

AIRE MILL

Exploring the role
of personality traits and age
in the experience and recognition
of emotions



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Institute of Psychology, University of Tartu, Estonia.

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*“Always laugh when you can.
It is cheap medicine.”*
Lord Byron

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LIST OF ORIGINAL PUBLICATIONS

This dissertation is based on the following publications and an unpublished manuscript, which will be referred to in the text by their respective Roman numerals (Nõlvak, A. = Mill, A.):

- I** Realo, A., Allik, J., **Nõlvak, A.**, Valk, R., Ruus, T., Schmidt, M. & Eilola, T. (2003). Mind-reading ability: Beliefs and performance. *Journal of Research in Personality*, 37(5), 420–445. DOI: 10.1016/S0092-6566(03)00021-7
- II** **Mill, A.**, Allik, J., Realo, A., & Valk, R. (2009). Age-related differences in emotion recognition ability: A cross-sectional study. *Emotion*, 9(5), 619–630. DOI: 10.1037/a0016562
- III** **Mill, A.**, Realo, A., & Allik, J. (2016). Retrospective ratings of emotions: The effects of age, daily tiredness, and personality. *Frontiers in Psychology*, DOI: 10.3389/fpsyg.2015.02020.
- IV** **Mill, A.**, Realo, A., & Allik, J. (2016). Emotional variability predicts tiredness in daily life: An experience sampling study. *Journal of Individual Differences*, 37(3), 181–193, DOI: 10.1027/1614-0001/a000206.
- V** **Mill, A.**, Kõöts-Ausmees, L., Allik, J. & Realo, A. (2017). The role of co-occurring emotions and personality traits in anger expression. *Manuscript under review*.

The author of the present dissertation contributed to these publications as follows:

- **Studies I and II:** participated in conducting the experiments and data collection; participated in carrying out data analyses and writing the manuscripts;
- **Studies III, IV, and V:** participated in formulating the research question, performed the data analyses, and wrote the manuscript as first author.

1. INTRODUCTION

1.1 Aims of the Dissertation

The experience and expression of emotions is at the core of everyday life, capturing, so to say, the beauty and pain of human life experience. In the context of the evolutionary framework that guides many approaches to emotions, they are considered regulatory mechanisms that developed to help us respond to the demands and opportunities of the social environment (Darwin, 1872). Emotions are characterized as temporary states of mind – relatively brief conscious experiences of feelings such as pleasure and displeasure. According to the World Health Organisation (2006), emotions such as joy and anger normally motivate people in goal-directed behavior, having a significant impact on psychological well-being.

The current research is aimed at understanding emotion processes and individual differences in emotion recognition, emotion experience, and emotion expression. The main research question can be formulated as the following: To what extent are the experience, expression, and recognition of emotions affected by the personality traits and age of participants? The thesis presents five studies that are based on two experiments. In the first experiment (**Studies I and II**), individual differences in emotion recognition were analyzed. In the second experiment (**Studies III, IV, and V**), individual differences in the experience and expression of emotions were explored.

Emotions are defined as relatively short episodic experiential processes that are biologically based and involve specific patterns of perception, experience, physiology, action, and communication, occur as a response to specific physical and societal challenges, and serve important adaptive functions (Keltner & Gross, 1999). Evaluation and monitoring of emotional states is essential in assessing one's mental health (Spielberger & Reheiser, 2009). During recent decades, research in the field of emotions has grown rapidly and some consensus has been reached regarding the nature of emotions (Ekman, 2016).

This research draws on several theoretical frameworks. These include empathic accuracy model by William Ickes (1997, 2003), basic emotions theory by Paul Ekman (1992), affect variability concept (Eid & Diener, 1999), and the accessibility model of emotional self-report (Robinson & Clore, 2002). In the following sections, I review the relevant literature and then discuss the results of the experimental studies which comprise the current dissertation on the topics of mindreading, emotion recognition, retrospective ratings of experienced emotions, affective variability, and the expression of anger. The terms 'emotions/emotional' and 'affect/affective' are used interchangeably and refer to current emotional states.

The objectives of the studies of the current dissertation are as follows:

- To explore the structure and dimensionality of self-reported mindreading beliefs (**Study I**);
- To examine the relationship between general mindreading belief and performance in actual mindreading tasks (i.e., the recognition of emotions expressed by face and speech, and the recognition of personality traits of a stranger), including the influence of personality traits and general intelligence (**Study I**);
- To investigate age differences in recognizing facial and vocal emotion expression by using cross-sectional data covering the adult life span, and to examine for which emotions, between which age groups, and in which direction, the age differences emerge (**Study II**);
- To explore the role of daily tiredness, age, and personality traits as sources of systematic bias in retrospective ratings of the momentary experience of four emotions: fear, sadness, anger, and happiness (**Study III**);
- To examine whether affective variability predicts state- and trait-level tiredness, taking into account other possible influences (i.e., mean levels of emotions, personality traits) (**Study IV**);
- To analyze how anger expression (anger-in vs. anger-out) is influenced by co-occurring emotions (fear, sadness, happiness, irritation, surprise, contempt, disgust, and disappointment), personality traits, and their interaction (**Study V**).

1.2 Experience and Expression of Emotions

1.2.1 The Concept of Emotions

Despite decades of research in the field, there is ongoing scientific debate about the nature and expression of emotions. How do emotions shape our everyday living? What are the main factors behind individual differences in the emotional lives of people? These are some of the guiding questions behind research on individual differences in emotions. Furthermore, some basic questions about the nature of the links between personality traits and emotions have yet to be fully explored. How do emotions fit into the personality framework? What patterns of variability in emotions exist and how can we interpret emotional variability? What is the interplay between the experience and expression of emotions, on the one hand, and basic personality traits, on the other? To what extent can daily tiredness be explained by fluctuations in affect? The current thesis aims to find answers to these questions as a vital bridge between the theoretical concepts of emotions and personality through two experimental studies.

Early theories of emotions were rather incomplete because they described only one aspect (e.g., physiology) or process (e.g., expression) of emotions. For example, according to William James (1884), emotion expressions were not the aftereffects of felt emotions, but the bodily reaction itself (e.g., smile) produced

the emotion (i.e., happiness). It is recognized in most current theoretical approaches that emotion is an umbrella term for a complex set of processes, which have many components. Most contemporary theories of emotion define emotions as processes, rather than states. Emotions are defined via a prototypical emotion episode consisting of different components: a cognitive (appraisal), motivational (action tendency), somatic (physiological), motor (expression), and a feeling (subjective experience) component (Bossyt, Moors, & Houwer, 2014). Emotion is not an isolated episode, but a chain of events involving a number of subsystems or components. One of these components, for example, is evaluation of the environment and the person–environment interaction. One of the basic premises of a group of theoretical approaches united under the title of appraisal theories is that emotions are adaptive responses which reflect appraisals of features of the environment that are significant for the organism’s well-being. The emotional process also includes a motivational component with action tendencies or other forms of action readiness, a component with peripheral physiological responses, and a motor component with respective expressive behavior (Scherer, Schorr & Johnstone, 2001; Moors, Ellsworth, Scherer & Frijda, 2013). At the higher level of conceptualization, the emotion categories are perceived via more general dimensions of valence and arousal as most common underlying affective dimensions (see Fontaine, Scherer, & Soriano, 2013, for a review). In addition, also the categories of potency-control and unpredictability are added as necessary for differentiate between emotions and explain major sources of variation in emotion domain (Fontaine, Scherer, Roesch, & Ellsworth, 2007). It is argued that dimensional and categorical emotion frameworks are compatible with each other, and the classification of perceived emotions into discrete categories may rely on perception of more general dimensions (Izard, 2007; Mehu & Scherer, 2015). While emotion researchers have not yet reached agreement about the details, number, or exact sequence of the emotion process, they agree on the main principles (Frijda, 2007; Moors, 2009). It is also argued that emotions differ from moods, as they have a short duration, high intensity, and are usually directed to a specific target (Moors, 2009).

