Understanding, expressing, and interacting: the development of emotional functioning in young children with autism

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CHAPTER 1.

General introduction

Before the COVID-19 pandemic and the implementation of restrictions on social contact, every day a person could have contact with about 10 to 25 people (Del Valle et al., 2007). Some contacts include only a simple greeting, whereas others involve meaningful and complex exchanges of emotions, thoughts, and perspectives. Navigating smoothly in the social world can be testing for any child. However, this is particularly challenging for children who have autism. Autism, traditionally known as autism spectrum disorder (ASD), is a life-long condition characterized by difficulties in social communication and social interaction, and by restricted and repetitive behaviors (see Box 1 for information on the diagnosis and prevalence). It affects how people experience and relate to the world around them. They see, feel and understand the world differently to people without autism. The everyday encounter of people, interactions and events which makes good sense to people without autism do not always make sense to people with autism. To get around in social interactions, every child needs to learn from a young age how to orient promptly, interpret accurately and respond appropriately to social cues. For young children, such development takes place often times through unplanned and unintended learning, by observing and overhearing how adults and people around deal with a social situation (Calderon et al., 2003). Autistic children miss out on many opportunities for such incidental learning, as they may not notice the nuances of communication such as the tone of voice and body languages or they may be absorbed by their own special interests and not attend to a social situation voluntarily (Attwood, 2015; Dawson et al., 2004; Klin et al., 2007; Loukusa et al., 2007). As stated above, social communication and social interaction fall in one of the most difficult areas for children on the spectrum (American Psychiatric Association, 2013). Some autistic children may not have a strong interest in connecting with others and prefer to spend time alone with their own imaginations and thoughts. Not participating in social interactions fits the needs of these children and their choices should be accepted and respected. However, still, many other autistic children do have the desire to interact with others, to make friends, and to lead a meaningful and fulfilling social life (Lawson, 2006; Jones & Meldal, 2001), whereas interacting with others can be incredibly difficult for these children, causing them tremendous stress, anxiety and negatively affecting their mental health (Corbett et al., 2010; Shroeder et al., 2014).

BOX 1. THE DIAGNOSIS AND PREVALENCE

DSM-5 ASD Diagnostic Criteria

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive):

1. **Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.**
2. **Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.**
3. **Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.**

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive):

1. **Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up toys or flipping objects, echolalia, idiosyncratic phrases).**
2. **Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat food every day).**
3. **Highly restricted, fixated interests that are abnormal in intensity or focus (e.g, strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interest).**

BOX 1 continued

4. **Hyper- or hyporeactivity to sensory input or unusual interests in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).**

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).

D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

<u>The estimated prevalence rates of autism</u>

According to the World Health Organization, one in 160 children has a diagnosis of autism. However, the prevalence rates vary by country. For example, the estimation in the U.S. in 2016 is that 18.5 per 1000 children aged 8 years have a diagnosis of autism (Maenner et al., 2020), in the U.K. the prevalence estimate is 10 per 1000 children (The British Medical Association, 2020), in Canada 15.2 per 1000 children (Schendel & Thorsteinsson, 2018), and in Denmark 12 per 1000 children (Imm et al., 2019). In the Netherlands, where the sample of children examined in this study came from, 28 per 1000 children were reported by their parents to have autism, according to Statistics Netherlands (Centraal Bureau voor de Statistiek, 2011). An explanation for the seemingly high prevalence rates in the Netherlands is that Statistics Netherlands did not explicitly ask parents for an official diagnosis. Therefore, the estimation may have included children who did not have an official diagnosis but the diagnosis was suspected by their parents. In a follow-up survey, Statistics Netherlands found that 70% of the 2.8% children were receiving treatment related to the diagnosis of autism. This results

BOX 1 continued

in a rate of 19 per 1000, which is in accordance with the current international prevalence rates of autism (Geurt et al., 2014).

Noteworthy, the prevalence rates have been increasing rapidly over the past 30 years worldwide. The prevalence rate of 2016 (18.5 per 1000) is about 10% higher than the prevalence estimation in 2014 (16.8 per 1000) and about 175% higher than the estimate in 2000 (Maenner et al., 2020). This increase is partly due to an increased awareness of autism in the general population, changes to the diagnostic criteria, early detection, and diagnosis of autism in children at a much younger age (Elsabbagh et al., 2012; Kim et al., 2011; Saemundsen et al., 2013).

Traditionally, autistic people are held responsible for the difficulties they encounter in social situations. However, successful interaction requires efforts from both interacting parties. As accurately pointed out by "the double empathy problem" (Milton, 2012), when it comes to understand and communicate with autistic people, non-autistic people are not doing any better. Instead of putting all the responsibilities on autistic people for the predicament, finding a suitable way to interact with them, preventing social exclusion and reducing the negative impacts on their mental health is an ineluctable responsibility of everyone living in the society. To achieve this, an important pathway is to increase the awareness of autism. This thesis is motivated by such a goal, endeavoring to make a positive step towards strengthening our understanding of the unique challenges that autistic children face at a young age in the social and emotional domain. Knowledge in this regard of young children can be especially important, helping parents as well as everyone around finding the right way to communicate with autistic children and to support them to achieve their full potential.

In particular, this thesis puts autistic children's emotional functioning under a magnifying glass. Emotion plays a key role in guiding and facilitating social interactions. From the functionalistic perspective (see Box 2), emotion is inherently informative and communicative. Towards the self, experiencing an emotion signals to us that something that matters is at stake (Frijda, 1986). It makes us focused, motivated, and prepared to initiate an action as a response to the situational change, either to give a hug or to swing a punch (Scherer, 2000). Towards others, expressing an emotion conveys to people what we want to achieve (Horstmann, 2003). A happy face signals to others that we like the situation and welcome further interaction, whereas an angry face warns others to back off and signals that

we want to reinstate our goal and status. Because of the powerful message that an emotional expression can convey, children need to learn from a young age how to keep their emotional arousal at an optimal level and to express their emotions in an appropriate way, so that they can achieve instead of sabotaging their goal (Rieffe, 2014). In the same vein, it is important for children to learn to read the emotional cues expressed by others. Only when a child knows what emotion another person expresses and understands why the person feels that way, can the child respond to that person appropriately and adaptively (Elfenbein et al., 2007).

Given the essential role of emotion in facilitating social interaction and establishing social relationships, it is not surprising that the abilities to express and to understand emotions start from infancy. The expressions of the basic emotions such as happiness, anger, fear and sadness are observed in infants from the first year of life. For example, by the third month of life, infants start to exhibit social smiles, i.e., expressions of happiness directed towards people, which strengthens the bonding between the infant and the caregiver (Wörmann et al., 2012). Typically developing children's ability to understand facial emotion expressions also grow rapidly during infancy. Infants that are a few months old show awareness that a happy face looks different from a surprised face (Grossmann, 2010). By the end of the first year, children can use adults' facial emotional expressions to guide their behaviors. A 12-month-old child would approach a novel person or object when the mother shows happiness, whereas the child would hesitate to move and stay closer with the mother when the mother shows fear (Carver & Vaccaro, 2007). Children's knowledge of emotion is further strengthened by associating verbal labels to emotional expressions. Being able to use emotion vocabulary to communicate about emotions with adults opens a new learning channel for emotion socialization (Streubel et al., 2020).

