Emotion regulation in children with autism spectrum disorder : the link with social functioning and psychopathology

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The link with social functioning and psychopathology

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Emotion regulation in children with Autism Spectrum Disorder
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CONTENTS

Chapter 1

General Introduction

“'I feel too much. That's what's going on.' 'Do you think one can feel too much? Or just feel in the wrong ways?' 'My insides don't match up with my outsides.' 'Do anyone's insides and outsides match up?' 'I don't know. I'm only me.' 'Maybe that's what a person's personality is: the difference between the inside and outside.' 'But it's worse for me.' 'I wonder if everyone thinks it's worse for him.' 'Probably. But it really is worse for me.'”

Jonathan Safran Foer, Extremely Loud and Incredibly Close

Autism spectrum disorders (ASD) are lifelong, neurobiological developmental disorders that are characterized by impairments in social interaction, communication, and by restricted and stereotypical behaviors. In this thesis, the term ASD will be used to refer to autistic disorder, Asperger syndrome, and Pervasive Developmental Disorder not Otherwise Specified (PDD-NOS). Prevalence estimates of ASD have been considered to be around 1% (Baird et al., 2006), but are rapidly increasing (Matson & Kozlowski, 2011). This increase in prevalence of ASD has been attributed to broader ASD diagnostic criteria, lower age at diagnosis, greater public awareness, and environmental components (e.g., toxic chemicals and gene mutations) (Fombonne, 2009; Matson & Kozlowski, 2011). In order to create a homogenous group this thesis is focused on a sample of high functioning children with ASD (HFASD). This should confine our insights to the consequences of this disorder on children's functioning without other confounding variables such as intelligence impacting on this relation.

Although not officially classified, emotional impairments are part of the characteristics of ASD (Begeer et al., 2008), which are presented in difficulties with coping with changes and new situations, and participating in social activities (Gomot & Wicker, 2012; Orsmond, Krauss, & Seltzer, 2004). More and more research shows that impaired emotion regulation is often the underlying cause for these difficulties (Laurent & Rubin, 2004). Emotion regulation refers to the processes that influence when we have certain emotions, how we experience emotions, and how we express these (Gross & Thompson, 2007).

In typical development (TD), emotion regulation is strongly linked to social functioning as well as to psychopathology (Cicchetti, Ackerman, & Izard, 1995; Gross, 2002). Although research indicates that children and adolescents with ASD experience difficulties in regulating their emotions (Laurent & Rubin, 2004), studies about the impact of impaired emotion regulation on social functioning and psychopathology in children with ASD are still scarce (Mazefski, Pelphrey, & Dahl, 2012). If we only look at group differences in emotion regulation, the common approach is to try to help children catch up with their TD peers. Yet, it could also be that these differences are adaptive for children with ASD. Only when we look at the whole picture, i.e., examine how their capacity for emotion regulation affects their daily functioning, can we begin to understand what we should or should not try to remediate in these children. **Therefore, in this thesis we examine how different aspects of emotion regulation are linked to social functioning and psychopathology in children and adolescents with ASD as compared to their Typically Developing (TD) peers.**

Emotions

This thesis is embedded in a theoretical framework which is based on the notion that emotions have a communicative and a functional value. The experience of an emotion signals to the individual that (1) a concern is at stake, and (2) a reaction is needed (action readiness). A concern could be personal (e.g., getting a bad grade), or relational (e.g., having an argument a significant other). In the situation in which a child or adolescent has an argument about who's turn it is on the computer, feelings of anger could arise. The emotion anger is functional such that it enables you to communicate your boundaries and attain your goals. A simplified model of the process occurring within an emotion is provided by Gross and Thompson (2007) and is illustrated by Figure 1.

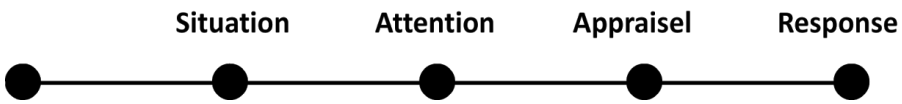

Figure 1. Emotion Process

An emotion always starts with a psychologically relevant *situation*. For example, in the middle of the night you are lying in bed and you hear the front door opening. Immediately, your *attention* is drawn to the situation. Or in other words, the emotion forces itself to your awareness (Frijda, 1986). As a consequence, bodily systems activate, such as changes in blood pressure and heart rate. Emotions are functional in a way that it makes us feel like doing something, the so-called *action tendency*. In case of fear, you tend to fight or flight. Additionally, the situation which is attended to (sound of opening door), gives rise to a cognitive evaluation or *appraisal* of the eliciting event; you may want to run to the door to see what is happening, or you may want to stay in bed and hide under the blankets. The product of this appraisal is the actual *response*, such as running to the door or hiding under the blankets. In turn, this response changes the situation and the process starts all over again. For example, you run to the door and realize that you forgot to lock the door and the wind blew it open. As a consequence you may feel relieved.