In a wider sense, this dissertation relies on affect program theory (see also Moors, 2009), which is based on the works of Ekman (1992), Izard (1977), and Panksepp (1998; 2000). The theory maintains that basic emotions have unique neural circuits that have evolved with a specific adaptive function, and these circuits are triggered when receiving specific input (stimulus), generating a specific action tendency, response, and emotional experience. The main evolutionary function of emotions is to activate a decision-making system, which also provides information about the significance of the stimulus that one is confronted with.

Emotions are evolutionary determined in order to facilitate rapid judgements and behavioral choices, this claim is supported by findings that basic emotions are experienced, expressed, and also recognized in a same way across cultures (Ekman, 1992; LeDoux, 2000). Emotions, which are considered to be basic or most fundamental are: happiness, sadness, fear, disgust, surprise, and anger, as

well as perhaps contempt (Ekman, 1992; Tooby & Cosmides, 2001). In order to demonstrate the innate nature of basic emotions, Matsumoto and Willingham (2006; 2009) studied the spontaneous expressions of blind athletes and found that the expressions of winners and losers were similar for sighted and blind competitors. This means that the production of facial expressions of emotion originate from an evolved response system.

In addition, there is preliminary evidence that other emotions may also qualify as basic emotions, including embarrassment (Keltner & Buswell, 1997) and pride (Tracy & Robins, 2004). Panksepp (1998, 2011) provided a different set of primal emotions, based on emotional circuitries. Basic emotions are argued to have a unique structure of components – i.e., facial expression (Ekman, 1984), neural and physiological activation pattern (Ekman, Levenson, & Friesen, 1983; Panksepp, 2000), appraisal pattern (Roseman, 1991), action tendency (Frijda, 1986), and experiential quality (Oatley & Johnson-Laird, 1987). Also, each emotional experience has a quantity (i.e., intensity) and a quality (i.e., a specific emotion, such as fear or anger) (Moors, 2009).

It is argued that, in addition to basic emotions, there are also other more cognitively complex, socially situated emotions, such as guilt, shame, embarrassment, disappointment, and envy, that develop during socialization as a function of a blending of the basic emotions (Parkinson, Fisher, & Manstead, 2005). It is argued that these social and self-conscious emotions emerge when emotions are linked with cognitions and mixed with other emotions experienced in specific situations. For example, embarrassment is defined as fear together with appraised negative attention from others (Johnson-Laird & Oatley, 2000). In the current thesis, disappointment and irritation are also included (**Study V**) as secondary emotions.

There is still ongoing discussion over whether basic emotions have their own “fingerprints,” that is, distinctly recognizable physiological or expressional signatures (e.g., Barrett, 2017). It is argued that, rather than the emotions themselves, it is the component processes of emotions that are biologically based (Orthonoy & Turner, 1990). The main criticisms relate to evidence from cross-cultural studies of facial expression recognition – it is argued that the use of forced-choice tasks may artificially boost the level of emotion recognition (Barrett, 2017; Russell, 1994). Barrett (2017) also shows that there is a great amount of variation both within and across people and cultures in the experience and expression of emotion. Recent research has also highlighted the importance of considering the influence of variability and individual differences in emotions as a function of personality (Montag & Panksepp, 2017). To sum up, there is considerable research evidence supporting the concept of basic emotions and non-basic, more social emotions, whereas the exact number and nature of both still differs according to theoretical perspective. There is growing interest in variability and individual differences in the experiencing and expressing of emotions. A better understanding of emotions in everyday contexts is tied to important life outcomes within the domains of welfare and health behavior (Bibby & Ferguson, 2011).

1.2.2 Social Communication of Emotions

Emotions can also be viewed as social phenomena, where interpersonal interactions are the basic stimuli for both emotional experiences and perception. The expression and recognition of emotions has been more the domain of social psychology, as the tasks involved rely on social communication. During an interaction, emotions are experienced and expressed, with simultaneous monitoring and interpreting of the emotions of others. Making inferences about others' states, traits, attitudes, intentions, and other characteristics is one of the most ubiquitous activities of daily life, and, indeed, a cornerstone of social interactions. These inferences about other people may or may not be an accurate reflection of what the communication partner is really feeling or thinking. Accurate interpersonal understanding has been found to be related to relational well-being (Cohen, Schulz, Liu, Halassa, & Waldinger, 2015). Therefore, emotion expression has a specific role in portraying and communicating the meaning of information in social interactions.

Facial emotion expressions as non-verbal signals, have a major part in interpersonal communication, together with spoken language. The recognition of facial emotions seems to be universal or near-universal across cultures and is also related to various psychiatric conditions, with decreased emotion recognition skills being characteristic of autism, social phobia, borderline personality disorder, and schizophrenia (van Dijke, van't Wout, Ford, & Aleman, 2016). Patients with depression, furthermore, tend to have a negativity bias in assessing facial emotion expressions (Punkanen, Eerola, & Erkkilä, 2011). It has been demonstrated that emotion experience and facial expression are strongly linked (Rosenberg & Ekman, 1994; Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). Facial movements that convey emotional meaning carry a range of information within social contexts, revealing details about what the communication partner is thinking and feeling. The scientific study of emotion expression dates back to the influential work of Darwin (1872/1998), who aimed to answer the question of how particular emotions are linked to specific facial morphology. He attributed the expression-emotion associations he found to adaptive and communicative functions for dealing with environmental problems. Contemporary research suggests that discrete facial expressions of emotion (1) are linked with internal states; (2) occur universally across emotion-eliciting situations; (3) are rated universally and discretely; (4) have important social functions; and (5) co-vary with other parts of the emotion system, such as physiological processes and specific actions (Matsumoto, Keltner, Shiota, O'Sullivan, & Frank, 2008). Similar to research in facial emotion expressions, there is also a solid amount of evidence indicating that specific vocal acoustic features are associated with the expression of emotions, and listeners can reliably interpret emotion-related arousal from vocal expressions (Scherer 1986, 1989, 2003; Banse & Scherer, 1996; see review by Johnstone & Scherer, 2000). This means that there is a clear link between a particular internal emotional state and the vocal communicative display of acoustic cues. The mean identification

rate of intended emotions is approximately 55%, being highest for anger, fear, sadness, and happiness (see a review by Johnstone & Scherer, 2000). It is argued that the primary functions of vocal emotion expressions are not just the signaling of the experience, but also influencing the listener's emotions and behavior (Bachorowski & Owren, 2008; Russell, Bachorowski, & Fernandez-Dols, 2003). Thus, vocal expressions of emotion can be seen as important tools for communication as well as social influence.

Emotional experience often unfolds as a reaction to the actions of other people, which usually also have an impact at the interpersonal level – someone does something that offends you and, as a result, you get angry, you react angrily, and the other person gets angry in return. Thus, although emotions are considered to be private intrapsychic experiences, they are also evidently connected to interpersonal processes. Other people affect our emotions, and are, in turn, affected by these themselves – emotions, thus, function both as causes and effects. It is argued that the key function of experienced emotions is to contribute toward interpersonal effect, being a part of the continual analyzing of social relations (Parkinson, 1995, 1996). For example, sadness leads to a seeking of social support, whereas anger draws attention to an unfairness in social relationships that needs to be changed for the sake of individual well-being.