While the basic emotions are present from the beginning of life, it is not until the end of the second year of life that moral emotions such as shame, guilt, and pride start to emerge. Moral emotions are more complex than basic emotions in that they are provoked when children evaluate themselves (Tracy & Robins, 2004). To experience moral emotions, children need to have advanced cognitive abilities including an awareness of the self (Lewis, 2000), as well as understandings of other people's thoughts and the prevailing social norms. This is because the self-evaluation is most often built upon the extent to which one thinks his or her behavior meets the expectations of others and of the society (Leary, 2004). The unique feature of moral emotions defines their unique role in regulating and shaping people's behaviors in accordance to the moral standards. Children who are prone to feeling guilty exhibit fewer aggressive behaviors (e.g., Colasante et al., 2016), whereas children who

display little embarrassment when misbehaving have a higher tendency to behave in antisocial ways (e.g., Keltner et al., 1995). Furthermore, as mentioned before, emotion has a communicative function. Moral emotions are no exception. Imagine a child who damages his/her friend's toy but does not show a hint of shame or guilt. How would this lack of emotional expression make his/her friend feel? When a social relationship is threatened by a misbehavior, the expression of shame or guilt illustrates to the other that one is aware of his transgression and regrets it, which can help restore the relationship (Leach, 2017).

Another complex and advanced emotional capacity that emerges and develops substantially in early childhood is empathy. To experience empathy, children need to mobilize and coordinate a group of emotional abilities. The ability to co-experience and feel for others' emotions is present early in life and prompts a baby to cry when hearing other babies cry (Dondi et al., 1999). At this stage, children can become overwhelmed by the emotional display of another due to a lack of self-other distinction (Hoffman, 2000). As they grow older, children become more able to distinguish the distress of others from their own. Through regulating the emotional arousals in themselves and attending to the emotions of others as separate, children's understanding of others' emotions grows with age, so does their prosocial motivation to comfort and help others (Lockwood et al., 2014). Empathy is a highly valued human capacity. For the self, it motivates prosocial actions and pushes one to dive in and help others in need (Morelli et al., 2014). Towards others, to empathize with another person makes that person feel heard and understood. This in turn nurtures and strengthens social relationships with other people (Anderson, 2018).

As discussed so far, emotion permeates into every aspect of our social lives. It is therefore not surprising that disturbances in the above-mentioned emotional processes not only lead to the breakdown of social interactions, but can also contribute to social and personal maladjustments (Keltner & Kring, 1998). What does this mean for people with autism? A plethora of research has investigated emotional functioning of autistic people (e.g., Harms et al., 2010, Lartseva et al., 2015; Nuske et al., 2013), revealing a very different profile of them to that of non-autistic people. These studies contributed greatly to our understanding of the difficulties and challenges that autistic individuals face in the emotional domain. Nonetheless, some important issues need further clarification and elaboration. First, relatively little is known about the emergence and development of emotional functioning in autistic children at the early life stage. Informing parents, educators and clinical professionals of the challenges that autistic children face at a young age is essential for parents and professionals

BOX 2. THE FUNCTIONALISTIC PERSPECTIVE OF EMOTION

From the functionalistic perspective, emotion is viewed as an attempt by an individual to adjust the relation between oneself and the environment (Campos et al., 1994; Saarni et al., 2006). Different from the discrete emotion theory, which asserts that emotions are innate and each emotion is associated with a fixed and distinguished set of facial expressions and neurophysiological reactions (Ekman & Cordaro, 2011; Izard et al., 2010), the functionalistic approach emphasizes that emotions are flexible, contextually bound and goal driven. Within this framework, every emotional episode is provoked by a specific event which is of importance to the person (Frijda, 1986). An emotion arises when the situation that matters to the person has changed. A desired change of the situation evokes positive emotion, whereas an unwanted change of the situation evokes negative emotion (Rieffe, 2014). Experiencing an emotion alerts the person of the change, and motivates the person to take an action to deal with the change (Moors et al., 2013). Therefore, emotions and emotion expressions are goal driven: when a person's goal is hampered and the person wants to reinstate his or her goal and status, anger is experienced and expressed; when a person is satisfied with the situation and wants the situation to continue, happiness is experienced and expressed.

to adjust their strategies promptly and to help autistic children in the most efficient way. Second, emotional research on autistic people tends to focus on their abilities to recognize and understand emotions in others, whereas relatively fewer studies examined their own emotional expressions and emotional reactions (Mazefsky et al., 2012). Applying a broader approach to studying both aspects of emotional functioning in autistic children allows us to gain a more complete profile of their socioemotional functioning. Third, despite the important social function of moral emotions, compared to basic emotions, the experience and expression of moral emotions in autistic children is understudied. However, it can be a great challenge for autistic children to develop moral emotions, because one prerequisite for experiencing moral emotions is to be aware of and have a good understanding of others' thoughts and perspectives. Yet, struggles in Theory of Mind are a hallmark of autism (Baron-Cohen, 2000). Fourth, to date most research on the emotional functioning of autistic children used a cross-sectional design. Cross-sectional studies are informative in helping identify the differences between autistic and non-autistic children at the moment of assessment. However, they cannot tell us how these alterations change over time. Do the differences disappear with age or do

they enlarge? What are the factors that promote or hinder the development of emotional functioning in autistic children? Such questions can only be answered by longitudinal studies. They have the unique potential to improve our understanding of the dynamic processes of child development and can contribute to understanding the drivers and determinants of the developmental outcomes.

The central aim of this thesis is to contribute to a comprehensive understanding of the early development of emotional functioning in preschool children with autism. To achieve this, a multidimensional approach is applied. Four studies are conducted to examine a group of key emotional abilities in preschool autistic children from both (1) the horizontal dimension: investigating the interpersonal differences by comparing autistic children to non-autistic peers, and (2) the vertical dimension: investigating the intrapersonal variations by following children's development over a period of two to three years.

First, a group of essential and diverse emotional abilities are selected for the investigation, ranging from basic emotions to more advanced moral emotions and empathy, and ranging from emotion recognition and emotion understanding to emotion expression and emotion vocabulary. Second, a longitudinal approach is applied to observe changes and continuities of various emotional abilities in autistic children over a period of two to three years, in comparison to the development of non-autistic children without autism. Furthermore, having emotional functioning as the focus of the research, this thesis also explores what factors contribute to the development of emotional functioning, and what impact the development of emotional functioning has on children's psychosocial wellbeing.

This thesis is arranged in the following way: it starts with examining the recognition of four basic emotions, i.e., happiness, anger, fear, and sadness. **Chapter 2** explores how the recognition of basic emotions develops in autistic and non-autistic children, and how the development is associated with the change of symptom severity in autistic children. Next, the focus is shifted to a group of more complex emotions, i.e., shame, guilt and pride. **Chapter 3** examines the experience and expression of moral emotions in autistic and non-autistic children, and the contributing role of Theory of Mind to the development of moral emotions. **Chapter 4** examines another complex emotional ability, i.e., empathy, which emerges from the interaction of multiple emotional and cognitive processes. The development of empathy is compared between autistic and non-autistic children. Besides, it is explored whether empathy contributes to the development of externalizing problems and social competence in autistic and non-autistic children. **Chapter 5** focuses on the impacts of emotional functioning on the development of psychopathology in children with and without autism. In doing so, first, the

development of internalizing and externalizing problems is compared between children with and without autism. Next, the longitudinal associations between emotion recognition, emotion expression, emotion vocabulary and behavioral problems are examined. The last chapter, Chapter 6, summarizes and integrates the findings of the above-mentioned research, and discusses the implications for the direction of future research.

