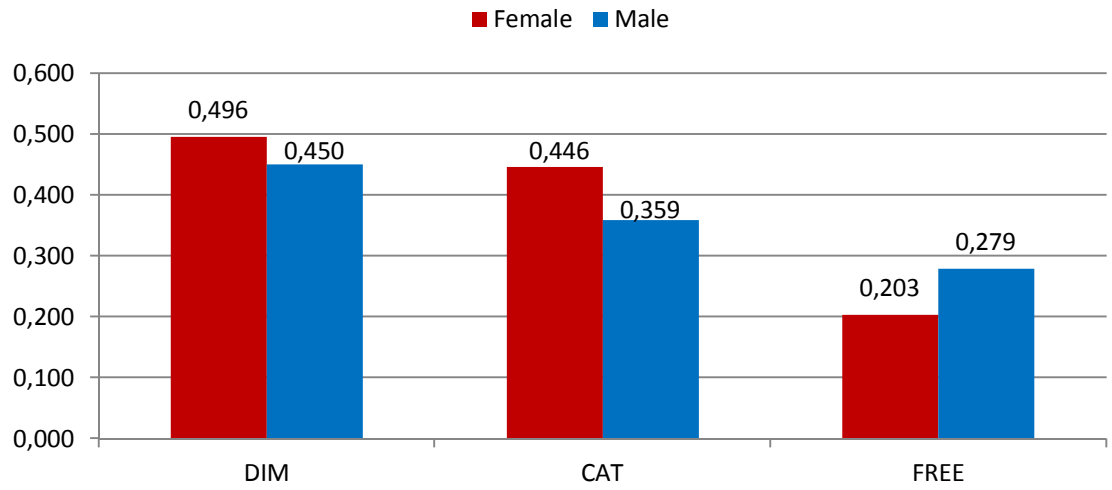

Fig. 34. Emotion recognition in male vs. female speakers across the experimental tasks.

The emotions of female speakers were recognized better than those expressed by men in two out of three tasks. In the Dimensional task female speakers' emotions were

recognized at M = 0,496 accuracy, the male speakers' at M = 0,450; in the Categorical task it was M = 0,446 for female and M = 0,359 for male speakers. The only exception was the Free Label task wherein the male at M = 0,279 accuracy rather than female speakers at M = 0,203 accuracy whose expressions of emotion were more accurately recognized. The reason for the latter might be the fact that in the Free Label condition the participants preferred to call men expressing *sadness* simply *sad*, which was both the easiest and the correct response. For female speakers the choice of vocabulary was greater and more varied, overlapping in effect with the negative differentiation effects as described above. With freedom to choose any word to describe the negative, somewhat *sad* emotions heard in the stimuli presented to them, participants appear to have been choosing from a wider range of vocabulary than they did for the male speakers.

What is interesting about the participants' reactions to male speakers, however, is not how high or low the accuracy might have been, but what kinds of mistakes in recognizing emotions expressed by men they made. Especially taking into account the fact that the majority of the participants in this study were female (N = 110, out of a total of N = 133). Though not really apparent in the error pattern in the Dimensional task results, the tendency to misinterpret *happiness* and *sadness* as something other the either of the two when expressed by male speakers was very strong in the Categorical and Free Label tasks. As the results from the Free Label task indicate, the male speakers expressing *sadness* were most likely to be misread as expressing *neutrality* or *boredom*, and the male speakers expressing *happiness* were most likely to be misread as expressing the many iterations *anger*. This result appears to fit it with previous gender stereotyping in emotion recognition research, wherein the tendency to stereotypically perceive males as more *aggressive* (Brody 1997: 386) and *angry* (Plant et al. 2000: 83) than females in their emotional expressions. It also appears to fit in with the studies investigating the evolutionary development of human emotions, which likewise point to *anger* as the emotional domain of men shaped both by the reproductive success drives and cultural factors (see Fessler 2006). The tendency also parallels Kopytko's model of the Individualized Affective Potential (IAP) with its self-based emotional perceptions shaped by nurture as much as nature (Kopytko 2002: 238), which warrants the implementation of culturally acquired gender stereotypes in emotional processing. Thus, there is a fairly well described tendency to generally interpret male expressions of

emotion as *anger*. It has also been observed that *happiness* and *anger* have similar arousal levels (Scherer et al. 2003: 444) and that when prosody is isolated from semantic and visual cues arousal becomes the main emotion differentiating feature. Taken together these observations may be taken to explain the strong tendency to misinterpret male *happiness* as male *anger* in this study. To my knowledge such a gender-specific effect for emotion emotional prosody has been observed and described for the first time here.

The tendency to opt for terms of emotional *neutrality* or *boredom* to describe male expressions of *sadness*, and a comparatively high ratio of terms denoting states of emotional neutrality in general is a bit harder to explain. Neutrality has ever been the control condition of emotion research, and in emotional prosody some studies used neutral semantics to control for the potential interference from emotional semantics on emotional prosody (see Chapter 2). But neutrality has hardly ever been investigated directly in terms of processing advantage. Only one study in emotional prosody describes such an advantage in a categorical emotion discrimination task wherein participants had to categorize *happy*, *angry* and *neutral* stimuli (Cornew et al. 2009: 1). The authors of that study were not ignorant of the similarity of the arousal levels between *happiness* and *anger* but operated under the assumption that the opposing valence of those emotions would differentiate the results (Cornew et al. 2009: 3). They found that valence was not a differentiating feature in their design, and their participants responded much faster and at higher accuracy levels to neutral prosody, and struggled to explain the effect by postulating a "neutrality bias" (Cornew et al. 2009: 11). However, since they have used pseudolanguage to mask semantics in their stimuli I believe the effect they saw is better explained by parallel to the Dimensional task results of this study. Here we found that isolating prosody from semantic and visual cues reduces the effects of valence for such isolated stimuli to virtual non-significance and arousal becomes the main differentiating feature (see Figure 7 in Chapter 4, Figure 15 in Chapter 5). I believe the advantage in distinguishing the *neutral* from the *happy* and *angry* prosody in Cornew et al. (2009) came from the marked difference in the arousal levels of a flat and *neutral* prosody and the raised emotional prosody of *happiness* and *anger*.

Neutrality bias does not seem like a viable notion in the light of the results of this study, and I believe other mechanisms are responsible for the relatively high ratio of

non-emotional terms used to describe the emotional stimuli. For one thing, due to ethical concerns, the emotions evoked in the participants in the course of stimuli development were far from extreme. All conveyed emotions at comparatively low level of arousal, even when they were acted. For another the participants' attention and involvement might have fluctuated due to the overall high demands of the tasks put to them. Within the Relevance-Theoretic mechanisms at play the effort costs of the tasks might have outstripped the potential benefits making the participants' best way out to opt for a less costly interpretation of *neutrality*. In interpersonal communication it may be less costly to miss the presence of any emotion than to misinterpret one for another, which might lead to negative interpersonal repercussions. This much at least could be claimed from the result of the Cornew et al. 2009 study, which could lend support to the idea that there is something to be gained from making quick and reliable distinctions between neutrality and emotions. In situations of high emotional strain it could be beneficial to quickly identify *neutral* stimuli for two reasons. For one, sorting the emotional from the non-emotional stimuli may enhance emotional processing by virtue of removing from consideration the temporarily irrelevant *neutral* stimuli. For another, in high emotional strain when the effort involved in emotional processing may cause errors in emotion recognition and misinterpreting an emotion as a *neutral* state may relieve some of the processing effort without severe interpersonal repercussions.

6.5. Hypothesis 4 – Discussion

> **Hypothesis 4:** The accuracy scores for acted emotion will be higher than that for natural emotion for all participants regardless of their proficiency in English.

The fourth and final hypothesis was motivated by the conclusions reached by Drolet et al. (2012), who investigated directly the differences in processing of naturally produced and acted stimuli. The authors found a greater overall activation in the brain in response to natural rather than acted stimuli, and an emotion-specific pattern whereby *anger* was best recognized when acted and *sadness* – when natural (Drolet et al. 2012: 144). Hypothesis 4 was formulated with that result in mind, but in more general terms for this dissertation. However, the participants in this study were non-native speakers of

English, none of them raised or socialized in the language, which I believed would make natural expressions of emotion less transparent to them in the light of Drolet et al.'s interpretation. Their idea of the pattern of activation specific to natural as opposed to acted emotional expressions processing to be caused by an activation and integration of autobiographical memories into online processing (Drolet et al.2012: 147). The grand majority of the non-native speakers of English recruited for this study had no history of living in an English-speaking country that would warrant forming autobiographical memories of emotional nature (a total of 14 participants out of 133 reported having spent any significant amount of time in an English-speaking country). It was therefore hypothesized that the acted expressions of emotions, being specifically designed to communicate the target emotions in a straightforward manner, would be more transparent to them. This hypothesis was mostly supported by the evidence. Figure 35 below illustrates the mean recognition accuracy scores for acted and natural expressions of emotion across the experimental tasks (averaged and recalculated in raw accuracy scores instead of percentages):

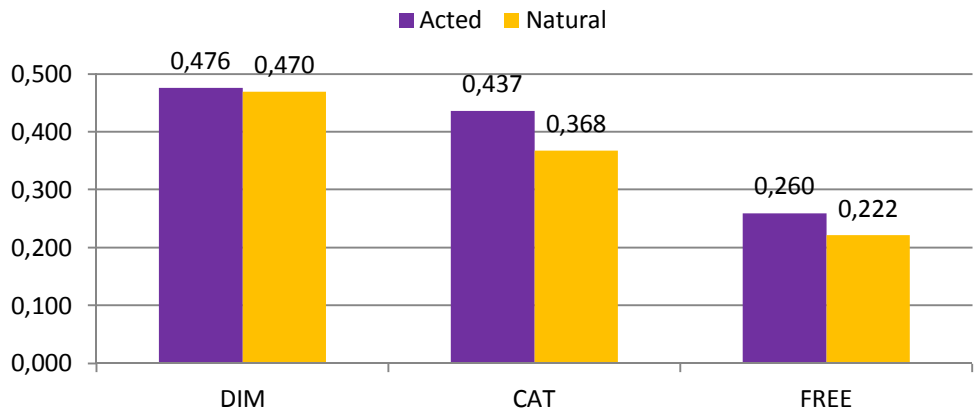

Fig. 35. Accuracy scores for acted vs. natural emotion expression across the experimental tasks.

On the whole the participants found the emotions in the acted expressions easier to recognize than those in natural expressions, though the difference was only significant in the Categorical and Free Label tasks. In the Dimensional task the recognition for acted emotion (M = 0,476) was only slightly higher than for naturally expressed emotion (M = 0,470), in the Categorical task the acted emotions (M = 0,437) were significantly better recognized than the natural emotions (M = 0,368), and in the

Free Label Task accuracy was significantly better for acted (M = 0,260) than for natural (M = 0,222) expressions of emotion. This effect, I believe has two major causes. One, as stated above, is the fact that none of the participants was raised in the English language, and very few of them had any opportunity to socialize with native speakers of English. The result was that the participants had no opportunity to collect emotional experiences that would help them recognize naturally expressed emotions in the English language. Another reason might be that the one source that might have informed whatever competence in emotion recognition the participants had was the television and cinema. Watching movies and TV shows in English is frequently endorsed by English as a foreign language program at the Faculty of English of Adam Mickiewicz University where the participants study, as a valuable source for learning pronunciation. In the case of this study, this practice might also have strengthened the effect of better recognition of acted emotion, simply by exposing the participants to typical and stereotypical portrayals of emotional expressions in English.

6.6. Overall conclusions

The research question for the dissertation was: *How is emotional prosody of one language (English) processed in the minds on non-native speakers of that language?* Out of the four hypotheses developed to answer this question three bore out. The results of this study was compared to the existing literature on emotional prosody and general emotional processing to determine how emotional prosody is processed in the non-native mind. My findings indicate that it is processed differently than what is reported as norm for the native speakers. There are certain patterns in emotional prosody recognition which are completely in line with existing research. There are others which speak to the differences in how emotions and emotional prosody of English are processed in a mind which is not natively English. I found no differences between the non-native English speakers of various proficiencies, but the lack of differentiation there might well have been due to the fact that the differences in proficiency were too small. The alexithymia scores for both proficiency groups were not significantly different and that proved the best predictor for the differentiation of recognition accuracy between the groups. Reflecting a much more universal and powerful general

tendency in emotion processing, the non-native speakers did show signs of negativity bias, and even gender-specific negative differentiation in their patterns of recognition and misidentification of emotions in prosody. However, they also showed a certain steady preference for misreading the English prosodic emotional signals as non-emotional expressions, which may reflect the extra processing effort that comes with attempting to identify emotions in a non-native language. The participants have also appeared not so much recognize the emotions of female English speakers better as misread the emotions of male English speakers more often and in gender-specific ways, thereby forcing the recognition accuracy for male speakers down.

Last but not least, the non-native speakers showed a markedly better recognition of acted emotions. This I believe to be an effect specific to non-native speakers of English, who cannot use any in-group advantages that come with being born into and raised in English and which would allow them to integrate their own autobiographical memories into ongoing emotional processing and thus enhance the recognition rates. The comparatively low emotion recognition scores across the board for the non-native speakers of English compared to the typical scores reported for native speakers of the language speak to the same effect. An effect here dubbed an in-group disadvantage. Non-native speakers are in a sense in-groupers – they know the language, they are subject to universal tendencies such as negativity bias and alexithymia, and they are exposed to certain manifestations of emotionality. Their problem appears to be in that the manifestations of emotionality that they are exposed to are not natural, they do not come from real-life emotional interactions with other users of English, native or otherwise. Hence their ability to recognize emotions from prosody alone is markedly lower than the universalist interpretation of the results of other research would predict. The Categorical task replicated the forced choice paradigm which is the staple in emotional prosody research, but it did not return the universal above chance recognition result across all stimuli types. Assuming a 33,33% chance threshold for a 3-way choice, the results for female speakers expressing *happiness* were just below chance (Female *Happy* Acted 29,60%; Female *Happy* Natural 31,03%), as were the results for male speakers expressing *happiness* naturally (Male *Happy* Natural 24,50%). Educational programs of English as a foreign language fail to so much as sensitize students to the import of emotional communication in that language or to the potential differences in the cadences and patterns of emotional expressions between English and the native

tongues of the learners. Hence the disadvantage. They are in-groupers by virtue of their linguistic competence but disadvantaged by their lack of sensitivity to or knowledge of emotional communication.

6.7. This study in the perspective of existing emotional prosody research

This study brings a couple of advances into the field of emotional prosody research reaching beyond the context on inquiring into the processing of emotional prosody within the non-native mind. First and foremost, to my knowledge this is the first study in this field to apply an integrative research paradigm in a systematic fashion. Applying the Dimensional, Categorical, and Free Label tasks allowed for a very comprehensive description of how emotional prosody is processed and recognized. The conjunction of the Dimensional and Free Label tasks in contrast with the multi-modal rating task not only replicates the results of frequent misidentification of *happy* prosody for *angry* prosody due to similar arousal levels for those emotions. It shows that the effect is caused specifically by the fact that, when isolated from semantic and visual cues, emotional prosody is differentiated by arousal alone with negligible effects of valence. Although this specific conclusion awaits further investigation (see Limitations and Future Directions), it would be impossible to produce it in a paradigm other than integrative, illustrating the validity and promise of this newly comprehensive approach. Using three different paradigms also opens up the possibilities of comparing the results produced in this study with a wider variety of studies in multiple specialized fields of emotion research, which was not at all possible for the majority of existing emotional prosody research as Chapter 2 illustrates.

Another advance both valuable and productive in terms of results of this study is in focusing the study design on the variables defined by the speakers producing the expressions of emotion rather than on the participants. Previous research focused on how emotional prosody is recognized with less care and control over how different aspects of its production may influence the processing and recognition of emotions from prosody. Hence some evidence exists on the subject of differences in how well men and women recognize emotional prosody (e.g. Schirmer et al. 2002, Fujisawa and Shinohara 2011), but virtually none on the subject of how emotional prosody produced

by men or women is recognized. In other words, the previous research was rather one-sided, focusing only on how emotional prosody is understood, as if the speakers performing the emotional prosody did not matter. This study focused on that neglected aspect and found a number of effects connected directly to variables defined by the speakers. This study shows that the previously observed effect of misidentification of *happiness* for *sadness* may actually be gender-specific in that it appears to be much more pronounced for male speakers. It also shows that not only are negative emotions such as *sadness* recognized better, but the errors in recognition of positive emotions have a very specific negative bent. Effects of negativity bias were thus demonstrated to be robust and varied in emotional prosody. And finally, the study demonstrates that there are indeed differences in how emotions are recognized from emotional prosody depending on whether the emotions are acted or more naturally expressed, a result lending credence to the conclusions reported by Drolet et al. in 2012. The major benefit of this study here is in the precision and complexity of data-driven description of the processes behind emotion recognition from prosody, and in the integration of previously disconnected results and conclusions from previous research.

6.8. Limitations and future directions

This study, despite the care put into its design was a novel approach, integrating three different paradigms to investigate an aspect of emotional expression which is notoriously hard to control – both in real life and in research environments. Therefore it has a number of limitations which should be taken into account both in interpreting the results of this study and in developing future research venues. For one thing, the measures of valence and arousal were not perfectly matched across the speakers, raters and participants. Unlike the latter two groups of participants who used a 7-point scales from (-3) to (3) for each of these measures, the speakers used a Self-Assessment Manikin, which uses a numberless 9-point scale. The measures of emotion categorization and naming were also absent from the speakers' self-assessment, both replaced by a shortened PANAS-like task. The future studies would do well to match the measures, their scales and ranges, as well as the way they are administered across all

populations to ensure a completely valid continuity of data which would lend itself better still to comparisons.

Another limitation of this study was the lack of gender balancing in the participants' population sample. The largely female population might be the very reason the gender-specificity of *happiness*-as-*anger* misidentification was discovered. However, this interesting effect should be investigated in a male population to see if this particular manifestation of gender stereotyping extends to male interpreters of emotion as well. Therefore future studies should strive to balance the male-to-female ratios of participants. Additionally, although the population was largely female and a gender-specific recognition effect for male speakers was found, the sexual orientation of the participants was not factored in at any point. There is some evidence that for heterosexual individuals certain properties of emotional prosody in the opposite sex can enhance processing of emotional meaning in prosody (see Ethofer et al. 2007). Therefore it might be advisable in future studies to factor in sexual orientation, which might throw more light on the gender-specific effects.

This study was also limited to two emotions only, both of them of fairly low level of expressed arousal. This limitation was deliberate as the study design was already complicated with three different response paradigms and multiple levels of analysis, and introducing even more by adding more emotions as variables was not advisable. However future studies could incorporate more emotions, or manifestation of *happiness* and *sadness* in which the arousal was manipulated to various levels. In both cases keeping the integrative paradigm for future studies would be advisable as that could help to further our understanding of how much of a differentiation is accounted for by arousal alone. Additionally, as was demonstrated by the Dimensional procedure in the rating task, it might be more beneficial not to investigate prosody alone. Instead, it would be much more informative to use a mixed multimodal approach, whereby various expressive cues to emotional meaning could be selectively added or subtracted to establish the dynamics of mutual dependence of all these cues on communicating emotions successfully. In other words, experimental studies more akin in design to the rating study reported in this dissertation might be a good future direction.