The recognition and regulation of emotions have also been considered as an interactive skill components within the broader context of emotional and social competence (Lerner & Arsenio, 2000). Emotional competence is defined as the capacity to respond emotionally in order to accomplish adaptive goals in social situations that provoke emotions (Saarni, 1999; Thompson, 1994). Emotional processes are argued to serve motivational, communicative, and regulatory functions in developing social competence in order to successfully navigate one's emotionality in social situations (Lerner & Arsenio, 2000). The control and regulation of one's emotions, as well as the emotions of others, have also been argued to form a part of the general factor of emotional intelligence, with emotion perception as a lower-level skill and emotion management as a higher-level process (Mayer, Caruso, & Salovey, 1999; Mayer, Salovey & Caruso 2000). Those who possess greater emotional intelligence are argued to monitor and regulate both positive and negative emotions in order to reach their desired social outcomes. Thus, emotionally intelligent behavior refers to the recognition and regulation of emotions using internal and external cues in accordance with behavioral, experiential, and physiological response tendencies (Barrett & Gross, 2001). There is an ongoing debate on whether internal feedback from postural and gestural movements induced by external stimuli produces the corresponding emotional experience. This idea dates back to James's theory (1884) suggesting that bodily changes lead to the experience of emotion, meaning that a posed smile, for example, induces a feeling of happiness. In a similar way, Neumann and Starck (2000) found that listening to a happy or sad voice induces the corresponding emotions, without the need to physically mimic the sound. However, a recent replication study failed to find evidence that

producing a facial expression results in measurable changes in emotion states (Wagenmakers et al., 2016). Thus, although the facial feedback hypothesis is frequently presented in textbooks as a key point of connection between emotion expression and experience, there are methodological difficulties in measuring the effect of the phenomenon. Furthermore, in real life, there is additional contextual information that also influences the emotion contagion between communication partners (i.e., exposure to a shared situation). One is happier when smiling because the communication partner usually smiles back: this interpretation, together with the intrapsychic state, leads to shared emotions in social communication.

During the emotion communication process, emotion encoding and decoding take place (Noller, 2006). Encoding involves the expression of experienced emotions, whereas decoding involves the detection of emotions expressed by the communication partner. The study of experience and expression of emotions is by necessity interdisciplinary, and although during the last decades important progress has been made in understanding the emotion processes, a number of aspects about emotion experience and communication remain unclear. The first, which is addressed by the current thesis, pertains to encoding – how is emotion expression (in case of anger) influenced by the interaction between momentary co-occurring emotions and underlying personality traits? Other questions, also addressed in current thesis, pertain to decoding – how accurate are people at assessing their emotion decoding ability (i.e., mindreading), which individual differences (i.e., personality, age) affect the emotion recognition accuracy? Understanding individual differences in emotion processes provides further evidence about the way we experience, perceive, express, and remember emotions.

1.2.3 Individual Differences in the Experience, Expression, and Recognition of Emotions

There is growing interest in the relationship between emotions and personality, which has led to integration in emotion and personality research (Allik & Realo, 1997). The extent to which certain stimuli actually elicit particular emotions may strongly depend on personality as well as situational factors. Both emotion and personality research aim to explain psychological differences across individuals and situations. One focal area is individual differences in the recognition, experience, and expression of emotions, and the degree to which these differences can be explained by personality traits. Reisenzein and Weber (2009) consider the emotion system to be a subsystem or component of personality that exists in some form in nearly all personality taxonomies. According to the Five-Factor Model of personality, there are five basic and relatively independent personality traits, usually labeled as Neuroticism, Extraversion, Openness to experience (Openness), Agreeableness, and Conscientiousness (McCrae & Costa, 1999). Four of these (Neuroticism, Extraversion, Agreeableness, and

Openness) have been suggested to be related to emotional dispositions of the individual (Pytlik Zillig, Hemenover, & Dienstbier, 2002; Watson, Clark & Tellegen, 1988). Neuroticism is considered the propensity to experience negative emotions; Extraversion entails a tendency toward positive affect; Agreeableness includes a friendly emotional disposition toward other people (i.e., being less anger-prone and more empathic); and Openness entails a capacity to experience esthetic feelings (Reisenzein & Weber, 2009). The goal of the present thesis is to shed light on these topics in order to provide new insight and build a better foundation for future research examining the relationship between personality traits and emotions.

1.3 Mindreading and emotion recognition

People seek to understand the psychological characteristics (i.e., emotional states, personality traits, abilities, etc.) of others during the social process of getting to know one another. Empathy in a wider sense means understanding and responding to the mental states of others (Blair, 2005). Empathic accuracy is defined as the perceiver's ability to correctly identify the states and traits of other people (Ickes, 1997), and can be considered an indicator of social competence (Stump, Ratliff, Wu & Hawley, 2009). It is argued that the accurate perception of states (i.e., current feelings and behavioral goals) is necessary for the accurate perception of enduring dispositions (Ickes, 1993). Although accurate judgment of communication partners is critical to social interaction, there is evidence that people are not good at assessing their own ability to understand others. For example, a study by Ickes, Stinson, Bissonnette, and Garcia (1990) demonstrated a lack of metaknowledge about empathic accuracy, measured using the dyadic interaction paradigm, in that correlations between self-reported empathy and empathic skills were missing or negative. The research on empathic accuracy has mainly operationalized this as a correspondence between what targets report expressing and what perceivers infer (Ickes et al., 1990) in an attempt to understand what kind of informational cues from targets (i.e., facial expression or semantic information) and what dispositions of perceivers affect the accuracy of judgments.

The main purpose of **Study I** was to explore the link between self-reported mindreading ability and actual performance in emotion recognition tasks as an indicator of empathic accuracy skills. Previous research has suggested that people are highly attentive to their abilities and think that they have quite a realistic sense of their strengths and weaknesses (Kruger & Dunning, 1999). Still, there is a body of literature reporting that people have rather poor insight into their own skills and abilities: when self-assessment is compared with real performance, there is only a modest correlation between perception and reality (Cricher & Dunning, 2009; Dunning, Heath, & Suls, 2004; Mabe & West, 1982). It has been shown that self-views about specific task performance are most strongly influenced by more global self-views (i.e., self-esteem) (Ehrlinger & Dunning, 2003).

Recognition of the emotions of a communication partner is a basic building block of social competence, and it has been shown that discrimination of facial displays of different emotions takes place quickly (Tracy & Robins, 2008), with special vigilance for perceiving potentially threatening and angry emotions in others (Blagrove & Watson, 2010; Eastwood, Smilek, & Merikle, 2001; Hansen & Hansen, 1988; Mogg & Bradley, 1999). Thus, in general, humans are usually skilled in emotion recognition. In **Study I**, the structure of self-rated mindreading ability was explored – whether self-rated competence in judging another person’s personality belongs to the same category as his or her opinion about the ability to read another person’s thoughts and emotions. It has been argued that personality is revealed through social behavior and can thus be readily understood by other people (Funder & Colvin, 1997). In addition, mindreading accuracy is conceptualized as the ability to infer someone’s mental state (e.g., emotions), behavior, roles, and identity (Davis & Kraus, 1997). The ability to recognize facial and vocal expressions of emotions has firm scientific evidence (Ekman, 1994), and more recent studies have extended this line of research, suggesting that the ability to recognize human emotions can also be applied to domesticated animals (Albuquerque, Guo, Wilkinson, Savalli, Otta, & Mills, 2016). Thus, the ability to make inferences about the emotions of a communication partner has strong evolutionary roots (Darwin, 1872). In addition to mindreading abilities, people possess the skill and habit of metacognition – defined as awareness and monitoring of one’s thoughts and task performance (Flavell, 1979). In order to explore the structure of self-rated mindreading abilities, a Mind-Reading Belief Scale (MBS) was created and validated in a group of 1,802 participants. It was demonstrated, in **Study I**, that self-assessment of four thematically organized groups of mindreading beliefs – the ability to infer others’ (1) personality traits, (2) mental states, (3) roles, identity, and status, and (4) future behavior – concentrate around one single generalized belief. As a result, the final MBS scale was developed, consisting of 8 items. Next, the relationship between mindreading belief and actual mindreading performance was explored. The results provided further evidence that self-reported measurements of mindreading skills are not closely related to actual mindreading skills. This also means that the hugely popular concept of emotional intelligence is more elusive than was originally thought (cf. Davies, Stan- kov, & Roberts, 1998). Thus, **Study I** made an important contribution to the mounting evidence that people lack insight into their mindreading abilities, which also imposes significant limitations on the popular construct of emotional intelligence.