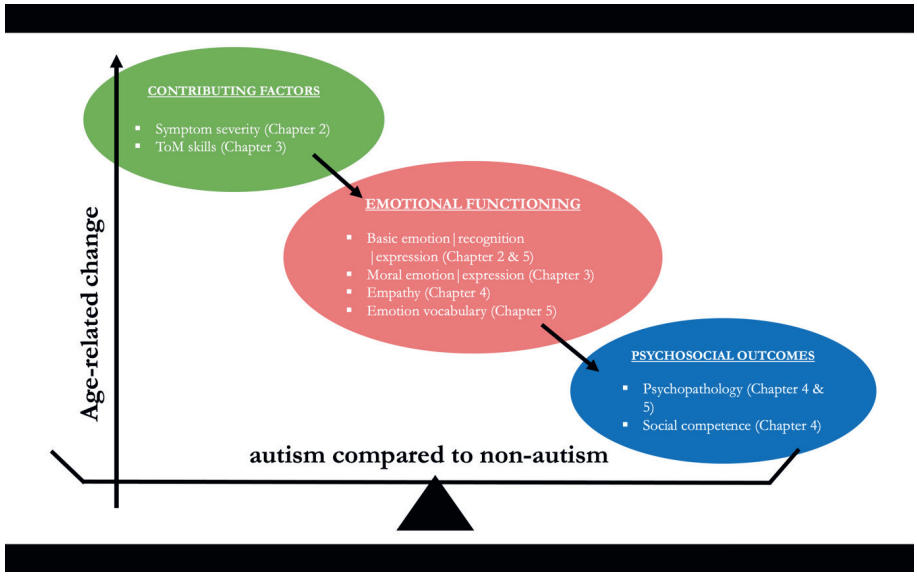

Figure 1. Graphic presentation of the multidimensional approach adopted by this thesis. The red panel displays the core variables examined in this thesis, i.e., the emotional abilities. The green panel and the blue panel display the variables, of which the associations with emotional abilities are examined in this thesis. The horizonal dimension compares between autistic and non-autistic children. The vertical dimension examines the age-related changes of emotional functioning in children.

It should be mentioned that, first, in this thesis, both person-first and identity-first language are used. In Chapter 1 and 6 both languages are used; in Chapter 3, 5, and 7 person-first language is used; in Chapter 2 and 4 identity-first language is used. Both types of language endeavor to remove the stigma of autism but through two different pathways. See Box 3 for the justifications of using both languages. Second, this thesis focuses on the emotional domain, which presents many challenges for people with autism. However, any challenges discovered by this thesis should not be used to label them. Like non-autistic

children, every autistic child is a unique human being with his or her own strengths and difficulties.

BOX 3. PERSON-FIRST LANGUAGE AND IDENTITY-FIRST LANGUAGE

What is the most appropriate way to address people with a diagnosis of autism, using person-first language (i.e., individuals with autism) or using identity-first language (i.e., autistic individuals)? In recent years, there is an increasing discussion on this topic.

Person-first language which places the person before the disability advocates that a person with disability is first and foremost 'a person' and thus deserves all the human rights, opportunities and due respects as assigned to any other human being (Vivanti, 2020). Person-first language emphasizes the value, autonomy and uniqueness of the person, of which the disability is only one feature and by no means the defining feature (Wright, 1983). Person-first language was originally proposed in the context of the broader disability rights movement (Kenny et al., 2016). Proponents of the movement argued that the traditional view of considering disability as a medical condition which needs to be cured or even prevented perpetuates a negative image of people with disabilities (Williams, 1996). Person-first language was proposed to facilitate more positive descriptions, and create more positive identities of people with disability (Bailey, 1991; Blaska, 1993). A survey in the Netherlands involving about 500 adults diagnosed with autism showed that the majority preferred the person-first language (Wevers, 2020).

However, not all members of the autistic communities support the use of person-first language (Gernsbacher, 2017; Sinclair, 1999). As shown by a recent survey in UK, a large percentage of autistic adults, family members, friends, and parents endorse the term "autistic" instead of "with autism" (Kenny et al., 2016). There are two major arguments against using person-first language and supporting using identity-first language (Kenny et al., 2016; Vivanti, 2020). First, using person-first language could belittle the experience of living with autism, downplay the inseparable relation between the person and the diagnosis, and deny the possibility that a person can have pride in his or her identification. Second, person-first language contradicts the common principle that positive and desirable features should precede the nouns. For example, we say "intelligent people" instead of "people with intelligence", "smart children" instead of "children who are smart". In this sense, person-first language is not only cumbersome but also paints the image with a negative tint. These arguments are consistent with the

BOX3 continued

perspective that autism is an expression of neurodiversity rather than pathology, and that the autism culture should be recognized, valued, and celebrated (Altman, 2001; Robertson & Ne'eman, 2008).

Person-first language and identity-first language, both endeavoring to remove the stigma of autism and disability in general, represent two different pathways. The former emphasizes the value of the person above and beyond the disability, and the latter posits that the disability itself can be the reason for pride and celebration (Vivanti, 2020). Which language to choose requires careful weighing of the situation and respecting the preferences of the individual and the group that are being described. This thesis used both languages, following the recommendation proposed by Dunn and Andrews (2015, page 262):

"Although a definitive mandate for writing and speaking about disability might be desirable, we suggest that flexibility is an appropriate, respectful response. Sufficient research focused on the preferences of disabled people for terminology and language use has not been conducted. We hope that the issue raised in this article will spur interest so that the needed research will be done. Until then, we believe that psychologists should broaden their cultural competence by using both person-first and identity-first language when working on disability issues or interacting with people with disabilities."

Below the content of each chapter is discussed in greater detail:

Emotion recognition is the very first step for initiating successful social interaction. According to the functionalistic view of emotion, emotion has an important communicative function. When a person expresses an emotion, it signals to the interactive partner what he or she wants to achieve (Horstmann, 2003). Imagine an autistic child who does not attend to or is confused about the emotion expression of his or her peer. This will hinder the child from responding 'properly' to the emotional signal sent by the other. Over time, difficulties in emotion recognition can obstruct the autistic child from establishing and maintaining positive social relationships (Dede et al., 2021).

In typical development, emotion recognition begins with discriminating emotions. Children first learn to differentiate between different facial expressions (*Emotion*

Differentiation) (Heck et al., 2018). Together with growing cognitive ability, especially language ability, children learn to assign verbal labels to emotion expressions (*Emotion Identification*). Labeling emotions is an important ability which enables children to categorize emotions and to acquire the scripted knowledge of emotions, which includes not only facial expressions, but also bodily reactions, conscious feelings, action tendencies, and importantly, the eliciting events associated with the emotion (Widen & Russell, 2008). Understanding that every emotion is associated with an emotion-provoking situation and being able to predict another's emotion based on situational cues marks further progress towards matured emotion recognition (*Emotion Attribution*). While toddlers and preschoolers rely primarily on facial expressions, school-aged children reply more often on situational cues for processing emotional information (Herba & Phillips, 2004).