The speakers recruited for this study were not professional actors. This may be perceived as a limitation in view of the fact that using professional or amateur actors is both typical and even recommended by some of the most experienced researchers in the

field (Scherer and Ellgring 2007: 119). Still, it was an attempt to introduce more ecological validity to the process of stimuli development. The decision was based on the assumption that methods of emotion induction and elicitation shown previously to be effective in other fields could also be used here as well to good effect and that the effects of emotion induction procedures would also prime the speakers for acting out emotion as well. Future studies could explore this methodological direction further to establish the limitations of its effectiveness, or try to contrast this approach with using professional actors for emotion portrayals in a fashion similar to that of Drolet et al. (2012). In other words the limitation comes down to the fact that the acted stimuli were not acted by professional actors but by naïve individuals instructed to act out certain emotions, and the natural stimuli were still performed in a "unnatural" laboratory setting. The major difference was in the fact that the acted emotions were enhanced by the speakers' will to sound as instructed – *happy* or *sad*. In the case of natural expressions the instruction was not there, meaning the speakers expressed themselves only as naturally as the rather unnatural setting of a laboratory allowed. Still, while the stimuli might not have been perfect exemplars of acting or natural expressions, the differences in how they were perceived were significant and have potential to inform and guide future research.

Conclusion

All in all, although the study was not perfect in all aspects of design or execution, it constitutes a major contribution to both the field of emotional prosody and emotion research methodology. In the field of emotion prosody this study contributes by giving certain specificity to general results and effects described previously. It also demonstrates the import of careful design and control over the process of developing experimental stimuli, as it has been shown that the composition stimuli may hold more sway over emotion recognition than had previously been allowed. In the field of emotion research in general, it is one of the first demonstrations of successful application of a truly integrative paradigm approach to investigating a specific problem of emotion expression and recognition. The overall results also indicate that emotional prosody processing is subject to the same universal tendencies documented for other manners of expression such as various manifestations of negativity bias and gender stereotyping. Finally, it is the first systematic step towards investigating emotional prosody processing in bilingual contexts. Despite its imperfections, in terms of emotion research methodology as well as its findings this study is a valuable contribution to the field and has potential for future replication and seeding new research problems in the fields of emotion and bilingualism research.

SUMMARY

This dissertation had two objectives. One was to investigate how emotional prosody of the English language is recognized by non-native speakers of the language. The other was to attempt to implement an integrative research paradigm in emotion research in a systematic and comprehensive manner. There were four experimental hypotheses designed to address both these objectives. The experiment designed to test these hypotheses drew on the postulates of integrative paradigms of emotion research in general and on a critical review of literature on emotional prosody in particular.

Based on the premise that emotions are communicated between people rather than just expressed by one and recognized another person, great care was taken with the preparation of stimuli for the experiments. Speakers recruited to provide samples of emotional speech from which stimuli were created were all native speakers of English. They were both male and female, and they expressed either *happiness* or *sadness* either naturally or by acting out the emotions using emotionally charged sentences prepared for them. The emotions were induced using evocative film clips which served as a topic for conversation in natural emotional elicitation procedures and as emotional priming material in the acted emotion elicitation procedure. As they were expressing or acting out emotions, the speakers were recorded both in audio and video format, and their emotional states were monitored throughout by questionnaires.

The recordings of the emotional expressions were then processed into stimuli for a validation procedure. Four modalities of stimuli were created using various combinations of audio, video, and low-band pass filtered audio. The four types were: stimuli with normal audio and normal video(Audio-Visual Unfiltered), stimuli with filtered audio and normal video (Audio-Visual Filtered), stimuli with normal audio

(Audio Unfiltered), and stimuli with filtered audio (Audio Filtered). The raters recruited for the validation study were all native speakers of English from the same population as the speakers. Their ratings of the emotional expressions in the stimuli were used to verify that the stimuli indeed convey the emotions they were designed to convey.

The participants in the experiment proper were Polish natives speaking English as their second language, with one group of participants at a lower level of proficiency than the other. Their task was to identify emotions in the Audio Filtered stimuli presented to them. The audio filtering precluded the participants from relying on semantics to identify emotions, so that they had to make their identifications on prosody alone. The results indicated that there are no significant differences in emotional prosody recognition depending of English language proficiency, disproving Hypothesis 1. Significant differences were found in recognition of emotions expressed by male and female speakers, with female speakers being recognized better, which supports Hypothesis 2. Also significant were the differences in recognition of sadness and happiness, with sadness being recognized better, which supports Hypothesis 3. Finally, acted expressions of emotion were recognized better than natural, which supported Hypothesis 4.

STRESZCZENIE

Niniejsza dysertacja miała dwa cele. Po pierwsze, by zbadać jak angielska prozodia emocjonalna jest rozpoznawana przez użytkowników tego języka dla których nie jest on rodzimym językiem. Po drugie, by wprowadzić usystematyzowaną zintegrowaną metodę badania emocji. Cztery hipotezy badawcze zostały stworzone by osiągnąć oba cele. Eksperyment zaprojektowany by przetestować te hipotezy został oparty o postulaty zintegrowanych metod badania emocji oraz o krytyczną analizę literatury empirycznej na temat prozodii emocjonalnej.

Założeniem wyjściowym dysertacji było to, że emocje nie są po prostu sygnałami wysyłanymi przez jednych i odbieranymi przez drugich, lecz wynikiem interakcji pomiędzy uczestnikami rozmowy. Dlatego też wiele uwagi poświęcono przygotowaniu bodźców badawczych. Uczestnicy zaproszeni do dostarczenia próbek mowy nacechowanej emocjami byli rodzimymi użytkownikami języka angielskiego. Byli to mężczyźni i kobiety, wyrażający smutek lub radość, raz naturalnie, raz poprzez grę aktorską używając przygotowanych nacechowanych emocjonalnie zdań. Emocje były wywoływane z użyciem emocjonalnie nacechowanych filmów, które były tematami rozmów podczas których nagrywano naturalne wyrazy emocji, oraz prymami do aktorskich wyrażeń emocji. Wszystkie wyrazy emocji zostały nagrane w formatach audio i wideo, natomiast stany emocji były stale nadzorowane z użyciem kwestionariuszy.

Nagrania wyrazów emocji zostały przerobione na bodźce do wstępnej weryfikacji. Cztery typy bodźców zostały stworzone z zebranych nagrań audio i wideo oraz z audio przepuszczonego przez filtr niskoprzepustowy. Te cztery typy były to: bodźce z normalnym audio i wideo (Audio-Wizualne Niefiltrowane), bodźce z

normalnym wideo i filtrowanym audio (Audio-Wizualne Filtrowane), bodźce z normalnym audio (Audio Niefiltrowane), oraz bodźce z filtrowanym audio (Audio Filtrowane). Uczestnicy wytypowani do weryfikacji bodźców byli rodzimymi użytkownikami języka angielskiego i zostali wytypowani z tej samej populacji co uczestnicy którzy bodźców dostarczyli. Oceny bodźców dokonane przez uczestników weryfikacji użyte zostały do oceny skuteczności przekazu emocjonalnego bodźców.

Uczestnicy eksperymentu właściwego byli rodzimymi Polakami płynnie posługującymi się językiem angielskim, podzieleni na grupy o niższym i wyższym poziomie zaawansowania znajomości języka. Zadaniem uczestników było rozpoznanie prozodii emocjonalnej w bodźcach z filtrem niskoprzepustowym. Filtr uniemożliwił poleganie na semantyce wyrażeń w rozpoznawaniu emocji i zmusił uczestników do polegania wyłącznie na rozumieniu emocji za pośrednictwem prozodii. Wyniki wykazały brak różnic pomiędzy grupami uczestników ze względu na poziom znajomości języka angielskiego, tym samym obalając Hipotezę 1. Znaleziono również znaczące różnice w tym jak dobrze rozpoznawane były emocje wyrażane przez kobiety i mężczyzn, przy czym emocje u kobiet rozpoznawane były lepiej, co potwierdziło Hipotezę 2. Znaleziono również znaczące różnice w rozpoznawaniu smutku i radości, przy czym smutek rozpoznawany był lepiej, co potwierdziło Hipotezę 3.Wreszcie, emocje wyrażane z użyciem gry aktorskiej rozpoznawane były lepiej niż naturalne wyrazy emocji, co tym samym potwierdziło Hipotezę 4.

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Appendix A

LEAP-Q questionnaire

Language Experience and Proficiency Questionnaire (LEAP-Q)

Age:	□ Male □ Female

1. Please list all the languages you know in order of dominance:

1.	2.	3.	4.	5.

2. Please list all the languages you know in order of acquisition (your native language first):

1.	2.	3.	4.	5.

3. Please list what percentage of the time you are currently on average exposed to each language (percentage should add up to 100%):

List language here:					
List percentage here:					

4. When choosing to read a text available in all your languages, in what percentage of cases would you chose to read it in each of your languages (percentage should add up to 100%)?

List language here:					
List percentage here:					

5. When choosing a language to speak with a person who is equally fluent in all your languages, what percentage of time would you choose to speak each language? Please report percent of total time (percentage should add up to 100%).

List language here:					
List percentage here:					

6. Please name the cultures with which you identify. On a scale from zero to ten, please rate the extent to which you identify with each culture (examples of possible cultures include US-American, Chinese, Jewish-Orthodox, etc.). Use the 0-10 scale below.

List culture here:					
List score here:					

0	1	2	3	4	5	6	7	8	9	10
no identification	very low identification				moderate identification					complete identification

7. How many years of formal education do you have? _____
Please check your highest education level (or approximate US equivalent to a degree obtained in another country):

☐ Less than High School ☐ Some College ☐ Masters
☐ High School ☐ College ☐ PhD/MD/JD
☐ Professional Training ☐ Some Graduate School ☐ Other:_____

8. Date of arrival/immigration in the US (if applicable)_____ . If you have ever immigrated to another country, please provide name of country, and date of immigration here: _____ .

9. Have you ever had a: *vision problem* ☐, *hearing impairment* ☐, *language disability* ☐, or *learning disability* ☐? (check all applicable). If yes, please explain (including any corrections):
_____
_____

Language: ENGLISH

This is my 1st / 2nd / 3rd / 4th / 5th ……th language.

All questions refer to your knowledge of ENGLISH

1. Age when you…

began acquiring ENGLISH	became fluent in ENGLISH	began reading in ENGLISH	became fluent reading in ENGLISH

2. Please list the number of years and months you spent in each language environment.

	Years	Months
A country where ENGLISH is spoken		
A family where ENGLISH is spoken		
A school and/or working environment where ENGLISH is spoken		

3. On a scale from zero to ten please indicate your level of proficiency in speaking, understanding, and reading:

Speaking:		Understanding spoken language		Reading	

0	1	2	3	4	5	6	7	8	9	10
none	very low	low	fair	slightly less than adequate	adequate	slightly more than adequate	good	very good	excellent	perfect

4. On a scale from zero to ten please indicate how much the following factors contributed to you learning:

Interacting with friends		Language tapes/self-instruction	
Interacting with family		Watching TV	
Reading		Listening to the radio	

0	1	2	3	4	5	6	7	8	9	10
not a contributor	minimal contributor				moderate contributor					most important contributor

5. Please rate to what extent you are currently exposed to ENGLISH in the following contexts:

Interacting with friends		Language tapes/self-instruction	
Interacting with family		Watching TV	
Reading		Listening to the radio	

0	1	2	3	4	5	6	7	8	9	10
never	almost never				half of the time					always

6. In your perception, how much of a foreign accent do you have in ENGLISH?

0	1	2	3	4	5	6	7	8	9	10
none	almost none	very light	light	some	moderate	considerable	heavy	very heavy	extremely heavy	pervasive

7. Please rate how often others identify you as a non-native speaker based on your accent in ENGLISH?

0	1	2	3	4	5	6	7	8	9	10
never	almost never				half of the time					always

Language:	

This is my 1st / 2nd / 3rd / 4th / 5th ……th language.

All questions refer to your knowledge of ……..

1. Age when you…

began acquiring…	became fluent in…	began reading in…	became fluent reading in…

2. Please list the number of years and months you spent in each language environment.

	Years	Months
A country where …….. is spoken		
A family where …….. is spoken		
A school and/or working environment where …….. is spoken		

3. On a scale from zero to ten please indicate your level of proficiency in speaking, understanding, and reading:

Speaking:		Understanding spoken language:		Reading:	

0	1	2	3	4	5	6	7	8	9	10
none	very low	low	fair	slightly less than adequate	adequate	slightly more than adequate	good	very good	excellent	perfect

4. On a scale from zero to ten please indicate how much the following factors contributed to you learning:

Interacting with friends		Language tapes/self-instruction	
Interacting with family		Watching TV	
Reading		Listening to the radio	

0	1	2	3	4	5	6	7	8	9	10
not a contributor	minimal contributor				moderate contributor					most important contributor

5. Please rate to what extent you are currently exposed to …….. in the following contexts:

Interacting with friends		Language tapes/self-instruction	
Interacting with family		Watching TV	
Reading		Listening to the radio	

0	1	2	3	4	5	6	7	8	9	10
never	almost never				half of the time					always

6. In your perception, how much of a foreign accent do you have in ……..?

0	1	2	3	4	5	6	7	8	9	10
none	almost none	very light	light	some	moderate	considerable	heavy	very heavy	extremely heavy	perv-asive

7. Please rate how often others identify you as a non-native speaker based on your accent in……..?

0	1	2	3	4	5	6	7	8	9	10
never	almost never				half of the time					always

Appendix B

TAS-20 questionnaire

Using the scale provided as a guide, indicate how much you agree or disagree with each of the following statements by circling the corresponding number. Give only one answer for each statement.

Circle 1 if you STRONGLY DISAGREE

Circle 2 if you MODERATELY DISAGREE

Circle 3 if you NEITHER DISAGREE NOR AGREE

Circle 4 if you MODERATELY AGREE

Circle 5 if you STRONGLY AGREE

		Strongly disagree	**Moderately disagree**	**Neither disagree nor nor agree**	**Moderately agree**	**Strongly agree**
1.	I am often confused about what emotion I am feeling.	1	2	3	4	5
2.	It is difficult for me to find the right words for my feelings.	1	2	3	4	5
3.	I have physical sensations that even doctors don't understand.	1	2	3	4	5
4.	I am able to describe my feelings easily.	1	2	3	4	5
5.	I prefer to analyze my problems rather than just describe them.	1	2	3	4	5
6.	When I am upset, I don't know if I am sad, frightened, or angry.	1	2	3	4	5
7.	I am often puzzled by the sensations in my body.	1	2	3	4	5
8.	I prefer to let things happen rather than to understand why they turned out that way.	1	2	3	4	5

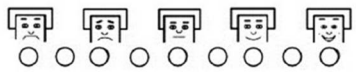
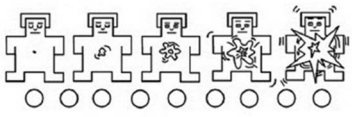
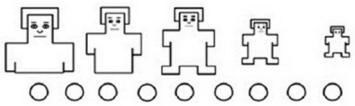
9.	I have feelings that I can't quite identify.	1	2	3	4	5
10.	Being in touch with emotions is essential.	1	2	3	4	5
11.	I find it hard to describe how I feel about people.	1	2	3	4	5
12.	People tell me to describe my feelings more.	1	2	3	4	5
13.	I don't know what's going on inside me.	1	2	3	4	5
14.	I often don't know why I'm angry.	1	2	3	4	5
15.	I prefer talking to people about their daily activities rather than their feelings.	1	2	3	4	5
16.	I prefer to watch "light" entertainment shows rather than psychological dramas.	1	2	3	4	5
17.	It is difficult for me to reveal my innermost feelings, even to close friends.	1	2	3	4	5
18.	I can feel close to someone, even in moments of silence.	1	2	3	4	5
19.	I find examination of my feelings useful in solving personal problems.	1	2	3	4	5
20.	Looking for hidden meanings in movies or plays distracts from their enjoyment.	1	2	3	4	5

Appendix C

The Post-Film Questionnaire

POST-FILM QUESTIONNAIRE

Each line on the page contains an adjective pair which you will use to rate your feelings about the film you have just seen. Some of the pairs may seem unusual, but you'll probably feel more one way than another while watching the film. So, for each pair, place a check mark close to the adjective which you believe describes your reaction to the film better. The more appropriate the adjective seems, the closer you should put your check mark to it.

SAD		HAPPY
QUIET		ACTIVE
INDEPENDENT		DEPENDENT

The following questions refer to how you felt while watching the film.

0	1	2	3	4	5	6	7	8
not at all / none				*somewhat / some*				*extremely / a great deal*

Using the scale above, please indicate the greatest amount of EACH emotion you experienced while watching the film.

_____	*amusement*	_____	*embarrassment*	_____	*love*
_____	*anger*	_____	*fear*	_____	*pride*
_____	*anxiety*	_____	*guilt*	_____	*sadness*
_____	*confusion*	_____	*happiness*	_____	*shame*
_____	*contempt*	_____	*interest*	_____	*surprise*
_____	*disgust*	_____	*joy*	_____	*unhappiness*

Did you feel any other emotion during the film? ○ No ○ Yes

If so, what was the emotion? _____

How much of this emotion did you feel? _____

Please use the following pleasantness scale to rate the feelings you had during the film. Circle your answer:

0	1	2	3	4	5	6	7	8
unpleasant								pleasant

Had you seen this film before? ○ No ○ Yes

Did you close your eyes or look away during any scenes? ○ No ○ Yes

Appendix D

PANAS-X questionnaire

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now. Use the following scale to record your answers:

1.	_____	*cheerful*	31.	_____	*active*
2.	_____	*disgusted*	32.	_____	*guilty*
3.	_____	*attentive*	33.	_____	*joyful*
4.	_____	*bashful*	34.	_____	*nervous*
5.	_____	*sluggish*	35.	_____	*lonely*
6.	_____	*daring*	36.	_____	*sleepy*
7.	_____	*surprised*	37.	_____	*excited*
8.	_____	*strong*	38.	_____	*hostile*
9.	_____	*scornful*	39.	_____	*proud*
10.	_____	*relaxed*	40.	_____	*jittery*
11.	_____	*irritable*	41.	_____	*lively*
12.	_____	*delighted*	42.	_____	*ashamed*
13.	_____	*inspired*	43.	_____	*at ease*
14.	_____	*fearless*	44.	_____	*scared*
15.	_____	*disgusted with self*	45.	_____	*drowsy*
16.	_____	*sad*	46.	_____	*angry at self*
17.	_____	*calm*	47.	_____	*enthusiastic*
18.	_____	*afraid*	48.	_____	*downhearted*
19.	_____	*tired*	49.	_____	*sheepish*
20.	_____	*amazed*	50.	_____	*distressed*
21.	_____	*shaky*	51.	_____	*blameworthy*
22.	_____	*happy*	52.	_____	*determined*
23.	_____	*timid*	53.	_____	*frightened*
24.	_____	*alone*	54.	_____	*astonished*
25.	_____	*alert*	55.	_____	*interested*
26.	_____	*upset*	56.	_____	*loathing*
27.	_____	*angry*	57.	_____	*confident*
28.	_____	*bold*	58.	_____	*energetic*
29.	_____	*blue*	59.	_____	*concentrating*
30.	_____	*shy*	60.	_____	*dissatisfied with self*

Appendix E

Language History Questionnaire

(Modified from Version 2.0)

Participant Number	

Age	
Sex	MALE / FEMALE

*circle the right answer

(1) Education. Check the highest degree obtained or school level attended. You can write a note such as "attended but did not finish" or "attending now" if that is the case. Middle School (Gimnazjum)

Middle School (Gimnazjum)	
High School (Liceum)	
College: BA/BS (Studia wyższe I stopnia)	
Graduate School: MA/MS (Studia wyższe II stopnia)	
Graduate School: PhD/MD/MJ (Studia wyższe III stopnia)	
Other (Inne)	

(2) Do you speak more than ONE LANGUAGE?