1.4 Age and emotion recognition

Previous studies have found a specific deficit in the facial judgment accuracy of negative emotions at advanced ages (Calder et al., 2003; Isaacowitz et al., 2007; McDowell, Harrison, & Demaree, 1994; Moreno, Borod, Welkowitz, & Alpert, 1993; Phillips, MacLean, & Allen, 2002; Ruffman, Henry, Livingstone, & Phillips, 2008; Sullivan & Ruffman, 2004; Suzuki, Hoshino, Shigemasa, & Kawamura, 2007), contradictory to the widespread belief that overall emotional competence improves with age as a result of life-experience. It is suggested that certain negative emotions such as fear, sadness (Calder et al., 2003; Keightley et al., 2006; Orgeta & Phillips, 2008; Ruffman et al., 2008; Wong et al., 2005), and anger (Calder et al., 2003; Orgeta & Phillips, 2008; Phillips et al., 2002; Ruffman et al., 2008; Sullivan & Ruffman, 2004a; Wong et al., 2005) are recognized more poorly by older people. On the other hand, for the recognition of facial displays of happiness and surprise, there is evidence of age-equivalence (Murphy & Isaacowitz, 2010; Orgeta & Phillips, 2008; Phillips et al., 2002; Sullivan & Ruffman, 2004), or even age-advantage (Murphy, Lehrfeld, & Isaacowitz, 2010). Beyond facial expressions, older adults have also been found to be less accurate at identifying emotional vocal expressions (Brosigole & Weisman, 1995; Paulmann, Pell, & Kotz, 2008; Ryan, Murray, & Ruffman, 2010).

The aim of **Study II** was to examine for which emotions, between which age groups, and in which direction age-differences in emotion recognition emerge, as well as identify the role of the personality traits of the perceiver. The most distinctive age-related difference was found for a group of negative emotions, sadness in particular, but also anger, to a lesser degree. In addition, it was demonstrated that the first differences in emotion recognition already emerge in a person's 30s. An analysis of the pattern of errors made during a forced-choice task of emotion recognition revealed that, although older age groups made more mistakes, the structure of response patterns does not differ between age groups. Thus, confusion matrices did not show a preference for positive or neutral response choices in older adults. Importantly, it was also demonstrated that the Big Five personality traits do not mediate emotion recognition accuracy, but Openness and Conscientiousness make an independent contribution – thus, people who are more determined to achieve their objectives and people who are more unconventional in their thinking are also better at detecting cues of emotions. The main conclusion of **Study II** was that trajectories of cross-sectional age-differences in emotion recognition accuracy differ among emotions: while recognition of facial contempt increased until 60 years of age, recognition of sadness and anger decreased progressively across age groups.

There are several reasons suggested for this age effect, based on explanations related to changes in the brain or to motivation, general cognitive decline, different gaze patterns, and methodological limitations.

The brain-based explanation suggests that structural and functional changes in the neural substrates are behind this age-related decline in emotion recognition (Adolphs & Tranel, 2004; Sato, Kochiyama, Yoshikawa, Naito, &

Matsumura, 2004). There is initial evidence that distinct neural components might be related to specific emotions, irrespective of modality; the hippocampus, for example, is activated when recognizing anger and fear (Britton, Taylor, Sudheimer, & Liberzon, 2006). Age differences in recognizing negative emotions have also been explained via motivational changes accompanying advancing age, as suggested by socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999). Socioemotional selectivity theory argues that prioritization of positive emotional goals leads to an age-related positivity effect, meaning that older adults prefer positive information and, thus, ignore negative emotions. The results of **Study II** do not seem to support socioemotional selectivity theory, as a shift toward more a positive outlook by preferring neutral or positive answers was not found. However, Isaacowitz and Stanley (2011) point out that most of the studies about the link between emotion recognition and age are rather descriptive in nature.

One mechanism suggested to lie behind the age-related emotion recognition decline is general age-related cognitive decline, which is also reflected in slower reaction times, declines in executive functioning, and other domains (Bäckman, Small, & Wahlin, 2001; Salthouse, 1996). As suggested in **Study II**, there is no evidence that the recognition of sadness or anger, either in the vocal or facial domain, is a more complicated cognitive task than the recognition of fear or disgust. Studies have yielded inconsistent findings, but the general conclusion is that age-related cognitive changes cannot fully account for age differences in emotion recognition (Keightley et al., 2006; Sullivan & Ruffman, 2004b), but are nevertheless significant in explaining the age-related decline in recognizing specific emotions, for example sadness (MacPherson, Phillips, & Delia Sala, 2002).

Studies using observational eye tracking have suggested that older adults make errors in facial emotion recognition by focusing too little on the top half of faces, with more gaze fixation on the mouth region (Wong et al., 2005; Sullivan et al., 2007). When recognizing facial emotion displays, the top of the face is more important for identifying sadness, fear, and anger, whereas the lower half of the face is an important indicator of disgust and happiness (Calder, Young, Keane, & Dean, 2000). Again, age differences in gaze patterns when looking at faces cannot fully account for differences in facial emotion recognition accuracy (Murphy & Isaacowitz, 2010).

Isaacowitz and Stanley (2011) argue that the documented age-related decline in emotion recognition might not reflect the social competence of older adults in everyday social relationships due to methodological limitations, as emotion recognition tasks to date may not measure the mechanisms used in real-life settings. On the other hand, a recent study by Schlegel and colleagues (2017) also reported age differences by using more ecologically valid emotion recognition test containing dynamic and multimodal emotion portrayals. Thus, although there is consensus that age-related differences in emotion recognition exist, the mechanisms behind this effect are not yet clearly delineated, particularly in relation to the transaction between the target, perceiver, and the associated cues.

1.5 Retrospective emotion ratings and personality

Reflecting on one's previously experienced emotions is important in making sense of one's life (Thomas & Diener, 1990). Memories about experienced emotions are integral to one's life-experience as well as in daily life – affect recall has a significant impact on one's behavior by guiding decision-making and planning (Fredrickson, 2000; Levine, Lench, & Safer, 2009; Robinson & Clore, 2002). It has been shown that emotionally arousing events are stored more strongly in memory (Kensinger, 2004). Although both scientific research and clinical assessment of experienced affect often relies on retrospective emotion ratings, little is known about how these deviate from momentary assessments, and what the role of personality traits in this assessment is. I now, therefore, turn to the question of how personality traits may influence emotional retrospection.

Retrospective reports can be expected to be influenced by general affective tendencies arising from one's personality traits, as previous research has found that people tend to exaggerate past emotional experiences (Hedges, Jandorf, & Stone, 1985; Kardum & Daskijević, 2001; Parkinson, Briner, Reynolds, & Totterdell, 1995; Thomas & Diener, 1990; Wirtz et al., 2003). Robinson and Clore (2002) explain this discrepancy between concurrent and retrospective affect by the need to mentally reconstruct the times when respective emotions were experienced. In addition, it is suggested that the retrospective exaggeration of emotional experiences may have adaptive value (Schwarz, 2007; Levine et al., 2009). Affective experiences tend to fade over time, and turn from episodic memories into semantic knowledge, as suggested by Robinson and Clore (2002).