So far, a plethora of research has investigated emotion recognition in autistic individuals across a range of contexts and age groups. Although the findings are not always consistent due to the heterogeneity of participant characteristics and task demands (for a review, see Harms et al., 2010), overall, emotion recognition is found to be more challenging for autistic individuals when the emotions are of a negative valence such as fear and disgust (e.g., Ashwin et al., 2006; Balconi et al., 2012; Humphreys et al., 2007; Wright et al., 2008), has a more complex nature such as shame and guilt (e.g., Heerey et al., 2003; Kotroni et al., 2019), is presented with a lower intensity (e.g., Greimel et al., 2014; Law Smith et al., 2010) and for a shorter duration (e.g., Clark et al., 2008). Furthermore, difficulties in recognizing emotions of other people are present at young ages in autistic children. There is evidence that emotion differentiation, emotion identification, and emotion attribution do not develop in autistic children to the same extent as in non-autistic peers (e.g., Evers et al., 2015; Tardif et al., 2007; Xavier et al., 2015). In contrast to the abundance of research on the intergroup differences in emotion recognition, to the best of our knowledge, there is only one longitudinal study, which followed the development of emotion recognition in autistic adolescents, showing that their emotion recognition improved over a period of 18 weeks (Rosen & Lerner, 2016). On the other hand, a recent meta-analysis which amalgamated 43 cross-sectional studies of different age groups, revealed that the discrepancies between autistic and non-autistic individuals in emotion recognition did not narrow down but rather expanded with age (Lozier et al., 2014). This emphasizes the importance of understanding the developmental course of emotion recognition in autistic individuals at different life stages. This gap of knowledge has motivated the first study in this thesis.

STUDY 1 (Chapter 2) aims to examine the levels and follow the development of three emotion recognition abilities (i.e., emotion differentiation, emotion identification, and emotion attribution) in regard to four basic emotions (i.e., happiness, anger, sadness and fear) in preschool autistic children, as compared to non-autistic peers. Besides, the longitudinal association between symptom severity and emotion recognition is explored in autistic children.

Moral emotions are distinguished from basic emotions and refer to a group of emotions with a more complex nature which emerge later in childhood than basic emotions. A key feature that distinguishes moral emotions such as guilt, shame, and pride from basic emotions such as fear, anger, and happiness is that the former involve self-evaluation (Tracy & Robins, 2004). A child who breaks his mother's favorite vase will feel scared if he is concerned about the punishment. However, the child will feel ashamed or guilty if he ascribes the negative outcome to his personal attributes (e.g., 'I am clumsy') or action (e.g., 'I did a bad thing'). Implementing self-evaluation is a complex cognitive process, which requires advanced cognitive abilities such as Theory of Mind. Theory of Mind is considered to play a key role in the evaluative process that provokes moral emotions (Harris, 2008; Lagattuta & Thompson, 2007; Lewis, 2000). As noted by Leary (2004), the self-evaluation that elicits moral emotions is not simply how people evaluate themselves, but often how they establish a self-evaluation based on others' view of them. If one thinks that others hold a positive view of himself, the person may feel proud; if one thinks that others have a negative view of himself, the person usually feels guilty or ashamed (Muris & Meesters, 2014).

Given that the experience of moral emotions relies on the extent to which a child is able to evaluate himself or herself based on his or her understanding of others' thoughts and emotions, the question arises: would autism affect children's experience and development of moral emotions, considering that autism has long been associated with difficulties in Theory of Mind and emotion understanding? To date only a small body of literature has examined moral emotions in children and adolescents with autism, and even fewer have looked into the relation between Theory of Mind and moral emotions. Overall, compared to children without autism, studies reported children and adolescents with autism to score lower in tasks measuring the recognition of moral emotions. Autistic children also scored lower in questionnaires which asked them to rate their own experience of moral emotions (e.g., Davidson et al., 2018; Hobson et al., 2006; Losh & Capps, 2006). Besides, Theory of Mind abilities seem to indeed relate to the experience and recognition of moral emotions in autistic children (Davidson et al., 2018; Heerey et al., 2003). Albeit informative, the extant studies

examined school-aged children and adolescents using a cross-sectional design, and thus it remains unanswered whether the differences are already present at a young age. Nor do we know how moral emotions develop in early childhood in children with autism. This gap of knowledge has motivated the second study in this thesis.

STUDY 2 (Chapter 3) aims to examine the levels and developments of moral emotions and the contributing role of Theory of Mind to the moral emotion developments in preschool children with autism, as compared to typically developing peers.

Empathy refers to the ability to perceive and understand others' emotions, and to react adaptively to others' needs, e.g., to comfort, support or spare the other person (Ketelaar et al., 2013). From a developmental perspective, empathy can be divided into several layers (Netten et al., 2015). *Affective empathy* is the process where the emotions of another person cause arousal in the observer. This is already observed in infants, e.g., when one baby cries, other babies start crying as well. These early automatic responses upon witnessing others' distress indicate that the predisposition to experiencing empathy is hardwired in the human brain (Decety & Meyer, 2008). *Cognitive empathy* occurs at an older age than affective empathy, which involves a more sophisticated conscious comprehension of others' emotional state and is acquired through social learning (Decety et al., 2018). Note that a precursor of cognitive empathy is to pay attention to the other person and understand that it is the other person who is experiencing the distress. *Attention to others* not only facilitates better understanding of others' emotions, but also helps alleviate the stress felt in oneself (Rieffe et al., 2010). With age children show a growing attention to the affected other and an improved cognitive empathy. Children start to understand not only what the other feels but also why the other feels so. This prepares the child to react appropriately to the other's emotions, and triggers prosocial action (Eisenberg et al., 2010). *Prosocial action*, namely, taking the action to support and help others is crucial for maintaining good social relationships.

While empathy seems to develop naturally and without much effort in most typically developing children, it can be challenging for autistic children. First, empathy development in autistic children can be hindered by their diminished social attention. Reduced attention to social stimuli such as people, faces, and body movements is observed in autistic individuals at different stages in life (Chita-Tegmark, 2016). Some researchers ascribed this to a diminished social motivation, positing that social interactions are less rewarding for autistic individuals, and therefore they orient less often and less spontaneously towards other people (Chevallier et al., 2012). However, other researchers posit that many autistic people are also longing for friendship and love, and yet due to difficulties in social-information processing, social

interactions often lead to overarousal, exhaustion, and frustration. Therefore, autistic people may avert their attention as a regulating strategy to avoid being overwhelmed by the intense and perplexing social input (Markram & Markram, 2010; Tanaka & Sung, 2016).