Yes	No

*circle the right answer

If you answered "No", you need not continue this form. If you answered "Yes", list the languages in order of proficiency (most proficient first):

Language(s)

(3) Name the countries:

Where you were born:	
Where you currently reside:	

(4) If (3a) and (3b) are the same, skip to question (5), if they are not the same, how long have you been in your current country of residence?

(;)	(years; months)

(5) If you have lived or travelled in other countries for more than 3 months, please indicate the names of the country/countries, your length of stay, the languages you learned or tried to learn, and the frequency of use of the language while in that country according to the following scale (circle appropriate number in the table):

Never	Rarely	Occasionally	Sometimes	Frequently	Very Frequently	Always
1	2	3	4	5	6	7

Country	Length of stay	Language	Frequency of use of the Language

(6) Rate your language learning abilities. How good in general do you feel you are learning new languages (e.g. relative to friends or people you know)?

*circle appropriate number

Very Poor	Poor	Fair	Neutral	Good	Very Good	Excellent
1	2	3	4	5	6	7

(7) How many years have you spent learning each language you know (formal education: tutoring, courses, school subjects, etc.):

Language(s)	Years

(8) Please rate your current ability on reading, writing, speaking, and listening for all languages you know according to the following scale:

Very Poor	Poor	Fair	Functional	Good	Very Good	Native-like
1	2	3	4	5	6	7

Language(s)	Reading							Writing							Speaking							Listening						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7

(9) Do you have a foreign accent in the languages you speak? If so, please rate how strong you think your accent is according to the following scale:

Very Poor	Poor	Fair	Functional	Good	Very Good	Native-like
1	2	3	4	5	6	7

Language(s)	Reading						
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7
	1	2	3	4	5	6	7

(10) Estimate in terms of hours per day, how often you are currently engaged in the following activities for each language you know.

Activities ↓ | Language(s) →			
Listening to Radio/Watching TV:	(hrs)	(hrs)	(hrs)
Reading for fun:	(hrs)	(hrs)	(hrs)
Reading for work:	(hrs)	(hrs)	(hrs)
Interacting on the Internet*:	(hrs)	(hrs)	(hrs)
Writing articles/papers:	(hrs)	(hrs)	(hrs)
Writing on the Internet**:	(hrs)	(hrs)	(hrs)
Other:	(hrs)	(hrs)	(hrs)

*chats, IMs, snap-chat, Skype, Messengers, Facebook, Twitter etc.
**Tumblr, blogs, editorials, websites, etc.

(11) Estimate, in terms of hours per day, how often you speak your languages currently with the following people:

Language(s)	Family members	Friends	Class-/Groupmates	Co-workers

(12) Do you happen to mix words or sentences from two (or more) languages in your speech (e.g. saying a sentence in one language but use a word or phrase from another language in the middle of the sentence)?

Yes	No

*circle the right answer

(13) How often do you use your language(s) for the following activities? Circle the number in the table according to the scale below:

Very Poor 1	Poor 2	Fair 3	Functional 4	Good 5	Very Good 6	Native-like 7

Language(s)	Arithmetic (counting, adding multiplying etc.)	Remembering numbers (student IDs, phone numbers, etc.)	Dream	Think	Talk to yourself	Express emotions
	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7

Appendix F

REC QUESTIONNAIRE

(1) How many speakers do you think there were?

(2) Were there both MALE and FEMALE speakers (can you tell how many MALE/FEMALE)?

(3) Can you tell whether the speakers spoke one or many languages? Can you guess the language(s)?

(4) You've done 3 tasks. One of them involved SMILY faces, one involved only NUMBERS, and one involved WORDS. Please rank them in order of difficulty – (put the hardest task at I, medium at II, easiest at III), use the names of tasks in caps (SMILY, NUMBERS, WORDS):

I.

II.

III.

Table 28. Complete summary of the studies discussed in the literature review in Chapter 2 – single language studies

No	Language(s)	Prosody isolated	Stimulus type	Emotion elicitation	Speakers	Validation	Response accuracy %	Response Times	Response mode	Participants
[1]	German	no	SENTENCES 30 happy, 27 angry, 30 neutral	read as-if	1 GER native (♀)	YES 23 GER 8♀15♂	98,82% happy 99,23% angry 98,43% neutral	not reported	yes/no (word probe)	34 GER 18♀16♂ mean age=25,7; SD=3,0
[2]	German	no	WORDS (verbs) 74 positive, 74 negative, 74 neutral	read as-if	2 GER native (1♀1♂)	YES 46 GER 23♀23♂	≈93% positive ≈96% negative ≈98% neutral	≈910ms positive ≈915ms negative ≈905ms neutral	forced choice: positive vs. negative v. neutral	64 GER 32♀32♂ mean age=24,5; SD=3,25
[3]	German	no	SENTENCES 99 happy, 99 sad	read as-if	1 GER native (♀)	YES no details given	≈88% happy ≈82% sad	≈1220ms happy 1225ms sad	LDT	20 GER 10♀10♂ mean age=24,0; SD=2,1
[4]	German	no	VOCAL. & WORDS 2 sadness, 2 grief, 2 disappointment, 2 rage, 2 surprise, 2 fear, 2 terror, 2 disgust, 2 pleasure, 5 happiness	vocalize & read as-if	1 GER native (♀) 1 BUL native (GER non-native) (♂)	NO	"all participants correctly identified [the stimuli]"	not reported	VOCAL: oddball out task WORDS: congruency task	48 GER 22♀26♂ mean age=24,5; SD = ?
[5]	German	no	SENTENCES 20 sad, 20 happy, 20 angry, 20 fearful	natural & acted	78 GER native (naive) 42 GER native (actors)	NO	Play-acted identified as anger, natural as sadness, bias against selecting happiness.	"no significant differences between emotions"	forced choice out of 4	24 GER 24♀ mean age=24,0; SD = ?
[6]	German	no	SENTENCES 16 sad, 16 happy, 16 angry, 16 neutral	read as-if	1 GER native (♀)	NO	for all emotions = 73%; SD = 9%	not reported	forced choice out of 4	10 GER 10 ♂ mean age=25,0; SD = ?

[7]	German	no	SENTENCES 50 pleas. surprised, 50 happy, 50 angry, 50 sad, 50 fearful, 50 disgusted, 50 neutral	read as-if	4 GER native (2♀ 2♂)	NO	63,05% sad 61,05% happy 86,75% angry 75,3% disgusted 55,55% fearful 42,95% surprised 88,05% neutral (pseudolanguage results)	not reported	forced choice out of 7	64 GER 32♀ 32♂ mean age=?; SD = ? age range=18-50
[8]	German	yes (pesudolanguage)	SENTENCES 50 happy, 50 angry, 50 disgusted, 50 fearful, 50 neutral	read as-if	1 GER native (♀)	YES undisclosed previous rating study	44,2% happy 65,0% angry 28,8% disgusted 42,5% fearful 72,8% neutral	not reported	forced choice out of 5	13 GER ?♀ ?♂ mean age=46,0; SD=11,85
[9]	German	yes (pseudolanguage)	SENTENCES 30 angry, 30 disgusted, 30 fearful, 30 neutral	read as-if	1 GER native (♀)	YES undisclosed previous rating study	for all emotions = 68,54%	not reported	forced choice out of 5	12 GER 1♀ 11♂ mean age=49,2; SD=?
[10]	English	no	PASSAGES 4 happy, 4 sad, 4 angry, 4 fearful	read as-if	4 ENG native (2♀2♂)	YES 48 judges in forced-choice out of 5 (4 emotions + 'I don't know')	92,10% happy 77,63% sad 86,84% angry 76,32% fearful	not reported	forced choice out of 6 (target emotions) in pictures	19 ENG 11♀ 8♂ mean age=9,8; SD=1,8
[11]	English	no	SENTECES 4 happy, 4 sad, 4 angry, 4 neutral, 4 fearful, 4 surprised, 4 disgusted, 4 sleepy	read as-if	1 ENG native (♀)	NO	for all emotions = 71,88%	not reported	forced choice out of 6 (target emotions) in pictures and words	69 ENG 19♀ 50♂ mean age=12,02; SD=2,49
[12]	English	no	SENTENCES 6 happy, 6 sad, 6 angry, 6 fearful	read as-if	unspecified (different study referenced)	NO	76,67% happy 83,3% sad 90% angry 65% fearful	not reported	forced choice out of 4 (target emotions) in pictures	18 ENG ?♀ ?♂ mean age=10,3; SD=1,5

[13]	English	no	NUMBERS 32 happy, 32 sad, 32 angry, 32 neutral	read as-if	6 ENG native (3♀3♂)	YES disclosed previous rating study	73,92% happy 71,21% sad 77,25% angry 70,90% neutral	not reported	forced choice out of 4	19 ENG 19♂ mean age=24,8; SD=8,79
[14]	English	no	SENTENCES 20 happy, 20 sad	read as-if	1 ENG native (1♂)	YES 27 raters (0-10 adequacy rating scale)	for all emotions = 94,55%; SD=6,36%	for all emotions = 2520ms; SD=290ms	forced choice out of 2	44 ENG 36♀ 8♂ mean age=18,7; SD=1,3
[15]	English	no	WORDS 30 happy, 30 sad, 30 neutral	read as-if	1 ENG native (1♂)	YES 30 raters (15♀ 15♂) (0-10 adequacy rating scale)	85% happy 88% sad 87% neutral	≈1700ms happy ≈1200ms sad ≈1390ms neutral	old-new recall task & -2 (negative) to 2 (positive) rating scale	112 ENG 56♀ 56♂ mean age=21,69; SD=1,6
[16]	English	yes (pseudolanguage) 50% yes (low band pass filter) 50%	SENTENCES 16 happy, 16 pleas. surprised, 16 fearful, 16 angry	read as-if	4 ENG native (2♀2♂)	YES disclosed previous rating study for psudolanguage YES 5 raters for filtered	pseudolanguage for all emotions = 76,2% filtered for all emotions = 69,3%	“no [sig.] differences”	forced choice out of 4	18 ENG 6♀ 12♂ mean age=44,4; SD=12,1
[17]	English	yes (low band pass filter above 350Hz)	SENTENCES 60 happy, 60 sad	read as-if	1 ENG native (1♂)	YES 27 raters (unspecified rating scale)	for all emotions = 81,5%	not reported	forced choice out of 2	28 ENG 22♀ 6♂ mean age=20,9; SD=3,1
[18]	English	yes (low band pass filter above 70-300Hz)	VOCAL.&WORDS 48 happy, 48 sad, 48 disinterested, 48 neutral, 48 surprised, 48 angry	(uncertain) read as-if	unspecified (different study referenced)	? disclosed previous rating study	for all emotions = 89,4%	not reported	forced choice out of 4 (target emotions) in pictures	29 ENG ?♀ ?♂ mean age=23,3; SD=?
[19]	English	yes (low band pass filter above 333Hz)	SENTENCES ? happy, ? sad, ? neutral	read as-if	1 ENG native (1♂)	NO	"accuracy was positively correlated with bilateral activation of [seected brain areas]"	not reported	respond to happy	13 ENG 13♂ mean age=32,2; SD=0,93

[20]	English	yes (low band pass filter above 333Hz)	SENTENCES 60 happy, 60 sad, 60 neutral	read as-if	1 ENG native (1♂)	YES 27 raters (0-10 adequacy rating scale)	for all emotions = 70% (SD=5,1%)	not reported	respond to happy	13 ENG 13♂ mean age=32,2; SD=3,6
[21]	English	yes (pseudolanguage)	SENTECES 60 happy, 60 sad, 60 angry, 60 disgusted, 60 pleas. surprise, 60 neutral	read as-if	6 ENG natives (3♀ 3♂)	YES 20 raters	28% happy 63% sad 50% angry 26% disgusted 26% surprise 40% neutral	not reported	forced choice out of 6	24 ENG 12♀ 12♂ mean age=21,9; SD=2,4
[22]	English	yes (pseudolanguage)	SENTENCES 48 happy, 48 angry, 48 neutral	read as-if	4 ENG natives (2♀ 2♂)	YES 40 raters (forced choice out of 3 + 1-5 arousal scale)	81% happy 87% angry 92% neutral	not reported	forced choice out of 3 + 1-5 certainty scale	26 ENG 12♀ 14♂ mean age=21,2; SD=2,6
[23]	English	yes (pseudolanguage)	SENTENCES 20 happy, 20 sad, 20 angry, 20 fearful, 20 disgusted, 20 neutral	read as-if	4 ENG natives (2♀ 2♂)	YES 24 raters (forced choice out of 7)	89,1% happy 94,4% sad 85,8% angry 94,6% fearful 74,5% disgusted 86,6% neutral	“faster from offset in happy and disgusted no difference for sad, angry, fearful, neutral”	forced choice out of 6	40 ENG 20♀ 20♂ mean age=25,0; SD=5,0

[24]	Portugese	yes (pseudolanguage)	SENTENCES 16 happy, 16 sad, 16 angry, 16 fearful, 16 disgusted, 16 surprised, 16 neutral	read as-if	2 POR (Eur.) natives (2♀)	YES (see: Participants)	75% happy 84% sad 77% angry 65% fearful 50% disgusted 87% surprised 88% neutral	≈3000ms happy ≈2950ms sad ≈2980ms angry ≈3200ms fearful ≈3100ms disgusted ≈3200ms surprised ≈3050ms neutral	forced choice out of 7 + 1-7 adequacy rating scale	80 POR 72♀ 8♂ mean age=21,8; SD=6,1
[25]	Dutch	yes (pseudolanguage)	WORDS 24 happy, 24 sad	read as-if	1 DUTCH native (1♀)	YES 10 DUTCH -4 (very sad) to 4 (very happy) rating scale	not reported	716ms sad 737ms happy	congruency with musical prime task	32 POR 16♀ 16♂ mean age=23,8; SD=4,0
[26]	Japanese	no	PHRASE 4 happy, 4 sad, 4 angry, 4 neutral	read as-if	4 JAP natives (2♀ 2♂)	YES 2 raters	≈65% happy ≈80% sad ≈82,5% angry	not reported	forced choice out of 4 (target emotions) in pictures	103 JAP 50♀ 53♂ mean age=12,33; SD=1,16
[27]	Japanese	yes (low band pass filter above 400Hz)	WORDS 51 positive, 93 negative	read as-if	26 JAP natives (13♀ 13♂)	YES 13 raters (?♀ ?♂) 5-point valence scale	78% positive 82% negative	1280ms positive 1278ms negative	forced choice out of 2	110 JAP 87♀ 23♂ mean age=?; SD=?
	English	yes (low band pass filter above 400Hz)	WORDS 81 positive, 81 negative	read as-if	1 ENG native (1♀)	YES 33 raters (?♀ ?♂) 5-point valence scale	92,5% positive 96% negative	909ms positive 884ms negative	forced choice out of 2	38 ENG 24♀ 14♂ mean age=?; SD=?

[28]	English	yes (pseudolanguage)	SENTENCES 30 happy, 30 sad, 30 angry, 30 fearful, 30 disgusted, 30 pleas. surprised, 30 neutral	read as-if	4 ENG natives (2♀ 2♂)	NO	79,6% happy 90,5% sad 88,4% angry 87,4% fearful 71,5% surprised 76,4% disgusted 76,4% neutral	not reported	forced choice out of 7 + 5+point intensity scale	24 ENG 12♀ 1♂ mean age=24,9; SD=7,9
	German	yes (pseudolanguage)	SENTENCES 40 happy, 40 sad, 40 angry, 40 fearful, 40 disgusted, 40 pleas. surprised, 40 neutral	read as-if	4 GER natives (2♀ 2♂)	NO	59,6% happy 72,6% sad 88,0% angry 70,8% fearful 68,8% surprised 76,6% disgusted 94,3% neutral	not reported	forced choice out of 7 + 5+point intensity scale	24 GER 12♀ 12♂ mean age=24,2; SD=2,8
	Hindi	yes (pseudolanguage)	SENTENCES 35 happy, 35 sad, 35 angry, 35 fearful, 35 disgusted, 35 pleas. surprised, 35 neutral	read as-if	4 IND natives (2♀ 2♂)	NO	67,1% happy 75,7% sad 74,4% angry 75,6% fearful 57,9% surprised 63,9% disgusted 66,1% neutral	not reported	forced choice out of 7 + 5+point intensity scale	20 IND 10♀ 10♂ mean age=21,55; SD=3,0
	Arabic	yes (pseudolanguage)	SENTENCES 20 happy, 20 sad, 20 angry, 20 fearful, 20 disgusted, 20 pleas. surprised, 20 neutral	read as-if	4 SYR natives (2♀ 2♂)	NO	59,9% happy 74,7% sad 63,1% angry 62,3% fearful 50,4% surprised 55,0% disgusted 63,5% neutral	not reported	forced choice out of 7 + 5+point intensity scale	19 SYR 9♀ 10♂ mean age=23,9; SD=5,1

[31]	English	no	VOCALIZATIONS for each language: 10x achievement, amusement, anger, disgust, fear, sensual pleasure, relief, sadness, surprise	vocalize	English 4 (2♀ 2♂)	YES (no details given)	81% sadness 88,36% amusement 96,04% achievement 51,84% sens. pleas. 67,24% relief 81% anger 96,04% disgust 96,04% fear 70,56% surprise	not reported	forced choice out of 2	51 ENG speakers 30♀ 21♂ mean age=28,85; SD=?
	Himba	no	VOCALIZATIONS for each language: 10x achievement, amusement, anger, disgust, fear, sensual pleasure, relief, sadness, surprise	vocalize	Himba 11 (6♀ 5♂)	NO	44,69% sadness 19,86% amusement 33,14% achievement 12,45% sens. pleas. 39,86% anger 42,24% disgust 15,21% fear 9,97% surprise	not reported	forced choice out of 2	58 HIMBA speakers 32♀ 26♂ mean age=?; SD=?