The Big Five personality traits, especially Neuroticism and Extraversion, have been shown to be related to general negative and positive affectivity, respectively (Watson & Clark, 1992). The nature of Neuroticism is high stress-reactivity and proneness to negative emotions such as anxiety and worry, and Extraversion can be seen as a tendency to feel energetic and sociable, with high positive arousal (Costa & McCrae, 1989; John, Donahue, & Kentle, 1991). Thus, it can be expected that a person with typical attributes of someone high in Neuroticism may recall more negative affect when thinking about emotional events experienced in the past.

The main aim of **Study III** was to explore the individual differences in systematic biases in the retrospective vs. momentary emotion ratings of sadness, fear, happiness, and anger. The study was based on experience sampling data gathered across two weeks on 7 randomly determined occasions per day. The results indicated that age and daily tiredness impact the retrospective emotion ratings given to experienced emotions at the end of the day. More long-term retrospective ratings of experienced emotions are influenced by the Big Five personality traits. The results support the Accessibility Model of Emotional Self-Report (Robinson & Clore, 2002), which differentiates between levels of remembering one's emotions, based on the accessibility principle of amount of time passed (i.e., one day vs. weeks), arguing that short-term judgments are

influenced more by episodic memory biases, such as current affective state, whereas longer-term judgments are influenced more by semantic knowledge (beliefs about self and one's personality traits). **Study III** demonstrated, through experience sampling data, that Neuroticism is linked to retrospective exaggeration of negative affect, and Extraversion is linked to retrospective exaggeration of positive affect. To date, only two studies, limited to university samples, have investigated the associations between personality traits and retrospective emotion reports (Barrett, 1997; Safer & Keuler, 2002). In addition, **Study III** also investigated the personality associations with momentary-retrospective report discrepancies by using specific emotion items, whereas previous studies have used broader positive and negative affect categories (Barrett, 1997; Safer & Keuler, 2002). More recently, Lay and colleagues (2016) also demonstrated the retrospective emotion exaggeration effects of Neuroticism and Extraversion by distinguishing between high and low arousal affect. Previous studies have relied on just one retrospective report per participant (Barrett, 1997; Hedges et al., 1985; Kahneman, 2000; Parkinson et al., 1995; Safer & Keuler, 2002). **Study III**, however, used repeated daily assessments over a period 14 days to capture the time course of memory of experienced emotions by comparing one day with two week assessments. Personality associations with memories about emotional experiences were stronger for the longer recall period. Robinson and Clore (2002) suggest that, as time passes, memories about specific affective experiences become based more on general self-knowledge to compensate for the fading of memories. Thus, personality links with memories about emotional experiences tend to be stronger when individuals are retrieving emotions over a longer period. The negative association between Neuroticism and a retrospective exaggeration of fear and sadness, and the link between Extraversion and a retrospective enhancement of the feeling of happiness as reported in **Study III** have been supported by a more recent study by Lay and colleagues (2016). This suggests that differences in personality traits also express themselves in the way people see their past emotional experiences. In addition, discrepancies between retrospective and concurrent reports can be partly explained by personality differences. **Study III** provided further evidence about the link between tiredness and affective experiences, by demonstrating that tiredness felt at the end of the day leads to an enhancement of the negative emotions of fear, sadness, and anger, and a reduction in happiness. **Study III** also demonstrated that the age-related positivity effect in emotion experience (Carstensen et al., 2011) could be partially explained by a retrospective reduction in the intensity of experienced emotions by way of a reactive emotion regulation mechanism. Taken together, the results of **Study III** provided further evidence that people with high Neuroticism have a bias toward the retrieval of negative emotions, whereas people high in Extraversion are more likely to retrieve more emotions that are positive. It is argued that retrospective emotion reports reveal more about personality and belief structures than concurrent affect reports (Robinson & Clore, 2002). However, despite the reported discrepancies, retrospective reports of emotions experienced in the past are still

quite accurate, as has also been concluded in other studies (Lay, et al., 2016; Kardum & Daskijević, 2001). Emotional memories are important; they shape future behaviors and choices about aims that are worth pursuing and those that are better to avoid. Personality traits have a significant role to play in the process of reconstructing emotional experiences. In general, emotionally meaningful experiences are central to one's identity and self-knowledge.

1.6 Emotional Variability

During last decades, the study of intraindividual variability has made significant contribution to understand behavior in a wide variety of domains. For example, heart rate variability (HRV) has been found to be related to different aspects of well-being and social cognition, people with higher HRV are more accurate in emotion recognition tasks, whereas reduced HRV is associated with psychiatric disorders, alcohol dependence, and several somatic diseases like chronic pain (Geisler, Vennevald, Kubiak, & Weber, 2010; Kemp, Quintana, Kuhnert, Griffiths, Hickie, & Guastella, 2012; Quintana, Guastella, Outhred, Hickie, & Kemp, 2012; Tracy et al., 2016.). Within-person variability in affect is an area of growing attention in empirical investigation (Barrett, 2017). It is important to understand which changes are more likely to take place in experienced emotions due to personality qualities and other person-related variables (e.g., age), and which changes take place as a response to idiosyncratic events, i.e., how and why people differ in these fluctuations. Variations in the intensity and duration of emotional experiences provide important information about a person's mental health and wellbeing. It has been found that recognizing and understanding one's feelings can help individuals cope more effectively with their emotional experiences (Pond et al., 2012), whereas the ability to regulate one's emotions by suppressing or enhancing emotion expression predicts lesser distress in the longer term (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). On the other hand, higher intra-individual variability in negative emotions has been found to be related to higher distress, depression, and poorer physical health, both concurrently and prospectively (Eid & Diener, 1999; Kuppens, Van Mechelen, Nezlek, Dossche, & Timmermans, 2007; Ram, Gerstorf, Lindenberger, & Smith, 2009). Higher variability in negative emotions has also been found to be a stable individual difference characteristic over periods from months to years (Eid & Diener, 1999; Hardy & Segerstom, 2016; Röcke, Li, & Smith, 2009). In addition, higher variability in happiness has been linked to higher psychological distress, but only during the concurrent life period (Gruber, Kogan, Quoidbach, & Mauss, 2013; Hardy & Segerstom, 2016). Higher variability in affect has been linked to higher Neuroticism, and lower Agreeableness and Extraversion (Kuppens et al., 2007; Timmermans, Van Mechelen, & Kuppens, 2010). Higher Openness has also been associated with higher affective variability (Velting & Liebert, 1997). Wilson, Thompson, and Vazire (2016) found that within-person variance in personality traits is mostly

affected by fluctuations in positive and negative affect, and for some personality traits, situational variables also have a significant impact. Ching et al. (2014) found positive affect to co-vary positively with Extraversion, Agreeableness, Openness, and Conscientiousness, and negatively with Neuroticism, whereas negative affect co-varied positively with Neuroticism and negatively with Extraversion, Agreeableness, and Conscientiousness. The emotional experiences of older people have been found to be less variable across time (Röcke, Li, & Smith, 2009), especially in regard to negative emotions (Chow, Hamagani, & Nesselroade, 2007).