Another possible obstacle for autistic children to develop empathy is their struggles in emotion recognition. Understanding the emotion of others is the core component of cognitive empathy. Decades of research provide converging evidence that autism is associated with difficulties in understanding other people's minds (Baron-Cohen, 2001). Difficulties in emotion understanding are observed already in the first years of life in autistic children and the problem persists into adulthood (Harms et al., 2010; Lozier et al., 2014). Not surprisingly, autistic children and adults often scored lower than non-autistic peers when cognitive empathy was measured (e.g., Deschamps et al., 2014; Mul et al., 2018; Pouw et al., 2013). Furthermore, with reduced attention to others and inefficient emotion understanding, it is not surprising that autistic children were observed to initiate prosocial actions less frequently than non-autistic children (Hudry & Slaughter, 2009; Russell et al., 2013). Note, however, the findings on affective empathy are less consistent than the findings on the other empathy components. While observational studies often reported less affective empathy in autistic children (Dawson et al., 2004; Hutman et al., 2010), studies using parent reports and self-reports usually found no group difference in affective empathy (Hudry & Slaughter., 2009; Deschamps et al., 2014; Pouw et al., 2013).

Although the extant studies provided valuable information on empathy in autistic children and adults, they focused on one or two aspects of empathy, such as cognitive empathy and prosocial actions. The four empathy components, i.e., affective empathy, cognitive empathy, attention to others, and prosocial action, were rarely studied simultaneously. Besides, some questions remain unanswered. First, due to the cross-sectional nature of the extant studies, little is known about how empathy develops in early childhood. Do autistic children develop their empathy skills at the same rate as non-autistic children or do they develop differently? These questions can be answered only by longitudinal studies. Second, past studies on young autistic children often used observational tasks. In these tasks, children needed to interact with an adult stranger. This could present an extra challenge to autistic children and thus interfere with their performance. Adding insight from parents and using a multimethod approach can contribute to a more comprehensive understanding of empathy development in autistic children. Third, empathy has long been associated with positive psychosocial outcomes in typical development (Eisenberg et al., 2010). Yet, whether

the same associations exist in autistic children remains largely unknown. The third study is conducted to address these questions.

STUDY 3 (Chapter 4) aims to examine the development of four empathy components (i.e., affective empathy, attention to others, cognitive empathy and prosocial actions) in preschool autistic children using parent reports and observational tasks. Besides, it examines the extent to which the development of empathy contributes to the change of externalizing problems and social competence in autistic and non-autistic children.

Research on typically developing children shows that problems in emotional functioning not only hinder implementing smooth and positive social interactions, but can also contribute to the development of psychopathology (Cole & Deater-Deckard, 2009; Keenan, 2000). As asserted by the functionalistic perspective, emotions are functional, even negative emotions. They prepare us to deal efficiently with environmental demands, e.g., anger and fear prepare us to fight or flight in challenging situations. However, emotions are functional only when the level of arousal and duration are under control or manageable. Being overwhelmed by emotions, as indicated by elevated levels of *negative emotion expressions*, puts children at risk of developing internalizing and externalizing behavior problems (Horwitz & Wakefield, 2007; Zeman et al., 2002). In addition to unregulated emotion expression, impaired *emotion recognition* is also related to the development of behavioral problems. Correctly identifying others' emotions is prerequisite to establishing and maintaining positive interpersonal relations. Frequently experiencing unpleasant and stressful social interactions can contribute to social exclusion and the development of internalized feelings such as anxiety, loneliness, and sadness (Fine et al., 2003). Besides, misunderstanding others' emotions can lead to a hostile perception of others' intention and in turn provoke aggressive reactions (Martin et al., 2010; Schultz et al., 2000). Finally, *emotion vocabulary*, namely, children's knowledge of emotion words, enables them to identify their own emotional state and to communicate their emotions with other people (Streubel et al., 2020). This creates a channel which helps children deal with their emotional arousal and thus prevents behavioral problems. Importantly, the knowledge of emotional words enables children to carry out discussions with others on emotions. Such emotion talk promotes in the long run the development of emotional competence in children (Gentzler et al., 2005).

Children diagnosed with autism are at a high risk of comorbid conditions including internalizing problems, such as anxiety and depression, and externalizing problems, such as hyperactivity and aggression (Bauminger et al., 2010; Salazar et al., 2015). The prevalence rates of having at least one psychiatric condition in addition to their core syndrome range

from 70% to 90% (De Bruin et al., 2007; Simonoff et al., 2008), about 3 to 10 times higher than in the general population (Costello et al., 2003). Although internalizing and externalizing problems are well recognized in the mental health profiles of children with autism, information on their developmental trajectories, especially in early childhood, is scarce. Besides, little is known about the contribution of emotional functioning to the development of internalizing and externalizing problems in young children with autism, although the relation has been established in typically developing children. The gap of knowledge has motivated the fourth study of this thesis.

STUDY 4 (Chapter 5) aims to examine the development of psychopathology and the contributing role of emotion functioning in preschool children with and without autism.

Chapter 6 summarizes the findings of the aforementioned four studies, provides an overview of the findings on the early development of various aspects of emotional functioning in autistic children, and discusses the implications and recommendations for future research.

References

Altman, B. (2001). Disability definitions, models, classification schemes, and applications. In G. L. Albredht, K. D. Seelman, & M. Bury (Eds.), *Handbook of Disability Studies* (pp. 97–122). Thousand Oaks, CA: Sage.

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*®). American Psychiatric Publication.

Anderson, L. S. (2018). Building empathy, strengthening relationships. *YC Young Children*, *73*(3), 34-42.

Ashwin, C., Chapman, E., Colle, L., & Baron-Cohen, S. (2006). Impaired recognition of negative basic emotions in autism: A test of the amygdala theory. *Social Neuroscience, 1*(3-4), 349-363.

Attwood, A. (2015). *The Complete Guide to Asperger's Syndrome*. London: Jessica Kingsley.

Bailey D (1991) Guidelines for authors. *Journal of Early Interventions* 18: 118–119.

Balconi, M., Amenta, S., & Ferrari, C. (2012). Emotional decoding in facial expression, scripts and videos: A comparison between normal, autistic and Asperger children. *Research in Autism Spectrum Disorders, 6*(1), 193-203.

Baron-Cohen, S. (2000). Theory of mind and autism: A fifteen-year review. *Understanding Other Minds: Perspectives from Developmental Cognitive Neuroscience*, *2*, 3-20.

Baron-Cohen, S. (2001). Theory of mind in normal development and autism. *Prisme*, *34*(1), 74-183.

Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, *34*(2), 163-175.

Bauminger, N., Solomon, M., & Rogers, S. J. (2010). Externalizing and internalizing behaviors in ASD. *Autism Research*, *3*(3), 101-112.

Blaska J (1993) The power of language: speak and write using 'person first'. In: Nagler M (ed.) *Perspectives on Disability*. Palo Alto, CA: Health Markets Research, pp. 5-32.

Calderon, R., Greenberg, M., Marschark, M., & Spencer, P. (2003). Social and emotional development of deaf children: Family, school, and program effects. *The Oxford Handbook of Deaf studies, Language, and Education*, *1*, 188-99.

Campos, J. J., Mumme, D., Kermoian, R., & Campos, R. G. (1994). A functionalist perspective on the nature of emotion. *Japanese Journal of Research on Emotions*, 2(1), 1-20.

Carver, L. J., & Vaccaro, B. G. (2007). 12-month-old infants allocate increased neural resources to stimuli associated with negative adult emotion. *Developmental Psychology*, *43*(1), 54.

Chevallier, C., Kohls, G., Troiani, V., Brodkin, E. S., & Schultz, R. T. (2012). The social motivation theory of autism. *Trends in Cognitive Sciences*, *16*(4), 231-239.