The studies summarized above are as follows – the number in the table is given in brackets, study reference beside it: (1) Kotz and Paumlann 2007, (2) Schirmer and Kotz. 2003, (3) Schirmer et al. 2005, (4) Bostanov and Kotchoubey 2003, (5) Drolet et al. 2012, (6) Rota et al. 2008, (7) Paulmann et al. 2008a, (8) Paulmann et al, 2010, (9) Paulmann et al. 2008b, (10) Fujiki et al. 2008, (11) Schmidt et al. 2010, (12) Hopyan-Misakyan et al. 2009, (13) Alba-Ferrara et al. 2011, (14) Mitchell 2006b, (15) Schirmer 2010, (16) Dimoska et al. 2010, (17) Mitchell 2006a, (18) Sorocco et al. 2009, (19) Mitchell et al. 2003, (20) Mitchell et al. 2004, (21) Paulmann and Pell 2011, (22) Cornew et al. 2009, (23) Rigoulot et al. 2013, (24) Castro and Lima 2010, (25) Goerlich et al. 2011, (26) Fujisawa and Shinohara 2011, (27) Kitayama and Ishii 2002, (28) Pell et al. 2009b, (31) Sauter et al. 2009.

Table 29. Full summary of the studies discussed in the literature review in Chapter 2 – single language studies

No	Language(s)	Prosody isolated	Stimulus type	Emotion elicitation	Speakers	Validation	Response accuracy %	Response Times	Response mode	Participants
[29]	Spanish (ARG) Arabic (SYR) English German	yes (pseudolanguage)	SENTENCES for each language: 8x happy, sad, angry, fearful, disgusted, neutral	read as-if	4 (2♀ 2♂) natives of each language	YES 21 Spanish raters, 19 Arabic raters, 24 English raters, 24 German raters	happy: 89% SPA, 59% SYR, 32% ENG,57% GER sad: 51% SPA, 77% SYR, 74% ENG, 65% GER angry: 81% SPA, 66% SYR, 67% ENG, 77% GER disgusted: 43% SPA, 45% SYR, 52% ENG, 28% GER fearful: 57% SPA, 53% SYR, 61% ENG, 51% GER neutral: 55% SPA, 61% SYR, 77% ENG, 89% GER	not reported	forced choice out of 7	61 SPA speakers 32♀ 29♂ mean age=27,0; SD=4,0
[30]	English German Chinese Japanese Tagalog	no	SENTENCES for each language: 2x happy, sad, angry, fearful	read as-if	2 (?♀ ?♂) natives of each language	YES 2 natives of each language – suitability rating	all results are ≈ happy: 99% ENG, 58% GER, 48% CHN, 58% JAP, 50% PHL sad: 90% ENG, 84% GER, 61% CHN, 79% JAP, 98% PHL angry: 99% ENG, 77% GER, 61% CHN, 48% JAP, 89% PHL fearful: 90% ENG, 53% GER, 68% CHN, 32% JAP, 53% PHL	not reported	forced choice out of 4	20 ENG speakers 12♀ 8♂ mean age=21,95; SD=?

[31]	English Himba	no	VOCALIZATIONS for each language: 10x achievement, amusement, anger, disgust, fear, sensual pleasure, relief, sadness, surprise	vocalize	English 4 (2♀ 2♂) Himba 11 (6♀ 5♂)	YES for English (no details) NO for Himba	sadness: 81% ENG, 44,69% HIMBA amusement: 88,36% ENG, 19,86% HIMBA achievement: 96,04% ENG, 33,14% HIMBA sensual pleasure: 51,84% ENG, 12,45% HIMBA relief: 67,24% ENG, ? HIMBA anger: 81% ENG, 39,86% HIMBA disgust: 96,04% ENG, 42,24% HIMBA fear: 96,04% ENG, 15,21% HIMBA surprise: 70,56% ENG, 9,97% HIMBA	not reported	forced choice out of 2	51 ENG speakers 30♀ 21♂ mean age=28,85; SD=? 58 HIMBA speakers 32♀ 26♂ mean age=?; SD=?

The studies summarized above are as follows – the number in the table is given in brackets, study reference beside it: (29) Pell et al. 2009a, (30) Thompson and Balkwill 2006, (31) Sauter et al. 2009.

Table 30. Original Velten sentences transformation to acting sentences for emotion elicitation procedure.

"Original Velten sentences" column lists the original sentences of the Velten technique; "Core phrase" column lists the core phrases used as key words and phrases used to find new sentences; "COCA sentence" column lists the raw output found in the COCA spoken corpus; "Date" column lists the dates and date codes of the COCA sentence transcripts listed in the corpus; "COCA title" column lists the titles of the sources of the new sentences by titles in the corpus; "COCA source" column lists the source codes of the COCA sentences from the spoken corpus. For some of the positive/happy sentences it was impossible to find any suitable phrases in the corpus, those are marked with "[no phrase returned results]" in the "Core phrase" column, and for those other suitable sentences were found in the corpus that would fit the positive/happy meaning.

	Original Velten sentences	Core phrase	COCA sentence	Date	COCA title	COCA source
1	Today is neither better nor worse than any other day, however, I feel a little low today.	*feeling down*	I don't want anybody's sympathy - because all it does is make me feel down and depressed, and I start crying. So I don't want anybody's sympathy.	1992 (19920312)	TIFFANY, STRUCK BY A STRAY BULLET AND PARALYZED	CBS_Street
2	I feel rather sluggish now.	*sluggish*	I have a headache; it's back again. I'm very sluggish and I could go to sleep. But I know what I have to do. I don't know. I just want to go home.	1995 (19950818)	We Want Our Children Back	ABC_2020
3	Sometimes I wonder whether school is all that worthwhile.	*not worth it*	I don't know. I don't think I would want to. After what I went through, I think it's not worth it	1992 (19920721)	Weight-loss Pills: Do They Really Work?	CNN_King
4	Every now and then I feel so tired and gloomy that I'd rather just sit than do anything.	*I'm tired*	But it just gets to where I 'm tired all the time, and not - I don't look - everything seems like such - not just a hassle, but overwhelming to do.	2001 (20010819)	Wasted	CNN_Presents
5	I can remember times when everybody but me seemed full of energy.	*so tired*	I don't know, it's just so difficult. I'm so tired all the time.	1992 (19921120)	Let's Make a Deal; Picking up the Pieces; Gergen & Shields; Conversation - What Next?; Field of Dreams	PBS_Newshour
6	Too often I have found myself staring listlessly into the distance, my mind a blank, when I definitely should have been studying.	*feeling empty*	I wake up feeling empty, that something's supposed to have been there but wasn't there was denied me or taken away.	2005 (20050123)	Profile: Navajo Indians and Mormons remember their involvement in program placing Indian children with Mormon families	NPR_ATCW

7	It has occurred to me more than once that study is basically useless, because you forget almost everything you learn anyway.	*useless*	I'm worthless. I'm useless. My life is useless. The world would be just as well if I weren't in it.	2001 (20010611)	ANDREW SOLOMON DISCUSSES HIS NEW BOOK "THE NOONDAY DEMON: AN ATLAS OF DEPRESSION"	NPR_FreshAir
8	People annoy me; I wish I could be by myself.	*alone*	Why me? Why - why don't they leave me alone?	1997 (19971228)	MCLIBEL; MCDONALD'S LIBEL LAWSUIT AGAINST TWO PROTESTERS REVEALS NOT ALL ACCUSATIONS IN THE PROTESTERS' LEAFLET WERE FALSE	CBS_Sixty
9	I've had important decisions to make in the past, and I've sometimes made the wrong ones.	*I was wrong*	I don't know what I was thinking. I was wrong. I shouldn't have done it.	2008 (080216)	Addicted to Love; death of Lesa Buchanan and trial of her lover, Dr. Christ Koulis	48 Hours 10:00 PM EST CBS
10	I do feel somewhat discouraged and drowsy------maybe I'll need a nap when I get home.	*couldn't handle*	I wasn't having that anymore. I couldn't handle it. Mentally, it was draining me.	1995 (19950728)	TEEN BOYS TELL THEIR MOMS, I WANT TO BE A WOMAN; TEEN-AGE BOYS CONFESS TO THEIR MOTHERS THAT THEY WANT TO BE WOMEN	Ind_Geraldo
11	Perhaps college takes more time, effort, and money than it's worth.	*not worth it*	Just give it up, forget it, it ain't happening, you know, it's not worth the effort, I'm tired of hearing it.	2008 (080525)	Coming Home; Rich Luttrell^s struggle to make peace with the realities of war; soldiers dealing with PTSD	Dateline NBC 7:00 PM EST NBC
12	I'm afraid the war in Vietnam may get a lot worse.	*war*	War is bloody. War is vicious. War is evil. War is messy. War destroys the dreams, the hopes, and the aspiration of a people. It breaks up families.	1991 (19910111)	Newshour 910111	PBS_Newshour
13	I just don't seem to be able to get going as fast as i used to.	*self-esteem*	My grades have gone down, I have no self-esteem left in me at all.	1993 (19930416)	Back With a Vengeance; Fast Times at Lakewood High; The Mind Game	ABC_2020
14	There have been days when I felt weak and confused, and everything went miserably wrong.	*I am weak*	I know - I know I'll break down. They'll find out I am weak. They'll find out I'm in pain. Oh, God! What God? I will break down, look like fool, an idiot.	1999 (19991028)	GOP Presidential Candidates Square off in New Hampshire; Sufferers of Depression Share Their Stories	CNN_King
15	Even a little bit of effort tires me out.	*wears me out*	It's very - it is very painful. And it - it absolutely wears me out.	1998 (19980707)	AUTHOR PATRICIA CORNWELL DISCUSSES HER NEW NOVEL, "POINT OF ORIGIN"	NBC_Today

16	I've had daydreams in which my mistakes kept occurring tome------sometimes I wish I could start over again.	*made mistakes*	I have not been a perfect man. I have made mistakes in my life.	2001 (20010826)	Analysis: Voices in the news of the past week	NPR_Sunday
17	I'm ashamed that I've caused my parents needless worry.	*my parents*	Look, I miss my parents every day of my life, and it doesn't get any easier just because I get older.	1996 (19961226)	REUNIONS FOR THE HOLIDAYS; GUESTS GET THE HOLIDAY GIFT OF BEING UNITED WITH FAMILY MEMBERS THEY HAVE NEVER KNOWN	Ind_Springer
18	I feel terribly tired and indifferent to things today.	*indifferent*	I feel - Well, I feel that - I'm sort of indifferent to it, you know. If that's her feeling, it would be like some kind of psychoanalyst saying the same thing. I could care less.	1999 (19990921)	Interview with Roger Clinton	FOX_Zahn
19	Just to stand up would take a big effort.	*too much for me*	I can't do this, this is too much for me. Bobby, I'm going to quit today. Okay, I'm gonna quit.	2012 (120217)	ONE MOMENT IN TIME; THE LIFE OF WHITNEY HOUSTON	ABC_20/20
20	I'm getting tired out, I can feel my body getting exhausted and heavy.	*exhausted*	I was bone-tired. I was pretty exhausted.	1990 (19900810)	The Father The Son; Life After Menopause; Beware of Highway 95	ABC_2020
21	I'm beginning to feel sleepy my thoughts are drifting.	*keep eyes open*	I can't keep my eyes open, I can't concentrate.	2007 (20070103)	Today's New Year, New You; Men's Health's Dave Zinczenko and relationship expert Laura Berman on having a better sex life	NBC_Today
22	At times I've been so tired and discouraged that I went to sleep rather than face important problems.	*can't handle*	I can't handle it mentally. I can not handle it. I can't even handle what's going on in my - you know, my daily life.	1996 (19961023)	GET AWAY FROM HIM!; FAMILY MEMBERS TELL 18-YEAR-OLD TO STAY AWAY FROM THE MAN SHE LOVES BECAUSE THEY BELIEVE HE'S NO GOOD FOR HER AND IS DANGEROUS	Ind_Springer
23	My life is so tiresome - the same old thing day after day depresses me.	*depressed*	That night I was just - I was really out of it. I was very depressed and I needed something to calm me down.	1993 (19931028)	JAIL BAIT: WHEN SEX WITH A MINOR BECOMES A MAJOR OFFENSE	Ind_Geraldo
24	I couldn't remember things well right now if I had to.	*focus*	I can't focus on what happened. What happened was awful.	2002 (20020914)	Tribute to 9/11 Families	CNN_KingWknd
25	I just can't make up my mind; it's so hard to make simple decisions.	*make up my mind*	I could never make up my mind. And I still can't.	1999 (19990517)	Impact: Business as Usual for President Clinton	Fox_Oreilly

26	I want to go to sleep - I feel like just closing my eyes and going to sleep right here.	*drained*	It was too difficult. I was too afraid. I felt drained.	2001 (20011120)	Dr. Phil's Get Real Challenge, part 6; learning more self-examination	Ind_Oprah
27	I'm not very alert; I feel listless and vaguely sad.	*sad*	It's just, it was sad. The whole thing is sad, and it still makes me sad.	1993 (19930811)	PART II-CHOOSING SIDES: SOUL SEARCHING; WOMEN'S CLINIC ASKS WOMEN SEEKING ABORTION SOUL-SEARCHING QUESTIONS FIRST	CBS_48Hours
28	I've doubted that I'm a worthwhile person.	*doubting myself*	The whole time I was doubting myself. I was thinking to myself, "this guy's not going to make it."	2003 (20030310)	Training Accidents, Allegations of Cover-up	CBS_Rather
29	I feel worn out my health may not be as good as it's supposed to be.	*burned out*	Now I'm ready to stop everything. I'm through. I quit. I 'm burned out.	1999 (19991201)	WOMEN IN THE SHADOWS; ESCORTS AND PROSTITUTES TALK ABOUT THEIR CAREERS AND LIFE CHOICES	ABC_2020
30	It often seems that no matter how hard I try, things still go wrong.	*no matter what I do*	No matter what I do, it's not good enough.	1999 (19990819)	Interview wit Dr. Joy Browne	Fox_Crier
31	I've noticed that no one seems to really understand or care when I complain or feel unhappy about myself.	*didn't understand*	And so I realized, you know, this isn't - this isn't right. They didn't get me. They didn't understand me.	2007 (20071111)	Key Player; The career of Alicia Keys	CBS_SunMorn
32	I'm uncertain about my future.	*don't know what's going to happen*	I'm a little bit apprehensive. I don't know what's going to happen.	2001 (20011113)	Dr. Phil's Get Real Challenge, part 5; recognizing and changing one's self-defeating ways	Ind_Oprah
33	I'm discouraged and unhappy about myself.	*not happy about*	I'm wasting my life for nothing. I'm not happy about it.	2008 (080727)	The Stripper & The Steelworker; investigation into murder of Kent Leppink	Dateline NBC 9:00 PM EST NBC
34	I've lain awake at night worrying so long that I hated myself.	*I hate myself*	I think he came to the decision that, you know, I hate myself, I hate this life.	2008 (080628)	Sugar Land Conspiracy; murders of two members of the Whitaker family	48 Hours 10:00 PM EST CBS
35	Things are worse now than when I was younger.	*than when I was younger*	It's worse than when I was younger.	2011 (110304)	TEEN TOXING; BOTOX FOR TEENS	PRIMETIME LIVE 9:27 PM EST
36	The way I feel now, the future looks boring and hopeless.	*dark future*	It never, never, ever gets better. So that was kind of a dark future that I had.	2002 (20020728)	60 MINUTES	CBS_Sixty
37	My parents never really tried to understand me.	*parents - understood me*	And I know that both of my parents loved me, but I never really felt that my parents understood me.	2010 (100415)	Mom Confesses She Did Not Love Adopted Daughter	NPR_TalkNat

38	Some very important decisions are almost impossible for me to make.	*I don't know what to do*	I don't know what to think. I don't know what to do.	2008 (081215)	20/20	ABC_20/20
39	I feel tired and depressed; I don't feel like working on the things I know I must get done.	*depressed*	I 'm very depressed. I can't think straight.	2008 (080316)	Appointment For Murder; Dr. David Cornbleet is murdered, and his family get involved in helping find the murderer and bringing him to justice	Dateline NBC 7:00 PM EST NBC
40	I feel horribly guilty about how I've treated my parents at times.	*feel guilty*	I felt guilty. I just felt it was my fault.	2010 (100813)	THE FAMILY ALBUM; TAPPAN ZEE SUICIDE TRAGEDY	20/20 10:33 PM EST
41	I have the feeling that I just can't reach people.	*can't deal with it*	I shrivel up into the fetal position and I can't deal with it.	2012 (120615)	Buffalo Surgeon Suspected in Murder of Nurse	CNN_Grace
42	Things are easier and better for other people than for me.	*more difficult for me*	As I got older, it became more and more difficult for me at times to live within my own skin.	1994 (19940202)	PART III-ON THE EDGE; ONE A DAY: AL PETERS, AGE 67, TAKES PROZAC TO OVERCOME CLINICAL DEPRESSION	CBS_48Hours
43	Often people make me very upset I don't like to be around them.	*don't like to be around*	It makes it uncomfortable. I don't like to be around a lot of people.	1999 (19990705)	ALTER EGOS? MAN SENT TO PRISON FOR SEXUAL ASSAULT SEEKS A NEW TRIAL AND INSANITY PLEA DUE TO MULTIPLE PERSONALITIES	NBC_Dateline
44	It takes too much effort to convince people of anything there's no point in trying.	*too much for me*	It 's too much for me. It's too intense. You know, I'm too tired.	2003 (20030414)	Mariah Carey; singer Mariah Carey talks about her breakdown and recovery, and about her new CD	Ind_Oprah
45	I fail in communicating with people about my problems.	*don't want to talk about it*	Never mind. I don't want to talk about it.	1999 (19991123)	THE WINNER; SOCCER COACH WHO ALMOST NEVER LOSES COMES UNDER FIRE FOR CHEATING	CBS_Sixty
46	It's so discouraging the way people don't really listen to me.	*aren't listening*	I keep on saying this but somehow folks aren't listening.	2009 (090815)	President Obama^s Town Hall Meeting in Grand Junction, Colorado	?
47	I've felt so alone before, that I could have cried.	*felt so alone*	I've never in my life felt so alone. It was just - he was so cold.	2005 (20050123)	Profile: Two women reflect on their differing views on abortion based on their own experiences	NPR_ATCW
48	Sometimes I've wished I could die.	*wanted to die*	I wanted to die. I didn't wanna be alive.	2007 (20070413)	THE PREACHER'S SIN; ARE YOUR CHILDREN AT RISK AT CHURCH?	ABC_2020
49	My thoughts are so slow and downcast I don't want to think or talk.	*heartsick*	It's a terrible mess. It makes me heartsick.	2004 (20041010)	Profile: Political concerns of residents of Broken Bow, Nebraska	NPR_Sunday