Daily tiredness is a common phenomenon and refers to a physical or mental state developed as a response to life strain, when one feels the need for rest or sleep. It is reported that people may feel the presence of tiredness up to a 67% of time (Schneider & Stone, 2014). Tiredness is also conceptualized as an indicator of the energetic arousal dimension, being one of three basic dimensions of mood (Wilhelm & Schoebi, 2007). There are several indicators of life quality linked to tiredness. For example, life satisfaction experienced during the day is influenced by sleep quality and tiredness, among other factors (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004; Perkinson-Gloor, Lemola, & Grob, 2013). However, there is a need for studies using an experimental design in order to understand state- and trait-level tiredness (Lievesley, Rimes & Chalder, 2014). Studies of affective variability have used different ranges of time points, with some measurements of up to 50, but the majority of studies employing 5-10, measurement occasions (Eid & Diener, 1999; Kuppens et al., 2007; Ram, et al., 2011; Hardy & Segerstom, 2016). Within-person trait variability has been argued to reflect the dynamics of social-cognitive processes in engaging with various contexts (e.g., mood, goals, and roles) (Fleeson & Jayawickreme, 2015). The main aim of **Study IV** was to explore the association between intraindividual variability in emotions and daily tiredness. More specifically, **Study IV** explored tiredness both at state and trait levels, with the purpose of clarifying the role of momentary feelings of tiredness in long-term tiredness ratings, and included different momentary (e.g., emotional variability, mean levels of emotions) and trait-level (e.g., personality traits, age) moderating variables. The results of **Study IV** demonstrated that intraindividual variability in emotions is relatively stable across time and situations, and plays an important role in predicting subjective feeling of tiredness. The results of **Study IV** also demonstrated that emotional variability is a homogeneous characteristic across emotion categories, meaning that when one's happiness fluctuates greatly across time, it is reasonable to assume that the pattern of variability is similar for other emotions. Also, emotional variability was found to be quite stable over a period of two weeks, suggesting that the tendency to experience emotions at very different levels of intensity vs. experiencing them in quite a consistent manner, can be considered a stable individual difference characteristic. People often expect that achieving a more predictable life will result in predictable emotional states – **Study IV**, however, suggests that emotional experiences tend to be the same over several weeks, and variability over even longer periods of time is an

important subject for further studies. One of the most important findings of **Study IV** was that a significant amount of tiredness can be explained by mean emotional states and emotional variability. The more emotions fluctuate over time, the more tiredness is felt momentarily as well as over longer time periods.

Trait-level factors also influence the experience of tiredness, with people high in Openness reporting less, and more extraverted people more, momentary tiredness. On the other hand, over longer time periods, more neurotic and more agreeable people report more tiredness, and more conscientious people less tiredness. In addition, there is an interaction between emotional variability and personality traits in predicting tiredness, meaning that the influence of emotional variability on tiredness depends on personality traits. Regarding the link between tiredness and age, it was found that, on average, older people are less tired, but, when reporting more emotional variability, older people also tend to report more tiredness. This suggests that superior emotional well-being in older adults is achieved by a reduced exposure to stressful events. **Study IV** made a significant contribution to the literature about associations between personality traits and state-level emotional experiences, as previous research had largely focused on the links between Extraversion and positive affect, and Neuroticism and negative affect.

Taken together, the results of **Study IV** made a contribution to the literature about the connection between tiredness and emotional variability, demonstrating that emotional variability is a separate predictor of the feeling of tiredness.

1.7 The importance of co-occurring emotions and personality traits in anger expression

People use a broad range of emotion regulation strategies to modulate their emotion expressions in order to work toward their short- and long-term goals (Gross, 2002; Gross & Thompson, 2007; Tamir, 2011). Research on anger has distinguished between two coping styles: anger-out (showing overt anger expression) and anger-in (suppressing overt anger expression) (Spielberger, 1999). This means that emotional reactions can be regulated in order to magnify or minimize the emotional loading of the situation. Expressing anger may serve different communicative effects, depending on the context and its significance. A person can express anger as an antagonistic reaction to show that he or she deserves more respect and to restore social status. There is evidence that social sharing reduces the intensity of experienced anger (Brans, van Mechelen, Rimé, & Verdyn, 2014; Frattaroli, 2006). However, depending on the situation, reparatory communicative behavior may mean the suppression of anger so as not to damage social status (Parkinson et al., 2005). The majority of researchers emphasize the role of a subjective appraisal of the situation as the most important factor in the elicitation of an emotion (Caspi & Roberts, 2001; Frijda, 1988; Smith & Ellsworth, 1985; Smith & Lazarus, 1993). Anger involves clear inter-

personal factors, such as the action tendencies of antagonism or retaliation – the feeling of injustice is frequently accompanied by revenge motivation. If someone has insulted us by doing (or not doing) something, the initial reaction is to do it back somehow. But anger can also rise as a result of simple physical or social resistance, without any blame appraisals – this explains why anger is frequently directed at non-human subjects (Parkinson et al., 2005). Thus, both the experience and expression of anger depend on the intrapsychic as well as interpersonal context. Barret (2017) stresses the need to consider the great amount of variability even in the facial expressions of anger. In real-life situations, feelings are frequently experienced in a mixed way (Berrios, Totterdell & Kellett, 2015). The precise characteristics of each anger episode – how it evolves, when and how it is expressed – depend on both individual (i.e., personality) and situational factors (i.e., the status and group membership of the person one is angry with and the apparent reason for the angry feelings). Previous studies have shown that differentiating one’s current affect into discrete categories by answering the question “what emotions are these that I feel right now?”, reduces anger expression (Pond, et al., 2012).

It can be expected that trait-level dispositions direct the way state-level emotions influence behavior. **Study V** focuses on individual differences in the situational regulation of anger expression. Specifically, the role of co-occurring emotions in influencing anger expression, together with the interactive effects of the Big Five personality traits, was explored. In **Study V**, everyday anger expression was conceptualized as anger-in and anger-out reactions to experiencing the feeling of anger.

Anger-in behavior is also defined as the suppression of the anger experience. Gross (1998) defines expressive suppression as a response-focused emotion regulation strategy that targets only the behavioral component (e.g., expression). Expressive suppression is thus an attempt to hide the overt expression of an emotion without changing the event or appraisal behind the experience of a particular emotion (Gross, 1998; Gross & John, 2003; Gross & Levenson, 1997). Expressive suppression as an emotion regulation strategy interferes directly with the signaling of a person’s inner state to a communication partner, in order to attain her or his social goals (Campos, Walle, Dahl, & Main, 2011; McRae, Heller, John & Gross, 2011; Nezlek & Kuppens, 2008; Russell, Bachorowski, & Fernández-Dols, 2003). Although widely used in everyday life, the expressive suppression of emotions is associated with a broad range of negative psychological and social outcomes, such as decreased well-being and social support, and reduced intimacy and warmth in close relationships for the individuals themselves as well as their interaction partners (Butler et al., 2003; English & John, 2013; Gross & John, 2003; Impett et al., 2012; Srivastava, Tamir, McGonigal, John, & Gross, 2009; Tackman & Srivastava, 2016). The reason for the negative consequences of expression suppression is the incongruence in the emotion processes in how one feels vs. what one expresses (English & John, 2013). However, in some situations, emotion suppression may be adaptive for well-being (Bonanno et al., 2004; Le & Impett, 2013).

Campos and colleagues (2011) have stressed the need to measure emotion regulation processes in the context of actual social interaction. It has been found that the use of emotion suppression is quite variable across time, as people differ as much from themselves as they differ from each other in their use of emotion suppression (Nezlek & Kuppens, 2008). Thus, people differ from each other on their number of average emotion suppression incidents, and their use of emotion suppression episodes differs from their own average use of emotion suppression across situations. The use of emotion suppression has been linked to trait Extraversion, suggesting that more outgoing, energetic, enthusiastic and assertive people are less inhibited in emotion expression (Gross & John, 2003; English & John, 2013).