Chita-Tegmark, M. (2016). Social attention in ASD: a review and meta-analysis of eye-tracking studies. *Research in Developmental Disabilities*, *48*, 79-93.

Clark, T. F., Winkielman, P., & McIntosh, D. N. (2008). Autism and the extraction of emotion from briefly presented facial expressions: stumbling at the first step of empathy. *Emotion*, *8*(6), 803.

Colasante, T., Zuffianò, A., & Malti, T. (2016). Daily deviations in anger, guilt, and sympathy: A developmental diary study of aggression. *Journal of Abnormal Child Psychology*, *44*(8), 1515-1526.

Cole, P. M., & Deater-Deckard, K. (2009). Emotion regulation, risk, and psychopathology. *Journal of Child Psychology and Psychiatry*, *50*(11), 1327-1330.

Corbett, B. A., Schupp, C. W., Simon, D., Ryan, N., & Mendoza, S. (2010). Elevated cortisol during play is associated with age and social engagement in children with autism. *Molecular Autism*, *1*(1), 1-12.

Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, *60*, 837–844.

Davidson, D., Hilvert, E., Misiunaite, I., & Giordano, M. (2018). Proneness to guilt, shame, and pride in children with Autism Spectrum Disorders and neurotypical children. *Autism Research*, *11*, 883-892.

Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A., & Liaw, J. (2004). Early social attention impairments in autism: social orienting, joint attention, and attention to distress. *Developmental Psychology*, *40*(2), 271.

De Bruin, E. I., Ferdinand, R. F., Meester, S., de Nijs, P. F., & Verheij, F. (2007). High rates of psychiatric co-morbid- ity in PDD-NOS. *Journal of Autism and Developmental Disorders*, *37*, 877–886.

Decety, J., Meidenbauer, K. L., & Cowell, J. M. (2018). The development of cognitive empathy and concern in preschool children: a behavioral neuroscience investigation. *Developmental Science*, *21*(3), e12570.

Decety, J., & Meyer, M. (2008). From emotion resonance to empathic understanding: A social developmental neuroscience account. *Development and Psychopathology*, *20*(4), 1053-1080.

Dede, B., Delk, L., & White, B. A. (2021). Relationships between facial emotion recognition, internalizing symptoms, and social problems in young children. *Personality and Individual Differences*, *171*, 110448.

Del Valle, S. Y., Hyman, J. M., Hethcote, H. W., & Eubank, S. G. (2007). Mixing patterns between age groups in social networks. *Social Networks*, *29*(4), 539-554.

Deschamps, P. K., Been, M., & Matthys, W. (2014). Empathy and empathy induced prosocial behavior in 6-and 7-year-olds with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *44*(7), 1749-1758.

Dondi, M., Simion, F., & Caltran, G. (1999). Can newborns discriminate between their own cry and the cry of another newborn infant? *Developmental Psychology*, *35*(2), 418–426.

Dunn, D. S., & Andrews, E. E. (2015). Person-first and identity-first language: Developing psychologists' cultural competence using disability language. *American Psychologist, 70*(3), 255.

Eisenberg, N., Eggum, N. D., & Di Giunta, L. (2010). Empathy-related responding: Associations with prosocial behavior, aggression, and intergroup relations. *Social Issues and Policy Review*, *4*(1), 143–180.

Ekman, P., & Cordaro, D. (2011). What is meant by calling emotions basic. *Emotion Review, 3,*364–370.

Elfenbein, H. A., Der Foo, M., White, J., Tan, H. H., & Aik, V. C. (2007). Reading your counterpart: the benefit of emotion recognition accuracy for effectiveness in negotiation. *Journal of Nonverbal Behavior*, *31*(4), 205-223.

Elsabbagh, M., Divan, G., Koh, Y. J., Kim, Y. S., Kauchali, S., Marcín, C., Montiel-Nava, C., Patel, V., Paula, C.S., Wang, C., Yasamy, M., & Fombonne, E. (2012). Global prevalence of autism and other pervasive developmental disorders. *Autism Research*, *5*(3), 160-179.

Evers, K., Steyaert, J., Noens, I., & Wagemans, J. (2015). Reduced recognition of dynamic facial emotional expressions and emotion-specific response bias in children with an autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*(6), 1774-1784.

Fine, S. E., Izard, C. E., Mostow, A. J., Trentacosta, C. J., & Ackerman, B. P. (2003). First grade emotion knowledge as a predictor of fifth grade self-reported internalizing behav- iours in children from economically disadvantaged families. *Development and Psychopathology*, *15*, 331–342.

Frijda, N. H. (1986). *The Emotions*. Cambridge: Cambridge. University Press.

Gentzler, A. L., Contreras-Grau, J. M., Kerns, K. A., & Weimer, B. L. (2005). Parent–child emotional communication and children's coping in middle childhood. *Social Development*, *14*(4), 591-612.

Geurt, H., Begeer, S., & Hoekstra, R. (2014). Prevalentiecijfers over autisme, accessed 03 March 2021, < https://www.autisme.nl/over-autisme/onderzoek-naar-autisme/prevalentiecijfers-over-autisme/>.

Greimel, E., Schulte-Rüther, M., Kamp-Becker, I., Remschmidt, H., Herpertz-Dahlmann, B., & Konrad, K. (2014). Impairment in face processing in autism spectrum disorder: A developmental perspective. *Journal of Neural Transmission*, *121*(9), 1171-1181.

Grossmann, T. (2010). The development of emotion perception in face and voice during infancy. *Restorative Neurology and Neuroscience, 28,* 219–236. doi:10.3233/RNN-2010-0499

Harms, M. B., Martin, A., & Wallace, G. L. (2010). Facial emotion recognition in autism spectrum disorders: a review of behavioral and neuroimaging studies. *Neuropsychology Review*, *20*(3), 290-322.

Harris, P. L. (2008). Children's understanding of emotion. In M. Lewis, J. M., Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of Emotion* (3rd ed., pp. 320–331). New York: Guilford Press.

Heck, A., Chroust, A., White, H., Jubran, R., & Bhatt, R. S. (2018). Development of body emotion perception in infancy: from discrimination to recognition. *Infant Behavior and Development*, *50*, 42-51.

Heerey, E. A., Keltner, D., & Capps, L.M. (2003). Making Sense of Self-Conscious Emotion. *Emotion, 3*(4), 394-400.

Herba, C., & Phillips, M. (2004). Annotation: Development of facial expression recognition from childhood to adolescence: Behavioural and neurological perspectives. *Journal of Child Psychology and Psychiatry*, *45*(7), 1185-1198.

Hobson, R. P., Chidambi, G., Lee, A., Meyer, J., Müller, U., Carpendale, J. I. M., Bibok, M., & Racine, T. P. (2006). Foundations for self-awareness: An exploration through autism. *Monographs of the Society for Research in Child Development*, i-166.

Hoffman, M.L. (2000). *Empathy and Moral Development: Implications for Caring and Justice*. Cambridge, United Kingdom: Cambridge University Press.

Horstmann, G. (2003). What do facial expressions convey: Feeling states, behavioral intentions, or actions requests? *Emotion*, *3*(2), 150.