50	I just don't care about anything life just isn't any fun.	*no fun*	It's getting to the point where I'm no fun anymore. I'm sorry.	2004 (20040221)	Interview: Edward "Chip" Monck discusses his career in the lighting and staging industry	NPR_Saturday
51	Life seems too much for me anyhow - my efforts are wasted.	*too much for me*	Well, I'll never master this. It's too much for me.	2002 (20021218)	Profile: Women Airforce Service Pilots of World War II	NPR_ATC
52	I'm so tired.	*just so tired*	I can't move. I 'm so tired.	2008 (080525)	Coming Home; Rich Luttrell^s struggle to make peace with the realities of war; soldiers dealing with PTSD	Dateline NBC 7:00 PM EST NBC
53	I don't concentrate or move I just want to forget about everything.	*want to forget*	I've seen and done things I want to forget.	2011 (110215)	On War And The New ^England^	Fresh Air 12:00 PM EST NPR
54	I have too many bad things in my life.	*bad things in my life*	I've done some pretty bad things in my life.	2010 (100322)	?	?
55	Everything seems utterly futile and empty.	*it's futile*	It's futile. What difference can one individual make?	1993 (19930606)	LAST GOOD POLITICIAN, BOBBY KENNEDY	CBS_SunMorn
56	I feel dizzy and faint need to put my head down and not move.	*blacked out*	I don't remember hitting the ground. I blacked out at some point in time.	2006 (20061011)	Lisa Ling goes inside North Korea; Anousheh Ansari discusses visiting the International Space Station; other guests discuss surviving life-threatening situations	Ind_Oprah
57	I don't want to do anything.	*I don't want to*	I'm not going to do it. I don't want to do it.	2001 (20011205)	Jim Jeffords discusses why he decided to switch political parties, changing the party leadership of the Senate	NPR_FreshAir
58	All of the unhappiness of my past life is taking possession of me.	*bad memories*	I'm sorry, it's just bringing up bad memories. It was a very trying time in my life.	1993 (19930203)	PART V-RIPOFF: OUTRAGEOUS FORTUNE; FORTUNE TELLERS INTIMIDATE VICTIMS INTO HANDING OVER LARGE AMOUNTS OF MONEY	CBS_48Hours
59	I want to go to sleep and never wake up.	*not wake up*	I'm laying there with IVs, with catheters, looking at the ceiling wishing I could go to sleep and not wake up.	2006 (20060425)	Psychologist Dan Gottlieb, a quadriplegic, talks about his new book "Letters to Sam," a collection of letters to his autistic grandson in which he describes his own experiences of being different	NPR_FreshAir

60	Some of my friends are so lively and optimistic.	*alive*	I've never felt so alive, so hopeful, and I've never felt such energy.	2009 (091028)	For October 28, 2009, CBS	CBS_Early
61	Things look good things look great!	*best day of my life*	Today it was probably one of the best days of my life.	2001 (20010414)	Whidbey 24 Returns Home After Detention in China	CNN_KingWknd
62	It the long run, it's obvious that things have gotten better and better during my life	*better and better*	I think everything is getting better and better in the future.	2000 (20000204)	World News Airing At Midnight ET	CNN_WorldNews
63	Things will be better and better today.	*better and better*	I think its getting - everything's getting better and better.	2005 (20051101)	Royal Couple Visits America; Former "Price is Right" Model Wins Lawsuit; Secret Pasts of Celebs on Soaps	CNN_Showbiz
64	In a buoyant mood like this one, I can work fast and do it right the first time.	*bubbly*	Let's do it, guys. I'm very like, fun loving, like, bubbly kind of person.	2008 (081215)	20/20	ABC_20/20
65	I can concentrate hard on anything I do.	*can focus*	And I'm successful because I can focus and do what I have to do to succeed.	2001 (20010514)	Personal Stories: The Lack of Accountability in Education	Fox_Oreilly
66	I feel light-hearted.	*cheer*	This year let's give the folks at home something to cheer about.	1995 (19950124)	1995 STATE OF THE UNION ADDRESS	CBS_Special
67	I'm able to do things accurately and efficiently.	*competent*	I can do the work. I 'm competent. I got it together.	2008 (080217)	Chrystia Freeland is the US managing editor of the Financial Times . is on a	The Chris Matthews Show Various Times NBC
68	I feel superb! I think I can work to be best of my ability.	*do my best*	I will keep working hard for them and that that is my motivation for being here. And I think that they gave me their trust and I'm going to do my best to be worthy of it.	1996 (19961108)	PRESIDENT CLINTON ANNOUNCES CHIEF OF STAFF LEON PANETTA'S RESIGNATION; APPOINTMENT OF ERSKINE BOWLES; ANSWERS A VARIETY OF QUESTIONS FROM THE PRESS	CBS_Special
69	I feel talkative - I feel like talking to almost anybody.	*easy to talk to*	I think a lot of times- I think I was always really easy to talk to.	1992 (19920825)	Woody Allen/Mia Farrow - Private Lives, Public Anguish	CNN_King
70	I'm full of energy, and am really getting to like the things I'm doing on campus.	*energetic*	I'm so energetic. You know, I'm just all over the place. You know, I love running and moving around.	2010 (100315)	NCAA Tournament About To Heat Up	NPR_TalkNat
71	I feel enthusiastic and confident now.	*enthusiastic*	I don't look a wink of sleep about that. I 'm enthusiastic about the future, whatever my role might be.	1994 (19940429)	R - Internal Affairs; Newsmaker; Political Wrap	PBS_Newshour
72	I feel an exhilarating animation in all I do.	*exhilarating*	Being in a cave is just a wonderful, exciting, exhilarating experience.	2001 (20010602)	Mammoth Caves Stretch 300 Miles	CNN_SatMorn

73	I'm feeling amazingly good today!	*feeling great*	I 'm feeling great, thank you. I couldn't be better. I'm having a great time.	1997 (19971026)	A RECORD NUMBER OF WELL-WISHERS	ABC_GMA
74	This is great - I really do feel good.	*feels so good*	I've always wanted to help people. It feels so good from inside to be able to help somebody.	2008 (081122)	Mortgage and the Murder; murder of Bernadette and Greg Ohlemacher	CBS_48Hours
75	I'm pleased that most people are so friendly to me.	*friend*	I found friends this summer that hold a bond tighter than anything I could ever have imagined, and I know we will be connected for a lifetime.	2006 (20060202)	GIRLS' WEEK OUT;	ABC_GMA
76	I feel that many of my friendships will stick with me in the future.	*friends stick by*	True friends stick by each other through thick and thin. And that's what I intend to do.	2011 (111126)	For November 26, 2011, CBS	CBS_48Hours
77	I know that in the future I won't over-emphasize so-called "problems".	*future*	Yes, I always knew that there was a great future. I didn't know as to the extent, but I had complete confidence that he was destined, without a doubt.	2004 (20040201)	On track; rock group Train talks about its success	CBS_Morning
78	I can make friends extremely easily.	*get along*	Well, I think I get along with people. I've always had a sense of a lot of friends and a lot of things that lot of ways I've interacted in my community throughout my life.	1999 (19991010)	JON CORZINE DISCUSSES HIS RUN FOR THE SENATE AND THE ISSUES HE'S CAMPAIGNING ON	Ind_NewsForum
79	For the rest of the day, I bet things will go really well.	*go well*	I feel really confident that everything's going to go well.	2005 (20050628)	48 Hours Mystery: `The Right to Kill`	CBS_48Hours
80	If your attitude is good, then things are good, and my attitude is good.	*good attitude*	If you have a good attitude and you're willing to work hard, anyone can come up.	1999 (19990228)	YOSEMITE WINTER; THE BEAUTY AND PEACEFULNESS OF YOSEMITE NATIONAL PARK IN THE WINTER	BCS_SunMorn
81	This might turn out to have been one of my good days.	*good day*	I'm feeling good. It's been a good day. It's a good hair day, too.	2008 (081215)	20/20	ABC_20/20
82	On the whole, I have very little difficulty in thinking clearly.	*great idea*	Not to make a commercial, but this - this is a great idea, I'm sure the others will come along with it.	1999 (19991119)	CO-OP TIME	CBS_Early

83	There should be opportunity for a lot of good times coming along.	*having a ball*	And we're enjoying what we're doing and just having a ball down here and feeling as if we're, in our own way, helping to make this country a little better and that's what it's all about.	1992 (19920202)	MICHAEL AND KITTY DUKAKIS; WHAT THEY ARE DOING NOW	CBS_SunMorn
84	I feel like bursting out with laughter - I wish somebody would tell a joke and give me an excuse!	*hilarious*	And the stuff was absolutely hilarious and really open and candid, and self-deprecating and kind of wonderful.	1998 (19980510)	Lunch-Box Chronicles	NPR_Sunday
85	Today is neither better nor worse than any other day. I do feel pretty good today, though.	*I feel good.*	Well, I'm proud of what I've accomplished. I really am and I feel good.	1993 (19930228)	NURSING SCHOOL; INNER-CITY PHILADELPHIA HOSPITAL OFFERS NURSING PROGRAM TO SURROUNDING POVERTY-STRICKEN NEIGHBORHOOD	CBS_SunMorn
86	God, I feel great!	*I feel great*	I feel great! I feel happy. I feel like it's going to be blast.	1996 (19960325)	CNN_TalkBack / 19960325	CNN_TalkBack
87	I'm full of energy and ambition - I feel like I could go a long time without sleep.	*I will fight*	I will work. I will save. I will sacrifice. I will endure. I will fight cheerfully. And I will do my utmost as if the issue of the whole struggle depended upon me alone.	2004 (20040609)	Reagan's Casket Arrives in Washington;	CNN_Event
88	My memory is in rare form today	*I'm game*	Well, I 'm game, I'll try it. I can push just as hard as the next person.	1995 (19950615)	ACHING FOR A CURE; PATIENTS EXERCISE AT WASHINGTON PAIN CENTER TO FIND RELIEF FOR THEIR CHRONIC PAIN	CBS_48Hours
89	I'm glad I'm in college------it's the key to success nowadays.	*I'm glad*	I'm glad to have him back. We're old friends, and I'm glad to be working together again.	2001 (20010726)	Analysis: NAFTA issue causing fierce debate in the Senate	NPR_Morning
90	I have a sense of power and vigor.	*invigorating*	It's overwhelming. It's dizzying. It's invigorating.	2006 (20060515)	Barnes Foundation Readies to Move Famous Paintings	NPR_Morning
91	I feel so gay and playful today I feel like surprising someone by telling a silly joke.	*laughing so hard*	That was so funny that we couldn't even get through rehearsal we were laughing so hard.	1994 (19941124)	All Natural?' - Questionable Health Food Claims	ABC_Primetime
92	Life is so much fun; it seems to offer so many sources of fulfillment.	*life is fun*	We're alive, we're well and life is fun. And li- you know, it's - it's like this huge blessing.	1997 (19970921)	FORTY YEARS AGO; FIGHT FOR DESEGREGATION IN LITTLE ROCK AND ITS LEGACY AND CONTINUING CONTROVERSIES	CBS_SunMorn

93	I'm too absorbed in things to have time for worry.	*life is good*	I can say that life is good to me, has been, and is good. So I think my task is to be good to it. So how do you be good to life? You live it.	2005 (20051218)	For December 18, 2005, CBS	CBS_Sixty
94	I feel cheerful and lively.	*lively*	Thank you to everybody for participating. It's very informative, a lively group, and we really appreciate it.	2010 (100615)	Analysis with Frank Luntz	FOX_Hannity
95	It's encouraging that as I get farther into my major, it's going to take less study to get good grades.	*looking up*	Still, there's a sense here that things are looking up.	1993 (19930425)	Americans Talk About Clinton's First 100 Days	NPR_ATC
96	It would really take something to stop me now!	*on a roll*	We're on a roll. Yes. We're on a roll. Today is going to be a great day.	1995 (19951108)	Nightline 19951108	ABC_Nightline
97	I'm optimistic that I can get along very well with most of the people I meet.	*people are nice*	People are so nice. They're just so nice to me that it's really fun to travel and see people.	1992 (19921026)	Marilyn Quayle on the Press and the Campaign	CNN_King
98	Now that it occurs to me, most of the things that have depressed me wouldn't have if I'd just had the right attitude.	*positive attitude*	I would say that my positive attitude is partly due to the fact to an enormous amount of support that I have received from my family, my husband and my friends.	1990 (19900320)	Ovarian Cancer	ABC_Nightline
99	My parents are pretty proud of me most of the time	*proud of X*	I'm so proud of both of you. God bless you.	1994 (19940206)	FORMER PRESIDENT JIMMY CARTER ON WHAT HE HAS BEEN DOING SINCE LEAVING THE WHITE HOUSE	CBS_SunMorn
100	This is just one of those days when I'm ready to go!	*ready to roll*	We're ready to roll. I got the best crew there is. We're ready to roll, and we're ready for anything that comes at us.	1998 (19980826)	Hurricane Bonnie: Weathering the Storm	CNN_Event
101	I feel highly perceptive and refreshed.	*refreshed*	One morning, I awoke feeling renewed, refreshed, suddenly aware that birds were singing outside.	2000 (20000101)	Profile: Author Paul Auster and the National Story Project	NPR_ATCW
102	My judgment about most things is sound.	*right decision*	I feel, I, I'm happy because I know for her it is the right decision and she's so at peace with it.	2009 (091123)	LIFE AFTER OPRAH; INSIDE STORY ON HER DECISION	ABC_GMA

103	I can find good in almost anything.	*see good*	It made me see the good in people and realize what people can do by pulling together and trying to make a difference.	2001 (20010131)	Interview: Representative Jim Langevin discusses being in Congress, being a paraplegic and his hopes that he can help other people with disabilities while in Congress	NPR_Morning
104	I've certainly got energy and self-confidence to spare.	*self-confidence*	It's built up myself-confidence a lot and it makes me really, really very relaxed.	2003 (20030914)	CNN BUSINESS TRAVELLER	CNN_Susiness
105	If I set my mind to it, I can make things turn out fine.	*set my mind*	And I guess it's because I'm really determined. And when I set my mind to doing something I do it and I achieve what I want to achieve, and I don't give up.	1994 (19940120)	Harding and Eckhardt Discuss the Kerrigan Assault	ABC_Primetime
106	My favorite song keeps going through my head.	*song*	This is such a beautiful song, for all the way it pinches; I mean, that's what makes it beautiful.	2002 (20020713)	Interview: Lucy Kaplansky discusses her career and her latest album, "Every Single Day"	NPR_Saturday
107	I feel so vivacious and efficient today - sitting on top of the world.	*top of the world*	I feel so positive right now. I 'm on top of the world. I got you, babe.	1997 (19970403)	FREE MY FAMILY; TEEN'S FIGHT TO AVOID AUTHORITIES AND SAVE HER PARENTS FROM PRISON AFTER THEY ARE WRONGLY ACCUSED OF SEXUALLY ABUSING THEIR CHILDREN	CBS_48Hours
108	I know good and well that I can achieve the goals I set.	*win*	I am going to win. I'm going to win. I'm going to beat this.	2001 (20010314)	Some of the Latest Trends in the Weight Wars, Including the Risks, CBS	CBS_48Hours
109	This is one of those days when I can grind out schoolwork with practically no effort at all.	*with ease*	It's wonderful. I can do these quirky, odd, you know, somewhat cerebral things and do them with ease.	1995 (19950521)	Interview With Singer-Songwriter Paula Cole	NPR_Weekend
110	My judgment is keen and precise today just let someone try to put something over on me.	*[no phrase returned results]*	It's probably been the most gratifying thing I've ever done.	1994 (19940323)	GAIL KINZER, HOMEOWNER, SHARON LESTER, PROFESSIONAL BUILDER, AND LINDA BETZ, VOLUNTEER, DISCUSS THE BUILDING OF A HOME FOR HABITAT FOR HUMANITY	CBS_Morning

111	I am particularly inventive and resourceful in this mood.	*[no phrase returned results]*	I'm so very fortunate because he has so much love for me. I'm very, very lucky. I'm very happy.	2007 (20070607)	Gigi Levangie Grazer, author and executive producer of "The Starter Wife," and Madonna Brown, real-life starter wife, discuss wives who are tossed aside by their husbands	NBC_Today
112	My thinking is clear and rapid.	*[no phrase returned results]*	Man, am I lucky. I am so lucky it's unbelievable. How blessed I've been and don't I know it to have my heart moved and my mind expanded.	1996 (19960501)	ABC_Special / 19960501	ABC_Special
113	I feel industrious as heck - I want something to do!	*[no phrase returned results]*	It's absolutely visionary! Fantastic! Incredible!	991 (19910725)	Lightning - The Sudden Killer	CNN_King
114	I can make decisions rapidly and correctly, and I can defend them against criticism easily.	*[no phrase returned results]*	Every morning that I see him in his little crib and his little smiling face at me, I just think this is the most amazing gift I've ever gotten.	2007 (20070828)	Michele Borba and Sally Tusa discuss single motherhood	NBC_Today
115	Life is firmly in my control.	*[no phrase returned results]*	I think it was probably the most positive things that 's ever happened to me.	1997 (19970912)	TOXIC FAME: THE DARK SIDE OF CELEBRITY; CELEBRITIES DISCUSS THE DARK SIDES OF BEING FAMOUS	Ind_Geraldo
116	I wish somebody would play some good loud music!	*[no phrase returned results]*	That's the most beautiful thing I've ever heard in my life.	1998 (19980823)	THE PEOPLE'S MUSIC; NEW YORKERS ENJOY OPERA IN CENTRAL PARK, THANKS TO ONE MAN	CBS_SunMorn
117	I feel elated about things.	*[no phrase returned results]*	This has been one of the most thrilling things I've ever been a part of in my whole life.	2008 (081027)	Hoda and Kathie Lee chat about current events	NBC_Today
118	I'm really feeling sharp now.	*[no phrase returned results]*	That was the best thing I've ever done! I love it!	2006 (20061011)	Lisa Ling goes inside North Korea; Anousheh Ansari discusses visiting the International Space Station; other guests discuss surviving life-threatening situations	Ind_Oprah
119	I'm full of energy.	*[no phrase returned results]*	I knew it was going to be great. And it was one of the most fun things I've ever done.	2009 (091113)	Between Albums, Rivers Cuomo Digs Up Solo Work	NPR_FreshAir

Appendix I

Senteces used as stimuli – each of the 12 sad acted sentences, and each of the 12 happy acted sentences was performed by each of the 4 speakers in each emotion condition. The 33 natural utterances in each emotion condition were produced by all 4 speakers of each emotion condition in various proportions per exclusion criteria described in chapter 3.

Table 33. Acted sentences used in the elicitation procedure.