The results of **Study V** showed that the experience of anger is frequently accompanied by the simultaneous co-occurrence of other emotions, and the suppression of the experience of anger is buffered by sadness, surprise, disgust, disappointment, and irritation. Showing one's anger out is influenced by co-occurring fear, sadness, and disappointment.

We were also interested in the specific interaction patterns between personality traits and co-occurring emotions. The results of **Study V** indicated that there are particular interactive effects between the Big Five personality traits and specific emotions. It was revealed that, when anger is accompanied by surprise, less open people hold their anger back more, whereas more open people express anger more overtly. When anger is accompanied by disgust, less conscientious people do not suppress their anger. In addition, Conscientiousness significantly influences the way people deal with anger when it is accompanied by contempt. Contempt is an emotion that reflects a feeling of superiority over another person and emerges in situations of jealousy, greed, and rivalry (Izard, 1991). Thus, people who are very goal-focused (i.e., high Conscientiousness) tend to mask their contempt when felt together with anger, as these two emotions together have the potential to seriously harm social relations. People high in Neuroticism hold anger back less when it is accompanied by disgust, surprise, or irritation, whereas anger is expressed more when accompanied by contempt. The influence of Conscientiousness and co-occurring sadness has a similar influence on anger behavior. Thus, high Conscientiousness has an influence on anger behavior when anger is accompanied by disgust, contempt, or sadness. Neuroticism has an interaction with irritation; as can be expected, people higher in Neuroticism suppress anger less when they are also irritated, surprised, or disgusted at that moment. There are some similarities and some differences when the overt expression of anger is analyzed. Conscientiousness, again, displays different interactions with co-occurring emotions: people high in Conscientiousness display less anger when it is accompanied by irritation or disgust. The higher the Conscientiousness, the less the anger expression is influenced by the co-occurring irritation. Thus, Conscientiousness seems to allow better self-control in situations of anger and irritation. However, co-occurring disgust does not influence the behavior of people high in Conscientiousness, but makes less conscientious people express more anger. The

picture is different for Extraversion: the more extraverted one is, the more a co-occurring feeling of disgust will result in an expression of feelings of anger. Co-occurring contempt also makes more open people show less anger out, while more neurotic people tend to show more anger out in the case of co-occurring contempt. Interestingly, people high in Neuroticism do not show their anger out when the feeling of anger is accompanied by disgust, but do show more anger out when it is accompanied by surprise, sadness, or contempt.

The **Study V** extends previous research on the ways in which emotions co-occurring with anger, and their interactive effects, influence anger expression. The results of **Study V** showed that simultaneously co-occurring emotions buffering against anger-in behavior are happiness, surprise, disgust, and disappointment, whereas the anger-out reaction is influenced by fear, happiness, disappointment, and irritation. Regarding emotion regulation, **Study V** showed that there are specific interactive effects between momentary emotions and personality traits that lead either to the suppression or expression of anger. It means that, when a person feels anger together with other emotions, the anger behavior depends on the basic personality dispositions of that person. This conclusion is implicitly stated in Big Five personality theory, pointing to the need to explicitly explore the links between personality and co-occurring emotion in influencing anger behavior. For example, although individual differences in emotion experience and expression of anger are well-documented, the exact interactions between the momentary emotions and personality traits that influence anger behavior need further exploration. In this study, to provide new insights into individual differences in anger behavior, we examined the role of momentary emotion x personality mechanisms in explaining anger-in vs. anger-out reactions.

2. CONCLUSION

The results presented in the current thesis provide new information about emotion processes. An advanced understanding of emotion recognition, experience, and expression can be helpful in clarifying the exact nature of the emotion processes that influence everyday emotional management.

To sum up, the main conclusions of the dissertation are the following:

- People have a generalized view of their empathic assessment accuracy across the different domains of state-level emotions, trait-level dispositions (i.e., personality, identity, etc.), and the behavioral intentions of their communication partner. This self-rated empathic accuracy, however, is not related to actual mindreading skills, but is rather a reflection of one's personality traits. Actual mindreading skills measured as objective performance on emotion recognition and personality assessment are rather a reflection of one's cognitive abilities. Thus, although people are motivated to understand others, they often lack insight into their actual social competence (**Study I**).
- Despite greater life experience, the ability to recognize specific emotions seems to decline with age. The first signs of age differences in emotion recognition accuracy emerge already in the 30s, being most distinctive for the negative emotions of anger and sadness. The recognition of facial contempt, however, increases until 60 years of age. These changes in emotion perception cannot be explained by other possible mediators, such as age-related cognitive decline. Although age differences in emotion recognition accuracy are now well documented, there is still no clear consensus about the mechanisms behind this age effect (**Study II**).
- It is adaptive to mentally reconstruct one's emotional experience over time. Memories about experienced emotions of sadness, fear, happiness, and anger are systematically influenced by factors at both state and trait levels, depending on the period of time elapsed. Retrospective emotion ratings given at the end of the day are influenced by age and daily tiredness – while tiredness generally leads to an exaggeration of negative emotions, older people tend to view experienced emotions as less intense. Retrospective ratings over longer periods of time depend more on personality traits – Neuroticism is linked to retrospective exaggeration of negative emotions, and Extraversion is linked to retrospective exaggeration of positive emotions (**Study III**). Thus, as time passes, memories about experienced emotions are still accurate, but become more influenced by personality traits.
- Tiredness, as one of the most frequently reported mental and physiological states, is influenced by mean levels of experienced emotions as well as by emotional variability. The more one's emotions fluctuate over time, the more tiredness is felt momentarily as well as over longer

periods of time (**Study IV**). Thus, stability of both positive and negative emotions leads to less experience of tiredness.

- Despite increasing health concerns, older people generally report less tiredness, but when they have recently experienced more variable emotions, they report even more tiredness than younger people. This suggests that superior emotional well-being in older adults is achieved by reduced exposure to emotionally stressful situations (**Study IV**).
- Anger behavior is influenced by co-occurring emotions that are simultaneously elicited in situations. Anger, experienced together with disgust or sadness, for instance, reduces both anger-in and anger-out reactions. In the case of co-occurring disappointment, people are more likely to direct their anger inwards and less likely to direct it outwards. Co-occurring fear only reduces the overt expression of anger (**Study V**).
- Anger behaviors are also associated with specific interactive effects between the experience of momentary emotions and personality traits that lead to higher levels of either suppression or expression of anger behavior (or both). For example, people high in Neuroticism are less likely to engage in anger-in behavior when experiencing disgust, surprise, or irritation alongside anger, but show more anger-out in the case of co-occurring contempt. People tend to hold their anger in less when it is accompanied by disgust, but the effect is stronger for people high in Conscientiousness. People high in Extraversion show more anger-out compared to people low in Extraversion, but the effect is much stronger in the case of co-occurring disgust. People high in Openness express more anger-out compared to people low in Openness, but that difference is reduced in the case of co-occurring contempt. This indicates an interaction between personality dispositions and the emotion system that clearly shapes behavior in people's everyday lives (**Study V**).

2.1 The future research directions

Current dissertation broadens the perspective of emotion research by providing further information about individual differences in emotion processes and their effects on behavior. A major task for future research is to include and integrate the information from inside the person with all kind of contextual information and provide theoretical models to interpret the findings including different levels of processing (i.e., intrapersonal, behavioral, interpersonal). Also, future research could turn more attention to other channels of emotion communication in addition to facial expressions, like the gestures and voice. There is growing need for further understanding of emotion processing, like affective variability in context of clinical and health psychology applications.