Horwitz, A. V., & Wakefield, J. C. (2007). *The Loss of Sadness: How Psychiatry Transformed Normal Sorrow into Depressive Disorder*. Oxford, UK: Oxford University Press.

Hudry, K., & Slaughter, V. (2009). Agent familiarity and emotional context influence the everyday empathic responding of young children with autism. *Research in Autism Spectrum Disorders*, *3*(1), 74-85.

Humphreys, K., Minshew, N., Leonard, G. L., & Behrmann, M. (2007). A fine-grained analysis of facial expression processing in high-functioning adults with autism. *Neuropsychologia*, *45*(4), 685-695.

Hutman, T., Rozga, A., DeLaurentis, A. D., Barnwell, J. M., Sugar, C. A., & Sigman, M. (2010). Response to distress in infants at risk for autism: A prospective longitudinal study. *Journal of Child Psychology and Psychiatry*, *51*(9), 1010-1020.

Imm, P., White, T., & Durkin, M. S. (2019). Assessment of racial and ethnic bias in autism spectrum disorder prevalence estimates from a US surveillance system. *Autism*, *23*(8), 1927-1935.

Izard, C. E., Woodburn, E. M., & Finlon, K. J. (2010). Extending emotion science to the study of discrete emotions in infants. *Emotion Review, 2,* 134–136.

Jones, R. S. P. & Meldal, T. O. (2001). Social relationships and Asperger's syndrome. A qualitative analysis of first-hand accounts. *Journal of Intellectual Disabilities, 5*(1), 35-41.

Keenan, K. (2000). Emotion dysregulation as a risk factor for child psychopathology. *Clinical Psychology: Science and Practice*, (4), 418-434.

Keltner, D., & Kring, A. M. (1998). Emotion, social function, and psychopathology. *Review of General Psychology*, *2*(3), 320-342.

Keltner, D., Moffitt, T. E., & Stouthamer-Loeber, M. (1995). Facial expressions of emotion and psychopathology in adolescent boys. *Journal of Abnormal Psychology*, *104*(4), 644.

Kenny, L., Hattersley, C., Molins, B., Buckley, C., Povey, C., & Pellicano, E. (2016). Which terms should be used to describe autism? Perspectives from the UK autism community. *Autism, 20*(4), 442–462.

Ketelaar, L., Rieffe, C., Wiefferink, C. H., & Frijns, J. H. (2013). Social competence and empathy in young children with cochlear implants and with normal hearing. The *Laryngoscope*, *123(*2), 518-523.

Kim, Y.S., Leventhal, B.L., Koh, Y.J., Fombonne, E., Laska, E., Lim, E.C., Cheon, K.A., Kim, S.J., Kim, Y.K., Lee, H., & Song, D.H. (2011). Prevalence of autism spectrum disorders in a total population sample. *American Journal of Psychiatry*, *168*(9), pp.904-912.

Klin, A., Danovitch, J. H., Merz, A. B., & Volkmar, F. R. (2007). Circumscribed Interests in Higher Functioning Individuals with Autism Spectrum Disorders: An Exploratory Study. *Research and Practice for Persons with Severe Disabilities*, *32*(2), 89–100.

Kotroni, P., Bonoti, F., & Mavropoulou, S. (2019). Children with autism can express social emotions in their drawings. *International Journal of Developmental Disabilities*, *65*(4), 248-256.

Lagattuta, K. H., & Thompson, R. A. (2007). The development of self-conscious emotions: Cognitive processes and social influences. In J. L. Tracy, R. W. Robins, & J. P. Tangney (Eds.), *The Self- conscious Emotions: Theory and Research* (pp. 91–113). New York, NY: Guilford Press.

Lartseva, A., Dijkstra, T., & Buitelaar, J. K. (2015). Emotional language processing in autism spectrum disorders: a systematic review. *Frontiers in Human Neuroscience*, *8*, 991.

Law Smith, M.J., Montagne, B., Perrett, D. I., Gill, M., & Gallagher, L. (2010). Detecting subtle facial emotion recognition deficits in high-functioning Autism using dynamic stimuli of varying intensities. *Neuropsychologia, 48*(9), 2777-2781.

Lawson, W. (2006). *Friendships: The Aspie Way*. Jessica Kingsley Publishers.

Leach C.W. (2017) Understanding Shame and Guilt. In: Woodyatt L., Worthington, Jr. E., Wenzel M., Griffin B. (eds) *Handbook of the Psychology of Self-Forgiveness*. Springer, Cham.

Leary, M. R. (2004). Digging deeper: The fundamental nature of" Self-conscious" emotions. *Psychological Inquiry*, *15*, 129-131.Lewis, M. (2000). Self-conscious emotions: Embarrassment, pride, shame, and guilt. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (pp. 623–636). New York: Guilford Press.

Lewis, M. (2000). Self-conscious emotions: Embarrassment, pride, shame, and guilt. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (pp. 623–636). New York: Guilford.

Lockwood, P. L., Seara-Cardoso, A., & Viding, E. (2014). Emotion regulation moderates the association between empathy and prosocial behavior. *PloS One*, *9*(5), e96555.

Losh, M., & Capps, L. (2006). Understanding of emotional experience in autism: insights from the personal accounts of high-functioning children with autism. *Developmental Psychology*, *42*(5), 809.

Loukusa, S., Leinonen, E., Kuusikko, S., Jussila, K., Mattila, M.L., Ryder, N., Ebeling, H. and Moilanen, I. (2007). Use of context in pragmatic language comprehension by children with Asperger syndrome or high-functioning autism. *Journal of Autism and Developmental Disorders*, *37*(6), pp.1049-1059.

Lozier, L.M., Vanmeter, J.W., & Marsh, A.A. (2014). Impairments in facial affect recognition associated with autism spectrum disorders: A meta-analysis. *Development and Psychopathology, 26*(4pt1), 933-945.

Maenner, M. J., Shaw, K. A., & Baio, J. (2020). Prevalence of autism spectrum disorder among children aged 8 years—autism and developmental disabilities monitoring network, 11 sites, United States, 2016. *MMWR Surveillance Summaries*, *69*(4), 1.

Markram, K., & Markram, H. (2010). The intense world theory–a unifying theory of the neurobiology of autism. *Frontiers in Human Neuroscience*, *4*, 224.

Martin, S. E., Boekamp, J. R., McConville, D. W., & Wheeler, E. E. (2010). Anger and sadness perception in clinically referred preschoolers: Emotion processes and externalizing behavior symptoms. *Child Psychiatry & Human Development*, *41*(1), 30–46.

Mazefsky, C. A., Pelphrey, K. A., & Dahl, R. E. (2012). The need for a broader approach to emotion regulation research in autism. *Child Development Perspectives*, *6*(1), 92-97.

Milton, D. E. (2012). On the ontological status of autism: the 'double empathy problem'. *Disability & Society*, *27*(6), 883-887.

Moors, A., Phoebe, C., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: State of the art and future development. *Emotion Review, 5,* 119–124.

Morelli, S. A., Rameson, L. T., & Lieberman, M. D. (2014). The neural components of empathy: predicting daily prosocial behavior. *Social Cognitive and Affective Neuroscience*, *9*(1), 39-47.

Mul, C. L., Stagg, S. D., Herbelin, B., & Aspell, J. E. (2018). The feeling of me feeling for you: interoception, alexithymia and empathy in autism. *Journal of Autism and Developmental Disorders*, *48*(9), 2953-2967.