	Acted Sentences	Emotion
1	I don't want anybody's sympathy because all it does is make me feel down and depressed, and I start crying.	*happy*
2	It just gets to where I'm tired all the time, and everything seems overwhelming to do.	*happy*
3	I don't know, it's just so difficult. I'm so tired all the time.	*happy*
4	I wasn't having that anymore. I couldn't handle it.	*happy*
5	My grades have gone down, I have no self-esteem left in me at all.	*happy*
6	I have not been perfect. I have made mistakes in my life.	*happy*
7	I miss my parents every day of my life, and it doesn't get any easier just because I get older.	*happy*
8	I can not handle it. I can't even handle what's going on in my daily life.	*happy*
9	It was too difficult. I was too afraid. I felt drained.	*happy*
10	It's just, it was sad. The whole thing is sad, and it still makes me sad.	*happy*
11	The whole time I was doubting myself.	*happy*
12	I don't know what's going to happen.	*happy*
13	Today it was probably one of the best days of my life.	*sad*
14	I think everything's getting better and better.	*sad*
15	It is just a wonderful, exhilarating experience.	*sad*
16	I'm feeling great, thank you. I couldn't be better. I'm having a great time.	*sad*
17	I'm having a lot of fun, because people are so nice to me.	*sad*
18	I feel really confident that everything's going to go well.	*sad*
19	I feel great! I feel like it's going to be blast.	*sad*
20	I'm glad to have him back. We're old friends, and I'm glad to be working together again.	*sad*
21	I am blessed to be here.	*sad*
22	There's a sense here that things are looking up.	*sad*
23	We're on a roll. Today is going to be a great day.	*sad*
24	I'm so proud of both of you. God bless you.	*sad*

Table 34. Natural sentences transcripts elicited as described in Chapter 3.

	Natural Sentences – Transcripts	Emotion
1	At the sadder parts it...made me... feel sad.	*sad*
2	But... She... Wanted to make sur elike he was going to be okay.	*sad*
3	I made me feel sad. I felt bad for her.	*sad*
4	No, I don't think she knew exactly howbad it would be. She probably had an idea, but not... it's worse than what they were gonna tell her.	*sad*
5	You would feel bad and you would be hurting too.	*sad*
6	I felt like in a sense part of him understood what happened because that's why he started crying.	*sad*
7	But then... I felt like a part of him didn't understand what happened.	*sad*
8	In what had happened and probably hurting knowing that he was about to die.	*sad*
9	Uhm. Like her heart just sank.	*sad*
10	Terrible. Really, really sad.	*sad*
11	I dunno. She kinda seemed like she seemed at peace with things.	*sad*
12	I don't wanna guess. It was scared at first and then it was sad.	*sad*
13	Probably adventure like at the end of the scene he did it.	*sad*
14	I don't have a word for it. Upset because I couldnt do anything with it. Sad too, because clearly that guy was her friend.	*sad*
15	I think the mom showed more amotion than the dad. He was inda annoying.	*sad*
16	Probably upset'n'sad, and...	*sad*
17	I'm not really lke that emotional of a person, but I gues it was alittle depressing.	*sad*
18	Uuh... she was very upset.	*sad*
19	Uh, everybody seemed pretty upset with the death, so they wanted to... I guess get her out of there.	*sad*
20	Uuh... I guess he was like really upset that like he lost somebody so close to him.	*sad*
21	I think they were really quiet and um they just felt like almost like guilty.	*sad*
22	I guess uhm sad coz I guess she lost like 3 out of her 4 uh... children.	*sad*
23	I think she kinda had an idea what was going on when that car was comin' up.	*sad*
24	I think he didn't wanna tell her – tell her that like all of her children were... dead.	*sad*
25	So... she must've... I don't know it's like a lot of overwhelming emotions.	*sad*
26	Uhm – it was like a wave of emotions.	*sad*
27	He felt sad because he was with that with, you know the woman he was with since he was younger.	*sad*
28	It seemed like she wanted to go in peace.	*sad*
29	Uhm. A little upset... sad.	*sad*
30	For the boy, but more so but more so because they lost somebody.	*sad*
31	I feel like because I knew – like I kinda knew the kind of atmosphere and where it was going.	*sad*
32	It seems like she wasn't supposed to be there but – I mean – that looked like it was her friend.	*sad*
33	The fact that her father just said like 'he's gone'.	*sad*
34	Um – at first he felt sad and distraught and then afterwards he begun to feel happy when he was with his family.	*happy*
35	Um, when he went into the bathroom he was second-guessing himself about the tiger.	*happy*
36	Um, he doesn't remember how anything happened, like how he lost his tooth.	*happy*
37	Uum. They felt very... accomplished for the team and themselves.	*happy*
38	I don't think that's... It's not normal, defninitely. But, um... it's funny, I find it amusing.	*happy*
39	So. What was going through his mind, uh... I think he was just worried about what's gonna happen later on.	*happy*
40	I like football, so I enjoyed watching this.	*happy*
41	I think tehy were more united. I feel like there was something... they didn't feel like that at the beginning of the scene.	*happy*
42	Um. It was like more of a friendship.	*happy*
43	Definitely happy, yeah. Very excited.	*happy*
44	I feel like yeah, he was definitely happy that they won.	*happy*
45	It's really – it's ha- it's really happy, it's really joyful.	*happy*
46	He definitely feels loved by all the people that were helping him.	*happy*
47	She was happy. She was happy to see her husband happy.	*happy*
48	And... I dunno, it's funny I can't describe that word very well.	*happy*
49	Uh – he's worried. Uh – slightly frightened, mostly worried.	*happy*

50	Apparently relaxed, relaxed about everything and just ‘Aight something crazy happened – awesome’.	*happy*
51	Very entertained and amused!	*happy*
52	She was trying to prove a point like I can’t think of an emotional word for that.	*happy*
53	Embarrassed. Not very embarrassed because he was sitting there quite contempt.	*happy*
54	He was feeling... It is hard to describe emotions to think about that to myself.	*happy*
55	Confused... Uhm. Entertained as well.	*happy*
56	And jealous a little bit.	*happy*
57	They felt releived, they felt happiness, they felt ease between each other.	*happy*
58	Relieved... and then happy for them.	*happy*
59	The kids were a bit confused and also happy to see their dad.	*happy*
60	The wife was just overcome with just a flood of different emotions.	*happy*
61	Uah, she was trying to prove a point and uh.. she’d do anything she had to do.	*happy*
62	Ah, he was probably trying to be funny, she figured the food must be that good.	*happy*
63	I guess he was in a bad mood before now he’s just so happy not to be dead that he’s just hugging everyone.	*happy*
64	She was happy, she just ran up, hugged him, and people came over with money […].	*happy*
65	[…] Feel-good scene. You know, they win the title.	*happy*
66	He was happy coz he was on the tam and his team still won, so.	*happy*

Appendix J

Scores of PANAS-X questionnaire from before and after the rating procedure reported in Chapter 4.

Table 35. Full PANAS-X scores from before and after the rating procedure.

mean	BEFORE	Rank	AFTER	mean
3,58	*calm*	1	*tired*	3,19
3,50	*attentive*	2	*attentive*	3,17
3,44	*relaxed*	3	*calm*	3,14
3,36	*concentrating*	4	*sleepy*	3,14
3,11	*tired*	5	*relaxed*	2,94
3,06	*sleepy*	6	*concentrating*	2,89
2,97	*at ease*	7	*at ease*	2,86
2,78	*interested*	8	*alert*	2,64
2,75	*cheerful*	9	*drowsy*	2,47
2,75	*confident*	10	*confident*	2,44
2,69	*strong*	11	*sluggish*	2,33
2,67	*alert*	12	*active*	2,33
2,64	*happy*	13	*interested*	2,17
2,64	*determined*	14	*determined*	2,14
2,50	*active*	15	*strong*	2,03
2,33	*sluggish*	16	*happy*	1,92
2,22	*joyful*	17	*cheerful*	1,86
2,11	*lively*	18	*surprised*	1,83
2,06	*delighted*	19	*enthusiastic*	1,81
2,03	*fearless*	20	*excited*	1,75
2,00	*excited*	21	*irritable*	1,72
2,00	*enthusiastic*	22	*fearless*	1,72
1,97	*drowsy*	23	*joyful*	1,72
1,94	*energetic*	24	*lively*	1,72
1,92	*proud*	25	*delighted*	1,69
1,75	*inspired*	26	*proud*	1,69
1,64	*daring*	27	*energetic*	1,69
1,64	*bold*	28	*bold*	1,47
1,56	*timid*	29	*daring*	1,44
1,53	*irritable*	30	*inspired*	1,44
1,44	*shy*	31	*amazed*	1,44

1,44	*lonely*	32	*jittery*	1,44
1,44	*distressed*	33	*sad*	1,42
1,42	*jittery*	34	*sheepish*	1,33
1,39	*bashful*	35	*alone*	1,31
1,39	*nervous*	36	*lonely*	1,31
1,33	*disgusted with self*	37	*distressed*	1,31
1,33	*alone*	38	*astonished*	1,31
1,33	*dissatisfied with self*	39	*shaky*	1,25
1,31	*amazed*	40	*bashful*	1,22
1,25	*surprised*	41	*timid*	1,22
1,25	*shaky*	42	*blue*	1,22
1,25	*astonished*	43	*nervous*	1,19
1,22	*angry at self*	44	*hostile*	1,19
1,22	*sheepish*	45	*loathing*	1,19
1,17	*scornful*	46	*downhearted*	1,17
1,14	*disgusted*	47	*scornful*	1,14
1,14	*sad*	48	*upset*	1,14
1,14	*blue*	49	*guilty*	1,14
1,14	*scared*	50	*dissatisfied with self*	1,14
1,14	*downhearted*	51	*shy*	1,11
1,11	*afraid*	52	*angry at self*	1,11
1,11	*upset*	53	*disgusted*	1,08
1,11	*angry*	54	*ashamed*	1,08
1,11	*ashamed*	55	*disgusted with self*	1,06
1,08	*guilty*	56	*afraid*	1,06
1,08	*hostile*	57	*angry*	1,06
1,08	*frightened*	58	*frightened*	1,06
1,08	*loathing*	59	*scared*	1,03
1,06	*blameworthy*	60	*blameworthy*	1,03

Appendix K

Tables 36-42 present complete inventories of responses given in the Free Label condition by their tags.

Table 36. Responses tagged as *empty* in the Free Label condition.

No	TAG: empty	FH	MH	FS	MS	Happy speakers total:	Sad speakers total:	Total:
1	*neutral*	85	110	76	155	195	231	426
2	*tired*	25	36	97	98	61	195	256
3	*bored*	33	45	46	100	78	146	224
4	*calm*	32	25	41	35	57	76	133
5	*curious*	36	34	14	8	70	22	92
6	*interested*	16	29	7	9	45	16	61
7	*normal*	15	15	9	20	30	29	59
8	*confused*	13	9	16	18	22	34	56
9	*complaining*	24	15	6	9	39	15	54
10	*explaining*	18	15	7	14	33	21	54
11	*shy*	11	1	31	6	12	37	49
12	*confident*	7	24	2	11	31	13	44
13	*sleepy*	10	4	16	13	14	29	43
14	*unsure*	0	6	18	14	6	32	38
15	*guilty*	12	3	11	6	15	17	32
16	*hurt*	11	5	12	3	16	15	31
17	*uncertain*	8	7	7	8	15	15	30
18	*asking*	13	6	6	4	19	10	29
19	*weak*	9	1	11	4	10	15	25
20	*exhausted*	2	4	7	11	6	18	24
21	*thoughtful*	4	8	5	7	12	12	24
22	*wondering*	5	6	8	5	11	13	24
23	*undecided*	4	1	7	9	5	16	21
24	*apologetic*	6	3	5	2	9	7	16
25	*doubtful*	4	3	6	3	7	9	16
26	*indifferent*	6	2	1	7	8	8	16
27	*aroused*	1	1	10	2	2	12	14
28	*ashamed*	8	0	4	2	8	6	14
29	*concerned*	3	4	3	4	7	7	14
30	*hesistant*	3	1	4	6	4	10	14

31	*love*	1	1	8	4	2	12	14
32	*question*	8	4	1	1	12	2	14
33	*sick*	1	4	7	2	5	9	14
34	*involved*	6	7	0	0	13	0	13
35	*careless*	2	3	3	4	5	7	12
36	*flirty*	5	0	5	2	5	7	12
37	*unsafe*	12	0	0	0	12	0	12
38	*lazy*	3	2	1	5	5	6	11
39	*uninterested*	2	2	2	5	4	7	11
40	*bossy*	0	9	0	1	9	1	10
41	*conversatory*	5	1	1	3	6	4	10
42	*defensive*	5	3	1	1	8	2	10
43	*informative*	3	4	1	2	7	3	10
44	*lecturing*	3	3	2	2	6	4	10
45	*lost*	2	3	1	4	5	5	10
46	*powerful*	0	8	0	2	8	2	10
47	*serious*	1	4	1	4	5	5	10
48	*lively*	1	6	2	0	7	2	9
49	*sure*	1	4	1	3	5	4	9
50	*talkative*	6	2	0	1	8	1	9
51	*thinking*	3	2	0	4	5	4	9
52	*vulnerable*	4	0	4	1	4	5	9
53	*patience*	1	2	3	2	3	5	8
54	*patter*	2	1	2	3	3	5	8
55	*regular*	3	1	1	3	4	4	8
56	*affectionate*	1	0	5	1	1	6	7
57	*certain*	2	3	0	2	5	2	7
58	*demanding*	4	2	0	1	6	1	7
59	*drunk*	1	1	0	5	2	5	7
60	*embarrassed*	1	3	1	2	4	3	7
61	*energetic*	3	2	1	1	5	2	7
62	*firm*	1	3	0	3	4	3	7
63	*in love*	3	0	4	0	3	4	7
64	*ironic*	2	2	1	2	4	3	7
65	*proud*	0	3	0	4	3	4	7
66	*chilled*	0	2	1	3	2	4	6
67	*confessing*	0	0	2	4	0	6	6
68	*creepy*	0	1	0	5	1	5	6
69	*engaged*	0	5	0	1	5	1	6
70	*ill*	0	0	3	3	0	6	6
71	*inquiring*	2	2	2	0	4	2	6
72	*persuading*	2	2	0	2	4	2	6
73	*self-confident*	0	5	0	1	5	1	6
74	*singing*	0	1	0	5	1	5	6
75	*strong*	0	3	0	3	3	3	6
76	*accepting*	0	0	4	1	0	5	5
77	*determined*	1	2	0	2	3	2	5
78	*disinterested*	0	1	0	4	1	4	5
79	*excuses*	2	2	0	1	4	1	5
80	*fighting back*	3	2	0	0	5	0	5
81	*harsh*	0	2	0	3	2	3	5
82	*jealous*	5	0	0	0	5	0	5
83	*nostalgic*	2	0	1	2	2	3	5
84	*not confident*	2	1	2	0	3	2	5
85	*patronizing*	0	3	1	1	3	2	5
86	*relieved*	1	1	1	2	2	3	5
87	*strict*	0	1	0	4	1	4	5

88	*unwilling*	0	1	1	3	1	4	5
89	*active*	0	4	0	0	4	0	4
90	*apathetic*	0	0	0	4	0	4	4
91	*betrayal*	3	1	0	0	4	0	4
92	*boastful*	0	1	1	2	1	3	4
93	*casual*	1	0	3	0	1	3	4
94	*declarative*	0	1	0	3	1	3	4
95	*delicate*	1	0	3	0	1	3	4
96	*dying*	0	0	4	0	0	4	4
97	*focused*	0	3	1	0	3	1	4
98	*funny*	1	0	1	2	1	3	4
99	*moralizing*	1	2	0	1	3	1	4
100	*order*	1	3	0	0	4	0	4
101	*pained*	0	1	2	1	1	3	4
102	*peaceful*	1	0	2	1	1	3	4
103	*planning*	3	0	0	1	3	1	4
104	*polite*	2	1	1	0	3	1	4
105	*restrained*	1	1	0	2	2	2	4
106	*submissive*	3	0	1	0	3	1	4
107	*thankful*	0	1	1	2	1	3	4
108	*tyrant*	0	2	0	2	2	2	4
109	*absent-minded*	1	0	0	2	1	2	3
110	*accused*	2	1	0	0	3	0	3
111	*agreeing*	1	1	1	0	2	1	3
112	*alert*	1	1	0	1	2	1	3
113	*authority*	0	1	0	2	1	2	3
114	*boss*	0	1	0	2	1	2	3
115	*brave*	0	2	0	1	2	1	3
116	*care*	2	0	1	0	2	1	3
117	*cocky*	0	3	0	0	3	0	3
118	*composed*	1	0	0	2	1	2	3
119	*convinced*	0	1	0	2	1	2	3
120	*decisive*	0	2	0	1	2	1	3
121	*disbelief*	2	0	0	1	2	1	3
122	*discussing*	1	0	0	2	1	2	3
123	*dominant*	0	1	0	2	1	2	3
124	*emotional*	0	2	1	0	2	1	3
125	*encouraging*	1	1	0	1	2	1	3
126	*expressive*	0	2	0	1	2	1	3
127	*helpful*	1	1	0	1	2	1	3
128	*high*	0	0	2	1	0	3	3
129	*horny*	1	0	0	2	1	2	3
130	*hungry*	0	0	0	3	0	3	3
131	*impatient*	0	2	1	0	2	1	3
132	*indecisive*	0	1	1	1	1	2	3
133	*introverted*	0	0	1	2	0	3	3
134	*lucky*	1	0	2	0	1	2	3
135	*okay*	2	0	1	0	2	1	3
136	*open*	0	1	1	1	1	2	3
137	*pretentious*	0	2	1	0	2	1	3
138	*professional*	0	0	2	1	0	3	3
139	*reassured*	0	1	1	1	1	2	3
140	*remorseful*	0	0	1	2	0	3	3
141	*responsive*	1	0	0	2	1	2	3
142	*rude*	1	0	1	1	1	2	3
143	*sensual*	0	0	2	1	0	3	3
144	*sexy*	0	0	2	1	0	3	3