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SUMMARY IN ESTONIAN

Emotsioonide kogemine, väljendamine ja äratundmine: isiksuseomadused ja vanus kui olulised mõjutegurid

Emotsioonid loovad igapäevaselt inimeste elule värvingu, iga inimese emotsionaalne maailm on ühest küljest unikaalne, kuid samas on oluline mõista üldisi seaduspärasusi emotsioonide kogemise, väljendamise ja äratundmise muhtretites. Kuigi emotsioonide teadusliku uurimise algus ulatub üle-eelmisesse sajandisse, on individuaalsete erinevuste mõistmine emotsioonide osas jõudnud teadusuuringute fookusesse just viimastel kümnenditel. Käesoleva väitekirja peamiseks uurimisküsimuseks on: „Kuidas mõjutavad inimese isiksuseomadused ja vanus emotsioonide kogemist, väljendamist ja teiste inimeste emotsioonide äratundmist?“.

Töö baseerub järgmistel teooriatel ja lähenemistel: Empaatilise täpsuse uurimissuund (*empathic accuracy approach*; Ickes, 1997, 2003); Põhiemotsioonide teooria (*basic emotions theory*; Ekman, 1992); Afekti variatiivsuse kontseptsioon (*affect variability concept*; Eid & Diener, 1999); Emotsioonide enesekohaste hinnangute ligipääsetavuse mudel (*the accessibility model of emotional self-report*; Robinson & Clore, 2002).

Uurimustöö raames viidi läbi kaks eksperimenti, esimeses käsitleti individuaalseid erinevusi emotsioonide äratundmises (**Uurimus I ja II**). Teises eksperimentis olid vaatluse all individuaalsed erinevused emotsioonide kogemises ja väljendamises, kasutades kogemuse väljavõtte meetodit (**Uurimus III, IV, V**).

Väitekirja põhijäreldused on järgmised:

- Inimestel on üsnagi selge ja üldistunud arusaam sellest, kui hästi suudetakse teise inimese seisundeid ja omadusi hinnata. Kuid see enesekohane hinnang oma inimesetundmise võimele ei ole seotud tegeliku sooritusega emotsioonide või isiksuseomaduste hindamisel (*empathic accuracy*), peegeldades pigem inimese isiksuseomadusi. Samas kui tegelik sooritus on seotud pigem vaimse võimekusega. Seega, kuigi inimesed on motiveeritud teisi inimesi mõistma, pidades sellist sotsiaalset kompetentsust oluliseks, ei ole sellised enesekohased hinnangud täpsed. Põhjused võivad peituda nii motivatsioonilistes tegurites kui ka vastava tagasiside puudumises (**Uurimus I**)
- Vaatamata suuremale elukogemusele, tunnevad vanemad inimesed teatud negatiivseid emotsioone (eriti viha ja kurbust) halvemini ära, ning selline muutus on täheldatav juba 30-ndates eluaastates. Samas kui näiteks põlguse väljenduse äratundmine isegi tõuseb 60ndate eluaastateni. Selliseid vanuselisi muutusi ei saa ära seletada nt vanusega kaasneva üldise kognitiivsete võimete langusega ega ka sotsio-emotsionaalse selektiivsuse teooriaga (Carstensen et al., 1999). Kuigi vanuselised erinevused emotsioonide äratundmise täpsuses on praeguseks dokumenteeritud mitmetes uurimustest, puudub uurijate vahel konsensus selle võimalike mehhanismide osas. (**Uurimus II**)

- Inimeste emotsionaalne maailm seisneb paljuski kogetud emotsionaalsete hetkede taasloomises, mis soodustab toimetulekut ja toetab emotsioonide regulatsiooni. **Uurimus III** näitas, et kurbuse, hirmu, rõõmu ja viha kogemise mäletamine sõltub olenevalt möödaläinud ajast nii inimese hetke väsimusest kui ka isiksuseomadustest ja vanusest. Päeva lõpus antud retrospektiivsed hinnangud kogetud emotsioonidele sõltuvad eelkõige hindaja vanusest ja väsimusest – väsimus soodustab negatiivsete emotsioonide tugevamaks hindamist, samas kui vanemad inimesed hindavad kogetud emotsioone tagantjärele pigem vähem tugevateks. Üle kahe nädala antud retrospektiivsed hinnangud on seostatavad kõige enam isiksuseomadustega – neurootilisus on seotud negatiivsete emotsioonidele subjektiivse intensiivistamisega, ekstravertsus jällegi kogetud positiivsete emotsioonide tugevamaks hindamisega.
- Väsimus on sageli kogetav vaimne seisund, mida mõjutavad nii kogetud emotsioonid kui ka nende varieeruvus. Mida enam emotsioonid kõiguvad, seda suuremat väsimust inimesed raporteerivad nii momendihinnangutes kui ka pikemate perioodide lõikes. Seega kinnitas uurimus, et väsimuse seisukohalt võttes on parem hoida emotsioone stabiilsena. (**Uurimus IV**)
- Varasemad uurimused on leidnud, et vaatamata tervisega seotud murede suurenemisele, raporteerivad vanemad inimesed vähem subjektiivset väsimustunnet. **Uurimus IV** kinnitas seda seaduspärasust, kuid ühtlasi selgus, et juhul kui vanemad inimesed on hiljuti kogunud rohkem varieeruvaid emotsioone, siis raporteerivad nad rohkem väsimust kui noored inimesed. Seega, järeldeb antud uurimusest, et parem vanemate inimeste parem emotsionaalne heaolu on saavutatud läbi parema situatsioonide valiku – osatakse paremini hoiduda tugevaid emotsioone tekitavatest olukordadest.
- Sageli kogeivad inimesed reaktsioonina mingile situatsioonile mitut emotsiooni korraga. Viha kogemisel surutakse viha alla või näidatakse seda välja ning see sõltub nii kaasuvatest emotsioonidest kui ka isiksuseomadustest. Näiteks kui lisaks vihale on inimene ka pettunud või hirmunud, näidatakse viha vähem välja. Lisaks esineb interaktiivne seos isiksuseomaduste ja kaasuvate emotsioonide vahel vihakäitumise seletamisel. See tähendab, et viha allasurumine või väljanäitamine sõltub korraga nii mingist isiksuseomadusest kui ka olukorra poolt lisaks vihale tekkinud kaasuvast emotsioonist. Erinevad isiksuseomadused interakteeruvad erinevate kaasuvate emotsioonidega. Näiteks neurootilisemad inimesed ei püüa oma viha väga alla suruda juhul kui sellega kaasnevad vastikus või üllatus, kaasuva põlguse korral aga otseselt väljendavad enam viha. Seega, andis antud uurimus panuse isiksuseomaduste ja emotsioonide süstemaatilise koostoimimise kohta igapäeva elus. (**Uurimus V**)

PUBLICATIONS

CURRICULUM VITAE

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Education

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Employment

2010– Clinical Psychologist, Rehabilitation Centre, North Estonia
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Research interests

Emotion recognition, experience and expression; personality traits; aging; tired-
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Clinical psychologist; Neuropsychologist; EuroPsy: health psychology

Publications

Mill, A., Kõöts-Ausmees, L., Allik, J. & Realo, A. The Role of Co-Occurring
Emotions and Personality Traits in Anger Expression. *Manuscript under
review*.
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in daily life: An experience sampling study. *Journal of Individual Diffe-
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1994–1999 Bakalaureuseõpe, psühholoogia osakond, Tartu Ülikool

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2012–2014 Lektor, Õigus- ja Sotsiaalteaduste keskuse, Sisekaitseakadeemia

Uurimistöö põhisuunad

Emotsioonide kogemine, väljendamine ja äratundmine; isiksuse seadumused;
vananemine; väsimus;

Erialaorganisatsioonid

Eesti Psühholoogide Liit

Kutsetunnistused

Kliiniline psühholoog; Neuropsühholoog; EuroPsy: tervisepsühholoogia

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