Muris, P., & Meesters, C. (2014). Small or big in the eyes of the other: On the developmental psychopathology of self-conscious emotions as shame, guilt, and pride. *Clinical Child and Family Psychology Review*, *17*(1), 19-40.

Netten, A. P., Rieffe, C., Theunissen, S. C., Soede, W., Dirks, E., Briaire, J. J., & Frijns, J. H. (2015). Low empathy in deaf and hard of hearing (pre) adolescents compared to normal hearing controls. *PloS One*, *10*(4), e0124102.

Nuske, H. J., Vivanti, G., & Dissanayake, C. (2013). Are emotion impairments unique to, universal, or specific in autism spectrum disorder? A comprehensive review. *Cognition & Emotion*, *27*(6), 1042-1061.

Pouw, L. B., Rieffe, C., Oosterveld, P., Huskens, B., & Stockmann, L. (2013). Reactive/proactive aggression and affective/cognitive empathy in children with ASD. *Research in Developmental Disabilities*, *34*(4), 1256-1266.

Rieffe, C. (2014). La regulación emocional infantil en contexto social (Children's emotion regulation in a social context). González, R. & Villanueva, L. (Eds.), *Emociones y bienestar en el desarrollo humano (Emotions and well- being in human development* (pp.125-150). Valencia: Publicaciones de la Universidad de Valencia.

Rieffe, C., Ketelaar, L., & Wiefferink, C. H. (2010). Assessing empathy in young children: Construction and validation of an Empathy Questionnaire (EmQue). *Personality and Individual Differences*, *49*(5), 362-367.

Robertson, S. M., & Ne'eman, A. D. (2008). Autistic acceptance, the college campus, and technology: Growth of neurodiversity in society and academia. *Disability Studies Quarterly*, *28*(4).

Rosen, T. E., & Lerner, M.D. (2016). Externalizing and Internalizing Symptoms Moderate Longitudinal Patterns of Facial Emotion Recognition in Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, 46(8), 2621-2634.

Russell, G., Rodgers, L. R., & Ford, T. (2013). The strengths and difficulties questionnaire as a predictor of parent-reported diagnosis of autism spectrum disorder and attention deficit hyperactivity disorder. *PloS One*, *8*(12), e80247.

Saarni, C., Campos, J. J., Camras, L. A., & wWitherington, D. (2006). Emotional development: Action, communication, and understanding. In W. Damon & R. L. Lerner (Series Eds.) and N. Eisenberg (Vol. Ed.), *Handbook of Child Psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 226–299). Hoboken, NJ: Wiley.

Saemundsen, E., Magnússon, P., Georgsdóttir, I., Egilsson, E., & Rafnsson, V. (2013). Prevalence of autism spectrum disorders in an Icelandic birth cohort. *BMJ open*, *3*(6).

Salazar, F., Baird, G., Chandler, S., Tseng, E., O'sullivan, T., Howlin, P., Pickles, A.& Simonoff, E. (2015). Co-occurring psychiatric disorders in preschool and elementary school-aged children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*(8), 2283-2294.

Schendel, D. E., & Thorsteinsson, E. (2018). Cumulative incidence of autism into adulthood for birth cohorts in Denmark, 1980-2012. *Jama*, 320(17), 1811-1813.

Scherer, K. R. (2000). Emotion. In M. Hewstone & W. Stroebe (Eds.). *Introduction to Social Psychology: A European Perspective* (3rd ed., pp. 151-191). Oxford: Blackwell.

Schultz, D., Izard, C. E., & Ackerman, B. P. (2000). Children's anger attribution bias: Relations to family environment and social adjustment. *Social Development*, *9*, 284–301.

Streubel, B., Gunzenhauser, C., Grosse, G., & Saalbach, H. (2020). Emotion-specific vocabulary and its contribution to emotion understanding in 4-to 9-year-old children. *Journal of Experimental Child Psychology*, *193*, 104790.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child & Adolescent Psychiatry*, *47*(8), 921-929.

Sinclair, J. (1999). Why I dislike 'person-first' language. Available at http://web.archive.org/web/20090210190652/http://web.syr.edu/~jisincla/person_first.htm

Schroeder, J. H., Cappadocia, M. C., Bebko, J. M., Pepler, D. J., & Weiss, J. A. (2014). Shedding light on a pervasive problem: A review of research on bullying experiences among children with autism spectrum disorders. *Journal of Autism and Developmental disorders*, *44*(7), 1520-1534.

Gernsbacher, M. A. (2017). Editorial perspective: The use of person- first language in scholarly writing may accentuate stigma. *Journal of Child Psychology and Psychiatry, 58*(7), 859–861.

Tanaka, J. W., & Sung, A. (2016). The "eye avoidance" hypothesis of autism face processing. *Journal of Autism and Developmental Disorders*, *46*(5), 1538-1552.

Tardif, C., Lainé, F., Rodriguez, M., & Gepner, B. (2007). Slowing Down Presentation of Facial Movements and Vocal Sounds Enhances Facial Expression Recognition and

Induces Facial–Vocal Imitation in Children with Autism. *Journal of Autism and Developmental Disorders, 37*(8), 1469-1484.

Tracy, J. L., & Robins, R. W. (2004). Putting the self into self-conscious emotions: A theoretical model. *Psychological Inquiry*, *15*(2), 103-125.

Vivanti, G. (2020). Ask the editor: What is the most appropriate way to talk about individuals with a diagnosis of autism? *Journal of Autism and Developmental Disorders*, *50*(2), 691-693.

Wevers, J. (2020). Autist of person met autisme? *Autisme Magazine*, *47*(3), 16-17.

Widen, S. C., & Russell, J. A. (2008). Children acquire emotion categories gradually. *Cognitive development*, *23*(2), 291-312.

Williams, G. (1996). Representing disability: some questions of phenomenology and politics. In: Barnes, C. and Mercer, G. (eds.) *Exploring the Divide*, pp. 1194–1212. Leeds: The Disability Press.

Wörmann, V., Holodynski, M., Kärtner, J., & Keller, H. (2012). A cross-cultural comparison of the development of the social smile: A longitudinal study of maternal and infant imitation in 6-and 12-week-old infants. *Infant Behavior and Development*, *35*(3), 335-347.

Wright, B. A. (1983). *Physical Disability: A Psychosocial Approach*. New York, NY: Harper & Row.

Wright, B., Clarke, N., Jordan, J.O., Young, A. W., Clarke, P., Miles, J., Nation, C., Clarke, N., Williams, C. (2008). Emotion recognition in faces and the use of visual context Vo in young people with high-functioning autism spectrum disorders. *Autism: The International Journal of Research and Practice, 12*(6), 607-626.

Xavier, J., Vignaud, V., Ruggiero, R., Bodeau, N., Cohen, D., & Chaby, L. (2015). A multidimensional approach to the study of emotion recognition in autism spectrum disorders. *Frontiers in Psychology*, *6*, 1954.

Zeman, J., Shipman, K., & Suveg, C. (2002). Anger and sadness regulation: Predictions to internalizing and externalizing symptoms in children. *Journal of Clinical Child and Adolescent Psychology*, *31*, 393–398.