145	*silent*	1	0	2	0	1	2	3
146	*slow*	0	1	1	1	1	2	3
147	*speech*	1	2	0	0	3	0	3
148	*statement*	2	0	0	1	2	1	3
149	*strange*	2	1	0	0	3	0	3
150	*UFO*	0	0	3	0	0	3	3
151	*unconvinced*	0	2	1	0	2	1	3
152	*unimpressed*	2	0	0	1	2	1	3
153	*unwell*	0	0	0	3	0	3	3
154	*whining*	1	1	1	0	2	1	3
155	*accusing*	0	2	0	0	2	0	2
156	*arrogant*	0	0	2	0	0	2	2
157	*asleep*	0	0	0	2	0	2	2
158	*at work*	0	0	1	1	0	2	2
159	*careful*	0	0	1	1	0	2	2
160	*caring*	0	0	0	2	0	2	2
161	*chatty*	1	0	1	0	1	1	2
162	*critical*	1	1	0	0	2	0	2
163	*cross*	0	1	0	1	1	1	2
164	*disengaged*	0	0	0	2	0	2	2
165	*disoriented*	0	0	0	2	0	2	2
166	*distracted*	0	1	1	0	1	1	2
167	*doesn't care*	0	0	0	2	0	2	2
168	*doesn't give a shit*	0	1	0	1	1	1	2
169	*dreadful*	0	1	0	1	1	1	2
170	*dreamy*	0	0	1	1	0	2	2
171	*easy*	0	0	1	1	0	2	2
172	*emotionless*	0	0	0	2	0	2	2
173	*envious*	2	0	0	0	2	0	2
174	*fascinated*	0	2	0	0	2	0	2
175	*fight*	0	2	0	0	2	0	2
176	*giving orders*	2	0	0	0	2	0	2
177	*gossiping*	1	0	1	0	1	1	2
178	*headache*	0	0	1	1	0	2	2
179	*heartless*	0	1	0	1	1	1	2
180	*honest*	1	0	1	0	1	1	2
181	*hopeful*	2	0	0	0	2	0	2
182	*inquisitive*	0	1	0	1	1	1	2
183	*insecure*	1	0	0	1	1	1	2
184	*kind*	1	0	1	0	1	1	2
185	*lifeless*	0	0	1	1	0	2	2
186	*loud*	0	0	0	2	0	2	2
187	*memorizing*	2	0	0	0	2	0	2
188	*miss*	0	1	1	0	1	1	2
189	*misunderstood*	0	1	1	0	1	1	2
190	*mocking*	0	1	0	1	1	1	2
191	*monotonous*	1	1	0	0	2	0	2
192	*motherlike*	1	0	1	0	1	1	2
193	*not understanding*	0	0	2	0	0	2	2
194	*not vivid*	0	1	0	1	1	1	2
195	*offensive*	0	1	0	1	1	1	2
196	*old*	0	1	0	1	1	1	2
197	*passionate*	1	0	1	0	1	1	2
198	*powerless*	0	0	1	1	0	2	2
199	*preaching*	0	0	0	2	0	2	2
200	*promising*	0	0	1	1	0	2	2
201	*proposing*	0	1	0	1	1	1	2

202	*puzzled*	0	0	1	1	0	2	2
203	*quick*	2	0	0	0	2	0	2
204	*romantic*	1	0	1	0	1	1	2
205	*sarcastic*	0	0	0	2	0	2	2
206	*shocked*	0	0	1	1	0	2	2
207	*shouting*	0	2	0	0	2	0	2
208	*supportive*	2	0	0	0	2	0	2
209	*suspicious*	0	2	0	0	2	0	2
210	*sympathetic*	0	0	1	1	0	2	2
211	*taunting*	0	1	0	1	1	1	2
212	*teaching*	0	2	0	0	2	0	2
213	*telling a story*	1	0	0	1	1	1	2
214	*tempting*	0	0	0	2	0	2	2
215	*torn*	1	1	0	0	2	0	2
216	*unamused*	0	0	0	2	0	2	2
217	*unconfident*	1	0	0	1	1	1	2
218	*undelighted*	1	1	0	0	2	0	2
219	*warning*	1	0	0	1	1	1	2
220	*wishful*	1	0	0	1	1	1	2
221	*a bad condition*	1	0	0	0	1	0	1
222	*about to die*	0	0	0	1	0	1	1
223	*absorbed*	0	0	1	0	0	1	1
224	*airing grievances*	0	0	0	1	0	1	1
225	*alluring*	0	0	1	0	0	1	1
226	*aloof*	0	1	0	0	1	0	1
227	*ambivalent*	0	0	0	1	0	1	1
228	*anecdote*	0	0	0	1	0	1	1
229	*answering*	0	0	1	0	0	1	1
230	*answering a question*	0	0	1	0	0	1	1
231	*anticipating*	1	0	0	0	1	0	1
232	*appreciation*	1	0	0	0	1	0	1
233	*approving*	0	1	0	0	1	0	1
234	*argumentative*	0	1	0	0	1	0	1
235	*asking for help*	0	0	1	0	0	1	1
236	*astonished*	0	1	0	0	1	0	1
237	*attention*	1	0	0	0	1	0	1
238	*begging*	0	0	1	0	0	1	1
239	*blame*	0	1	0	0	1	0	1
240	*boring*	0	0	0	1	0	1	1
241	*brutal*	0	0	0	1	0	1	1
242	*careworn*	0	1	0	0	1	0	1
243	*change*	0	0	1	0	0	1	1
244	*charm*	0	0	1	0	0	1	1
245	*cheated on*	1	0	0	0	1	0	1
246	*church*	0	0	0	1	0	1	1
247	*clarifying*	0	1	0	0	1	0	1
248	*cold*	0	0	0	1	0	1	1
249	*comfortable*	0	0	1	0	0	1	1
250	*comfy*	0	0	1	0	0	1	1
251	*commentary*	0	0	1	0	0	1	1
252	*compassionate*	0	0	1	0	0	1	1
253	*compliment*	0	1	0	0	1	0	1
254	*concise*	0	1	0	0	1	0	1
255	*condescending*	1	0	0	0	1	0	1
256	*confirmation*	0	0	1	0	0	1	1
257	*confronting*	0	0	1	0	0	1	1
258	*considering*	0	1	0	0	1	0	1

259	*contemplative*	0	0	0	1	0	1	1
260	*control*	0	0	0	1	0	1	1
261	*cool*	0	1	0	0	1	0	1
262	*counting sheep*	0	0	0	1	0	1	1
263	*courageous*	1	0	0	0	1	0	1
264	*creative*	0	1	0	0	1	0	1
265	*cunning*	0	1	0	0	1	0	1
266	*cynical*	0	1	0	0	1	0	1
267	*dangerous*	0	0	0	1	0	1	1
268	*daydreaming*	0	0	1	0	0	1	1
269	*dead*	0	0	1	0	0	1	1
270	*deep*	0	0	0	1	0	1	1
271	*demanding attention*	0	0	0	1	0	1	1
272	*denying*	1	0	0	0	1	0	1
273	*depressed*	0	0	0	1	0	1	1
274	*diffident*	1	0	0	0	1	0	1
275	*dinner*	1	0	0	0	1	0	1
276	*dirty talk*	0	0	0	1	0	1	1
277	*discontent*	0	1	0	0	1	0	1
278	*disdainful*	0	1	0	0	1	0	1
279	*dismissive*	1	0	0	0	1	0	1
280	*disturbed*	0	1	0	0	1	0	1
281	*doctor telling about cancer*	0	0	1	0	0	1	1
282	*doesn't bother*	0	0	0	1	0	1	1
283	*don't know*	0	0	1	0	0	1	1
284	*done*	0	0	0	1	0	1	1
285	*Down syndrome*	0	0	1	0	0	1	1
286	*drained*	0	1	0	0	1	0	1
287	*dreaming*	0	1	0	0	1	0	1
288	*dubious*	0	0	1	0	0	1	1
289	*dull*	0	1	0	0	1	0	1
290	*dumb*	0	0	1	0	0	1	1
291	*edgy*	1	0	0	0	1	0	1
292	*effort*	0	1	0	0	1	0	1
293	*emphatic*	0	1	0	0	1	0	1
294	*empowered*	0	0	1	0	0	1	1
295	*emptiness*	0	0	0	1	0	1	1
296	*enagaged*	0	0	1	0	0	1	1
297	*evening*	0	0	1	0	0	1	1
298	*excited*	1	0	0	0	1	0	1
299	*expecting*	0	1	0	0	1	0	1
300	*experienced*	0	0	0	1	0	1	1
301	*fancy*	0	1	0	0	1	0	1
302	*fatherly*	0	0	0	1	0	1	1
303	*fazed*	0	0	0	1	0	1	1
304	*fearless*	0	1	0	0	1	0	1
305	*ferocious*	0	1	0	0	1	0	1
306	*fierce*	0	0	0	1	0	1	1
307	*flat*	1	0	0	0	1	0	1
308	*food*	0	0	1	0	0	1	1
309	*fragile*	0	0	1	0	0	1	1
310	*fresh*	0	1	0	0	1	0	1
311	*friendly*	0	0	0	1	0	1	1
312	*full of denial*	0	0	1	0	0	1	1
313	*gay*	0	1	0	0	1	0	1
314	*generous*	0	0	0	1	0	1	1
315	*girlish*	0	0	1	0	0	1	1

316	*gruff*	0	0	0	1	0	1	1
317	*hangover*	0	0	1	0	0	1	1
318	*harmed*	0	0	1	0	0	1	1
319	*high pitch*	0	1	0	0	1	0	1
320	*hospitable*	0	1	0	0	1	0	1
321	*idea*	0	1	0	0	1	0	1
322	*immersed*	0	1	0	0	1	0	1
323	*impressed*	0	0	0	1	0	1	1
324	*impulsive*	0	1	0	0	1	0	1
325	*in a hurry*	1	0	0	0	1	0	1
326	*in pain*	0	1	0	0	1	0	1
327	*infatuated*	0	0	1	0	0	1	1
328	*intense*	0	1	0	0	1	0	1
329	*intimidated*	0	0	1	0	0	1	1
330	*itchy*	1	0	0	0	1	0	1
331	*judgmental*	1	0	0	0	1	0	1
332	*just got fired*	0	1	0	0	1	0	1
333	*just woke up*	0	0	1	0	0	1	1
334	*keen*	0	0	1	0	0	1	1
335	*laid back*	0	1	0	0	1	0	1
336	*laid down*	1	0	0	0	1	0	1
337	*lame*	0	1	0	0	1	0	1
338	*levelheaded*	0	0	0	1	0	1	1
339	*light-headed*	0	0	1	0	0	1	1
340	*listen to me*	0	1	0	0	1	0	1
341	*looking down*	1	0	0	0	1	0	1
342	*lost in thought*	1	0	0	0	1	0	1
343	*mad*	0	1	0	0	1	0	1
344	*making a suggesiton*	0	1	0	0	1	0	1
345	*making fun*	0	0	1	0	0	1	1
346	*malicious*	0	1	0	0	1	0	1
347	*mellow*	0	0	1	0	0	1	1
348	*messed up*	1	0	0	0	1	0	1
349	*mongoloid*	0	0	0	1	0	1	1
350	*monologue*	0	0	0	1	0	1	1
351	*moody*	0	1	0	0	1	0	1
352	*motivated*	0	1	0	0	1	0	1
353	*moved*	0	0	0	1	0	1	1
354	*mrrraaau*	0	0	0	1	0	1	1
355	*mysterious*	1	0	0	0	1	0	1
356	*nagging*	1	0	0	0	1	0	1
357	*negating*	0	0	1	0	0	1	1
358	*news*	1	0	0	0	1	0	1
359	*no idea*	1	0	0	0	1	0	1
360	*not satisfied*	0	1	0	0	1	0	1
361	*nothing*	0	1	0	0	1	0	1
362	*occupied*	0	0	1	0	0	1	1
363	*offering something*	0	1	0	0	1	0	1
364	*on edge*	0	1	0	0	1	0	1
365	*outburst*	0	0	0	1	0	1	1
366	*outgoing*	0	1	0	0	1	0	1
367	*overconfidence*	0	0	0	1	0	1	1
368	*overthinking*	0	0	0	1	0	1	1
369	*overworked*	0	0	0	1	0	1	1
370	*parenting*	0	1	0	0	1	0	1
371	*phlegmatic*	0	0	0	1	0	1	1
372	*pity*	0	1	0	0	1	0	1

373	*playful*	0	0	1	0	0	1	1
374	*poetic*	0	0	0	1	0	1	1
375	*possessed*	0	0	0	1	0	1	1
376	*praying*	0	0	0	1	0	1	1
377	*preoccupied*	0	0	0	1	0	1	1
378	*presentation*	1	0	0	0	1	0	1
379	*problem*	1	0	0	0	1	0	1
380	*problematic*	0	1	0	0	1	0	1
381	*provocation*	0	0	0	1	0	1	1
382	*pumped*	0	1	0	0	1	0	1
383	*rap*	0	0	0	1	0	1	1
384	*rapturous*	0	0	1	0	0	1	1
385	*rational*	0	0	0	1	0	1	1
386	*redneck*	0	1	0	0	1	0	1
387	*relentless*	0	0	1	0	0	1	1
388	*repressed*	1	0	0	0	1	0	1
389	*requesting*	0	0	1	0	0	1	1
390	*requiring*	0	0	0	1	0	1	1
391	*reserved*	0	0	1	0	0	1	1
392	*responsible*	0	0	0	1	0	1	1
393	*retarded*	0	0	0	1	0	1	1
394	*right*	1	0	0	0	1	0	1
395	*saying how life is cruel*	0	1	0	0	1	0	1
396	*scary*	1	0	0	0	1	0	1
397	*sceptical*	0	0	0	1	0	1	1
398	*scream*	0	1	0	0	1	0	1
399	*secret*	0	0	0	1	0	1	1
400	*seductive*	0	0	1	0	0	1	1
401	*self-esteem*	0	0	1	0	0	1	1
402	*sensitive*	0	0	0	1	0	1	1
403	*serene*	1	0	0	0	1	0	1
404	*shaking*	1	0	0	0	1	0	1
405	*shameful*	0	0	1	0	0	1	1
406	*shameless*	1	0	0	0	1	0	1
407	*silly*	1	0	0	0	1	0	1
408	*slutty*	0	0	1	0	0	1	1
409	*sociable*	0	0	0	1	0	1	1
410	*soppy*	0	0	1	0	0	1	1
411	*static*	0	0	0	1	0	1	1
412	*stoic*	0	1	0	0	1	0	1
413	*stoned*	0	1	0	0	1	0	1
414	*struggle*	0	1	0	0	1	0	1
415	*stupid*	0	1	0	0	1	0	1
416	*sulky*	1	0	0	0	1	0	1
417	*superiority*	0	0	0	1	0	1	1
418	*surprised*	1	0	0	0	1	0	1
419	*teacher talk*	0	1	0	0	1	0	1
420	*tedious*	1	0	0	0	1	0	1
421	*tense*	1	0	0	0	1	0	1
422	*thick*	0	0	0	1	0	1	1
423	*timid*	0	0	0	1	0	1	1
424	*too damn short*	0	0	1	0	0	1	1
425	*touched*	0	0	1	0	0	1	1
426	*translating*	1	0	0	0	1	0	1
427	*trustworthy*	0	1	0	0	1	0	1
428	*trying to justify herself*	0	0	1	0	0	1	1
429	*tutoring*	0	0	0	1	0	1	1

430	*unaffected*	0	0	0	1	0	1	1
431	*unclear*	0	1	0	0	1	0	1
432	*uncomfortable*	0	0	1	0	0	1	1
433	*under the weather*	0	0	1	0	0	1	1
434	*understanding*	0	1	0	0	1	0	1
435	*unstable*	0	0	1	0	0	1	1
436	*untouchable*	0	0	1	0	0	1	1
437	*vivid*	0	1	0	0	1	0	1
438	*weird*	0	1	0	0	1	0	1
439	*weirded out*	0	1	0	0	1	0	1
440	*wet blanket*	0	0	1	0	0	1	1
441	*whatever*	0	1	0	0	1	0	1
442	*wise*	0	1	0	0	1	0	1
443	*without energy*	0	0	0	1	0	1	1
444	*witty*	0	1	0	0	1	0	1
445	*wool-gathering*	1	0	0	0	1	0	1
446	*worked up*	0	1	0	0	1	0	1
447	*working*	0	1	0	0	1	0	1
448	*yearning*	1	0	0	0	1	0	1

Table 37. Responses tagged as *sadness* in the Free Label condition.

No	TAG: SADNESS	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*sad*	240	71	439	214	311	653	964
2	*negative*	27	56	43	49	83	92	175
3	*disappointed*	47	24	42	41	71	83	154
4	*depressed*	12	13	57	34	25	91	116
5	*crying*	11	7	34	2	18	36	54
6	*unhappy*	10	9	18	7	19	25	44
7	*bad*	7	12	6	14	19	20	39
8	*upset*	5	8	11	7	13	18	31
9	*regretful*	3	5	7	9	8	16	24
10	*resigned*	5	3	4	12	8	16	24
11	*sorry*	6	1	8	3	7	11	18
12	*dissatisfied*	2	4	3	5	6	8	14
13	*miserable*	5	2	7	0	7	7	14
14	*hopeless*	3	0	5	2	3	7	10
15	*sorrow*	1	2	3	4	3	7	10
16	*desparate*	2	2	5	1	4	6	10
17	*devastated*	0	0	6	3	0	9	9
18	*melancholic*	1	0	5	3	1	8	9
19	*overwhelmed*	1	0	2	5	1	7	8
20	*tearful*	3	0	5	0	3	5	8
21	*pessimistic*	1	0	4	2	1	6	7
22	*down*	0	0	4	2	0	6	6
23	*lonely*	3	1	2	0	4	2	6
24	*sobbing*	1	0	4	0	1	4	5
25	*helpless*	2	1	1	1	3	2	5
26	*grief*	4	0	0	1	4	1	5
27	*lost*	0	0	3	1	0	4	4
28	*unmotivated*	0	0	1	3	0	4	4
29	*defeated*	1	1	0	2	2	2	4
30	*gloomy*	0	0	1	2	0	3	3
31	*unenthusiastic*	0	0	0	3	0	3	3

32	*unsatisfied*	0	0	1	2	0	3	3
33	*discouraged*	1	0	1	1	1	2	3
34	*moaning*	1	0	1	1	1	2	3
35	*begging*	2	0	1	0	2	1	3
36	*discontent*	2	0	1	0	2	1	3
37	*letdown*	0	2	1	0	2	1	3
38	*resentful*	3	0	0	0	3	0	3
39	*gave up*	0	0	0	2	0	2	2
40	*mourning*	0	0	1	1	0	2	2
41	*weepy*	0	0	1	1	0	2	2
42	*breakdown*	1	0	1	0	1	1	2
43	*broken*	0	1	1	0	1	1	2
44	*despondent*	0	1	1	0	1	1	2
45	*disillusioned*	0	2	0	0	2	0	2
46	*distraught*	0	2	0	0	2	0	2
47	*about to cry*	0	0	0	1	0	1	1
48	*blue*	0	0	0	1	0	1	1
49	*careworn*	0	0	1	0	0	1	1
50	*damaged*	0	0	0	1	0	1	1
51	*dejected*	0	0	0	1	0	1	1
52	*doubtful*	0	0	0	1	0	1	1
53	*down in the dumps*	0	0	0	1	0	1	1
54	*heartbroken*	0	0	1	0	0	1	1
55	*indifferent*	0	0	1	0	0	1	1
56	*moody*	0	0	0	1	0	1	1
57	*morose*	0	0	0	1	0	1	1
58	*ok*	0	0	0	1	0	1	1
59	*positive*	0	0	0	1	0	1	1
60	*scared*	0	0	0	1	0	1	1
61	*tired with life*	0	0	1	0	0	1	1
62	*traumatised*	0	0	1	0	0	1	1
63	*disenchanted*	0	1	0	0	1	0	1
64	*horrible*	1	0	0	0	1	0	1
65	*inferiority*	1	0	0	0	1	0	1
66	*lamenting*	1	0	0	0	1	0	1
67	*moved*	1	0	0	0	1	0	1
68	*pleading*	1	0	0	0	1	0	1

Table 38. Responses tagged as *happiness* in the Free Label condition.

No	TAG: HAPPINESS	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*happy*	73	87	42	26	160	68	228
2	*positive*	54	43	45	38	97	83	180
3	*excited*	44	63	9	7	107	16	123
4	*relaxed*	7	11	12	21	18	33	51
5	*good*	13	10	13	9	23	22	45
6	*fine*	9	7	4	9	16	13	29
7	*satisfied*	6	8	5	4	14	9	23
8	*amused*	3	9	4	6	12	10	22
9	*content*	9	4	4	2	13	6	19
10	*hopeful*	6	2	3	3	8	6	14
11	*cheerful*	5	5	2	1	10	3	13
12	*enthusiastic*	1	8	2	1	9	3	12
13	*joy*	1	4	4	0	5	4	9

14	*self-confident*	0	5	0	4	5	4	9
15	*glad*	1	5	2	0	6	2	8
16	*optimistic*	1	3	1	3	4	4	8
17	*laughing*	0	2	2	3	2	5	7
18	*ok*	1	0	0	5	1	5	6
19	*playful*	1	2	1	1	3	2	5
20	*motivated*	2	2	0	0	4	0	4
21	*carefree*	0	1	0	3	1	3	4
22	*pleased*	1	0	2	1	1	3	4
23	*enjoying*	0	2	0	0	2	0	2
24	*joking*	0	2	0	0	2	0	2
25	*upbeat*	2	0	0	0	2	0	2
26	*nice*	0	1	0	1	1	1	2
27	*blessed*	0	0	2	0	0	2	2
28	*charmed*	1	0	0	0	1	0	1
29	*chirpy*	1	0	0	0	1	0	1
30	*flattered*	1	0	0	0	1	0	1
31	*friendly*	0	1	0	0	1	0	1
32	*hyped*	0	1	0	0	1	0	1
33	*inspired*	1	0	0	0	1	0	1
34	*merry*	0	1	0	0	1	0	1
35	*passionate*	0	1	0	0	1	0	1
36	*alright*	0	0	0	1	0	1	1
37	*blissful*	0	0	1	0	0	1	1
38	*charismatic*	0	0	0	1	0	1	1
39	*enchanted*	0	0	0	1	0	1	1
40	*giggling*	0	0	0	1	0	1	1
41	*jolly*	0	0	0	1	0	1	1
42	*unhappy*	0	0	1	0	0	1	1

Table 39. Responses tagged as *anger* in the Free Label condition

No	TAG: ANGER	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*angry*	94	296	12	122	390	134	524
2	*irritated*	52	70	10	26	122	36	158
3	*annoyed*	22	44	3	12	66	15	81
4	*mad*	11	24	2	12	35	14	49
5	*pissed off*	4	26	3	8	30	11	41
6	*arguing*	7	21	0	3	28	3	31
7	*furious*	2	18	0	2	20	2	22
8	*frustrated*	9	6	0	6	15	6	21
9	*aggressive*	0	11	0	2	11	2	13
10	*impatient*	5	6	0	2	11	2	13
11	*accusing*	1	9	0	1	10	1	11
12	*threatening*	1	1	3	6	2	9	11
13	*bitchy*	7	1	0	2	8	2	10
14	*scolding*	2	8	0	0	10	0	10
15	*reproachful*	2	2	1	0	4	1	5
16	*grumpy*	0	0	0	4	0	4	4
17	*insulted*	1	1	1	0	2	1	3
18	*mean*	0	2	0	1	2	1	3
19	*scary*	0	0	0	3	0	3	3
20	*bashing*	0	1	0	1	1	1	2
21	*enthusiastic*	0	2	0	0	2	0	2

22	*infuriated*	0	2	0	0	2	0	2
23	*offended*	1	0	1	0	1	1	2
24	*rage*	0	0	0	2	0	2	2
25	*telling off*	1	1	0	0	2	0	2
26	*butt off*	1	0	0	0	1	0	1
27	*cranky*	1	0	0	0	1	0	1
28	*cross*	0	0	0	1	0	1	1
29	*displeased*	0	0	1	0	0	1	1
30	*dressing down*	0	1	0	0	1	0	1
31	*evil*	0	0	0	1	0	1	1
32	*get lost*	0	0	0	1	0	1	1
33	*livid*	0	1	0	0	1	0	1
34	*outraged*	0	1	0	0	1	0	1
35	*quarrelsome*	0	0	0	1	0	1	1
36	*resentful*	0	1	0	0	1	0	1
37	*satisfatied*	0	1	0	0	1	0	1
38	*spiteful*	0	0	1	0	0	1	1
39	*standoffish*	0	0	0	1	0	1	1
40	*sullen*	0	0	0	1	0	1	1
41	*wrathful*	0	1	0	0	1	0	1

Table 40. Responses tagged as *fear* in the Free Label condition.

No	TAG: FEAR	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	*nervous*	23	44	10	14	67	24	91
2	*worried*	21	10	25	15	31	40	71
3	*anxious*	12	6	16	7	18	23	41
4	*scared*	9	3	14	6	12	20	32
5	*afraid*	10	1	6	3	11	9	20
6	*insecure*	2	2	8	1	4	9	13
7	*stressed*	6	2	2	3	8	5	13
8	*agitated*	3	6	1	0	9	1	10
9	*shocked*	2	7	0	1	9	1	10
10	*fearful*	2	0	4	1	2	5	7
11	*frightened*	2	1	1	3	3	4	7
12	*apprehensive*	0	0	3	1	0	4	4
13	*self-conscious*	1	0	2	0	1	2	3
14	*terrified*	1	0	2	0	1	2	3
15	*unsafe*	0	0	3	0	0	3	3
16	*panicked*	1	1	0	0	2	0	2
17	*under pressure*	0	2	0	0	2	0	2
18	*cowardly*	0	0	1	0	0	1	1
19	*frantic*	1	0	0	0	1	0	1
20	*intimidated*	0	0	1	0	0	1	1
21	*playful*	0	0	0	1	0	1	1
22	*shy*	1	0	0	0	1	0	1
23	*stage fright*	0	0	0	1	0	1	1
24	*threatened*	0	0	1	0	0	1	1
25	*uncertain*	0	0	0	1	0	1	1

Table 41. Responses tagged as *disgust* in the Free Label condition.

No	TAG: DISGUST	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	fed up	4	2	6	5	6	11	17
2	bitter	4	0	0	1	4	1	5
3	disgused	1	1	1	1	2	2	4
4	resentful	0	2	0	2	2	2	4
5	dissatisfied	1	0	0	0	1	0	1
6	nasty	1	0	0	0	1	0	1
7	repulsed	0	1	0	0	1	0	1
8	spiteful	0	1	0	0	1	0	1

Table 42. Responses tagged as *surprised* in the Free Label condition.

No	TAG: SURPRISE	FH	MH	FS	MS	Happy speakers total	Sad speakers total	Total
1	surprised	6	17	7	4	23	11	34
2	amazed	0	3	0	0	3	0	3
3	astonished	0	1	0	0	1	0	1

Appendix L

Informed Consent used at the emotion elicitation stage with the speakers.

Informed Consent

Study Title:	Emotional Prosody - Creation of a New Database
Principal Investigator (PI):	Dr Jeanette Altarriba
PI contact info:	(518) 442-5004, SS 391, jaltarriba@albany.edu
External Investigator (EI):	Halszka Bak, MA
EI contact Info:	(518) 442-3949, hbak@wa.amu.edu.pl

The purpose of this study is to collect audio and video recordings of emotional expressions for future study. The recordings will be used mainly for research on emotional prosody (the melody of speech, the "how" of things said when you are emotional), facial expressions of emotion, and emotion-related gestures.

To participate in the study you need to be a native speaker of English, have normal hearing, normal speech and language, and normal or corrected to normal vision.

All the recordings collected in the course of this study will be retained indefinitely for the purposes of research on emotion expression.

During this study you will be asked to complete several speaking tasks. You will be asked to watch short movie clips, discuss them with the investigator, fill out a questionnaire about each clip watched, and read out loud a series of sentences in either a happy or a sad tone of voice. You will be recorded on audio and video recording devices throughout the procedure. You will also be asked to complete a Language Experience and Proficiency Questionnaire (LEAP-Q) and Toronto Alexithymia Scale (TAS-20). This entire process should take about 45 to 60 minutes to complete.

Participation in this study is voluntary. You may withdraw from it at any point without any penalty. If you feel uncomfortable at any point during this study you may

discontinue your participation and you will still receive credit for participation. You can terminate participation even after you have signed the informed consent document without penalty or losing any benefits to which you may otherwise have been entitled. We will retain, analyze, and protect any information you have provided up until the point you have left the study unless you request that your data be excluded from any analysis and/or destroyed.

Although no risk greater than that encountered during daily life is involved in this study, all the movie clips and most of the discussion about the clips, as well as all the sentences to read will be of emotional value. The risks involved here are minimal, and we do not anticipate any risk in your participation other than some discomfort or evoking memories pertaining to the movies from which the clips you will be watching have been cut. The potential benefits of this study include learning about and gaining experience with experimental research methods, particularly with emotion research. The debriefing form will discuss the theories and hypotheses upon which this study has been constructed. This will give you a practical insight into the field of affective science research, and expose you to additional knowledge from that field. Furthermore, others may ultimately benefit from the knowledge obtained from this research.

Your name is required for the purpose of the informed consent and granting you the appropriate credit in accordance with the APSY 101 Research Pool Policies. Your name will not be in any other way connected to your results. The recordings of you taken during the study, your responses on the questionnaire pertaining to the movie clips as well as on the LEAP-Q and TAS-20 will be labeled only with your participant number. These and any other records will be kept confidential and anonymous, stored separately, and will be locked within the confines of the Cognition and Language Laboratory at the University at Albany and at the Language and Communication Laboratory at the University of Adam Mickiewicz in Poznan (Poland). These records will be kept indefinitely for future research purposes.

All information obtained in this study is strictly confidential unless disclosure is required by law. In addition, the Institutional Review Board and University at Albany or U.S. government officials responsible for monitoring the study may inspect the records.

You are free to ask any questions concerning the procedure, you have the right to have these questions answered to your satisfaction. Any questions about this study should be directed to the External Investigator, Halszka Bak, M.A. at (518) 442-3949 or

hbak@wa.amu.edu.pl. You can also contact Dr. Jeanette Altarriba, Full Professor, at (518) 442-5004 or jaltarriba@albany.edu.

As a courtesy to all participants in emotion related studies, the University Counseling Center is available free to students. The Counseling Center is located at 400 Patroon Creek Blvd., Suite 104 or can be reached by calling (518) 442-5800. For your convenience, shuttle buses are available from campus. Peer Services are also available through the Middle Earth Peer Assistance Program. For example, the Middle Earth Hotline is open 12pm-12am on weekdays and 24 hours on weekends. The hotline can be reached by calling (518) 442-5777. Additional services provided by Middle Earth include their online self-help resource (which can be accessed through their website, www.albany.edu/middleearthcafe) and Peer Career Advisor Service (available through Career Services in the Science Library G50). General information regarding Middle Earth can be viewed by visiting their website, www.albany.edu/counseling_center/aboutme.shtml.

If you have any questions concerning your rights as a research participant of if you wish to report any concerns about the study, please contact the University at Albany's Office of Regulatory Research Compliance at its toll-free number 1-866-857-5459 or via e-mail at hsconcerns@albany.edu.

I have read, or been informed of, the information about this study. My signature indicates that I understand the above statements. I hereby consent to participate in the study.

Printed Name	Signature	Date

Appendix M

Debriefing Form used at the emotion elicitation stage with the speakers.

Debriefing Form

Emotional Prosody - Creation of a New Database

You have just participated in the recording of material for the creation of a new database for the future research on emotional prosody (the emotional melody of speech, the 'how' of things said) and emotional expressions concurrent with emotional prosody. This study had two distinct parts, and each was aimed at eliciting from you a particular type of emotional expression. In one part you were asked to watch a series of emotionally evocative movie clips and discuss their emotional contents with the researcher and in the other you were asked to read out loud sentences in a specified emotional tone of voice. The former was aimed at eliciting from you a fairly natural, spontaneous emotionally affected and unscripted speech, while the latter was aimed at eliciting play-acted emotional speech. We will extract small samples of audio and video material from the recordings we have taken of you and these will serve as stimuli for research on recognizing emotional content in speech. These stimuli will help us answer a number of questions in emotional prosody research, e.g. whether there are significant differences in how unscripted vs. scripted emotional speech is understood, whether there are differences in how men and women phrase their emotional speech, whether bilingual individuals comprehend emotional speech differently when it's performed by native and non-native speakers of English. We will also investigate the relations between the facial expressions, body language, and the emotional speech. We ask that

participants not discuss the nature or the procedures of the study with anyone else who might be a future participant of this study.

If you have any questions, please contact Halszka Bak, M.A. at (518) 442-3949, or by e-mail at hbak@wa.amu.edu.pl.

As a courtesy to all participants in emotion related studies, the University Counseling Center is available free to students. The Counseling Center is located at 400 Patroon Creek Blvd., Suite 104 or can be reached by calling (518) 442-5800. For your convenience, shuttle buses are available from campus. Peer Services are also available through the Middle Earth Peer Assistance Program. For example, the Middle Earth Hotline is open 12pm-12am on weekdays and 24 hours on weekends. The hotline can be reached by calling (518) 442-5777. Additional services provided by Middle Earth include their online self-help resource (which can be accessed through their website, www.albany.edu/middleearthcafe) and Peer Career Advisor Service (available through Career Services in the Science Library G50). General information regarding Middle Earth can be viewed by visiting their website, www.albany.edu/counseling_center/aboutme.shtml.

Appendix N

Informed Consent used at the validation stage with the raters.

Informed Consent

Study Title:	Emotional Prosody - Creation of a New Database
Principal Investigator (PI):	Dr Jeanette Altarriba
PI contact info:	(518) 442-5004, SS 391, jaltarriba@albany.edu
External Investigator (EI):	Halszka Bak, MA
EI contact Info:	(518) 442-3949, hbak@wa.amu.edu.pl

During this study you will be asked to complete a computer task in which you will be asked to assess, classify, or name the emotional content of various audio and video clips. You will be exposed to clips of audio and video material, in some of which the audio signal will be strongly distorted. You will also be asked to complete a Language Experience and Proficiency Questionnaire (LEAP-Q) and Toronto Alexithymia Scale (TAS-20) at the beginning of the study, as well as the Positive and Negative Affect Scale (PANAS-X) at the beginning and at the end of the study. This entire process should take about 45 to 60 minutes to complete.

Participation in this study is voluntary. You may withdraw from it at any point without any penalty. If you feel uncomfortable at any point during this study you may discontinue your participation and you will still receive credit for participation. You can terminate participation even after you have signed the informed consent document without penalty or losing any benefits to which you may otherwise have been entitled. We will retain, analyze, and protect any information you have provided up until the point you have left the study unless you request that your data be excluded from any analysis and/or destroyed.

Although no risk greater than that encountered during daily life is involved in this study, all the audio and video material you will be exposed to will be of emotional value. The risks involved here are minimal, and we do not anticipate any risk in your participation other than some discomfort. The potential benefits of this study include learning about and gaining experience with experimental research methods, particularly with emotion research. The debriefing form will discuss the theories and hypotheses upon which this study has been constructed. This will give you a practical insight into the field of affective science research, and expose you to additional knowledge from that field. Furthermore, others may ultimately benefit from the knowledge obtained from this research.

You will receive 1.0 research credit for your participation.

You name is required for the purpose of the informed consent and granting you the appropriate credit in accordance with the APSY 101 Research Pool Policies. Your name will not be in any other way connected to your results. Your responses on the computer task and on the LEAP-Q, TAS-20, and PANAS-X questionnaires will be labeled only with your participant number. These and any other records will be kept confidential and anonymous, stored separately, and will be locked within the confines of the Cognition and Language Laboratory at the University at Albany and at the Language and Communication Laboratory at the University of Adam Mickiewicz in Poznan (Poland). These records will be kept indefinitely for future research purposes.

All information obtained in this study is strictly confidential unless disclosure is required by law. In addition, the Institutional Review Board and University at Albany or U.S. government officials responsible for monitoring the study may inspect the records.

You are free to ask any questions concerning the procedure, you have the right to have these questions answered to your satisfaction. Any questions about this study should be directed to the co-Principle Investigator, Halszka Bak, M.A. at (518) 442-3949 or hbak@wa.amu.edu.pl. You can also contact Dr. Jeanette Altarriba, Full Professor, at (518) 442-5004 or jaltarriba@albany.edu.

If you have any questions concerning your rights as a research participant of if you wish to report any concerns about the study, please contact the University at Albany's Office of Regulatory Research Compliance at its toll-free number 1-866-857-5459 or via e-mail at hsconcerns@albany.edu.

I have read, or been informed of, the information about this study. My signature indicates that I understand the above statements. I hereby consent to participate in the study.

Printed Name	Signature	Date

Appendix O

Debriefing Form used at the validation stage with the raters.

Debriefing Form

Emotional Prosody - Validation of a New Database

You have just participated in the validation of a newly created database of stimuli for the purposes of research on emotional prosody (the emotional melody of speech, the 'how' of things said) and concurrent emotional expressions. Your reactions to various types of stimuli – the video and audio (distorted or not) will allow us to establish what the relationships are between prosody, semantics, facial expressions and body language in emotional expressions. We are interested in emotional prosody in particular, although the general context (the other means of expression) in which it occurs is also important for our research. Your responses will serve mainly as a reference point for a future study on emotional prosody recognition in a bilingual population. Additionally, we will draw comparisons between different responses on different types of stimuli to determine how much, or how little information is enough to correctly identify an emotion in speech. We ask that participants not discuss the nature or procedures of the study with anyone else who might be a future participant of this experiment.

If you have any questions, please contact Halszka Bak, M.A. at (518) 442-3949, or by e-mail at hbak@wa.amu.edu.pl.

As a courtesy to all participants in emotion related studies, the University Counseling Center is available free to students. The Counseling Center is located at 400 Patroon Creek Blvd., Suite 104 or can be reached by calling (518) 442-5800. For your convenience, shuttle buses are available from campus. Peer Services are also available through the Middle Earth Peer Assistance Program. For example, the Middle Earth Hotline is open 12pm-12am on weekdays and 24 hours on weekends. The hotline can be reached by calling (518) 442-5777. Additional services provided by Middle Earth include their online self-help resource (which can be accessed through their website, www.albany.edu/middleearthcafe) and Peer Career Advisor Service (available through Career Services in the Science Library G50). General information regarding Middle Earth can be viewed by visiting their website, www.albany.edu/counseling_center/aboutme.shtml.