Situations in which you feel there is real danger or threat, automatic action patterns are essential for survival (e.g., running to the door to attack an intruder). However, these primary action tendencies are not always accepted and needed in more complex social situations. For example, in a meeting at work, you are annoyed by a colleague who is criticizing your work. Your first tendency is to make a comment about it to express your discontent. However, in order to attend to personal goals as well as social goals (such as maintaining a pleasant atmosphere during the meeting), a more socially acceptable and regulated form of the emotional reaction is needed. The so-called cognitive control system accounts for this reappraisal of the emotion, and enables people to adaptively respond to an emotionally arousing situation (Gross & Thompson, 2007). Thus, in order to attend to the social demands of the environment and maintain socially engaged, emotions need to be regulated.

Primary reactions to emotions are more prominently expressed by young children, in comparison to adults. For example, when a child is faced with a strange looking object, the child might feel afraid. As a consequence the child might start to cry, run away, or even attack the object. As children get older, they learn how to inhibit these impulsive reactions and their emotion expressions get more sophisticated and adapted to the social environment. Parents, caregivers and teachers play an important role by teaching children certain emotion regulation strategies. For example, a parent might teach their child how to ask the teacher for help, when a peer takes their toy. Or, the teacher might teach a child to count till 10 when the child is very angry.

Children and adolescents with ASD are faced with impairments in social communication and differences in neurophysiology, which means that social interactions might be unpredictable and they might be oversensitive to change. These impairments may prevent children and adolescents with ASD from learning emotion regulation strategies. For example, a hug from a parent might not be

recognized as comforting behavior. Oversensitivity for sound may prevent a child from participating in new environments, such as a playground. As a consequence of these impairments, children with ASD might withdraw themselves from social situations or develop inappropriate self-regulatory behaviors (e.g., lashing out) (Laurent & Rubin). In this thesis, we examine how emotion regulation is linked to social functioning and psychopathology in children and adolescents with ASD.

Emotion regulation

It is important to note that in this thesis we take a broad perspective on 'emotion regulation' in children with ASD by examining (i) an important prerequisite for emotion regulation, namely emotion awareness, (ii) coping strategies, and (iii) the understanding of others' emotions or empathy. To consider emotion regulation in terms of these three aspects stems from the idea that a successful exchange of emotional information can only be established when children are aware of their own emotions, but also understand and react to their own and others' emotions appropriately (Halberstadt, Denham, & Dunsmore, 2001).

i) Emotion awareness refers to the ability to differentiate between various emotions, to determine antecedents and possible consequences of emotions, to verbally share emotions, and to identify the physiological changes that accompany emotions. Lambie and Marcel (2002) consider emotion awareness to be a precondition for adaptive emotion regulation. In order to effectively regulate or cope with one's own emotions, it is necessary to have a certain insight into one's own emotions. There are several aspects of the emotion process of which one could be aware (Lambie & Marcel, 2002). First, there are the bodily changes which arise with the emotion, such as heart rate, breathing change, and tense muscles (Scherer & Wallbot, 1994). Secondly, there are the conscious thoughts, such as whether or not the emotion causing event is regarded as beyond one's control. Third, there are the action urges, such as wanting to move or wanting to protect (Lambie & Marcel, 2002). The emotion experience consists of all these three aspects. By understanding and identifying one's own emotion experience, one becomes able to control primary emotional reactions. For example, when a child recognizes an experienced emotion as anger, he/she knows that counting to 10 is a way to reduce the anger. Children learn to recognize their emotions by self-monitoring, observing others and the information provided by the community. For example, parents and caregivers teach their children when they experience sadness ("You're crying, don't be sad"). In TD children and adolescents, emotion awareness is associated with mental well-being and social functioning, in terms of decreased levels of internalizing symptoms and somatic complaints, and higher levels of friendship quality (Kouwenberg, Rieffe, & Banerjee, 2012; Rieffe & De Rooij, 2012; Rieffe et al., 2007b).

The tendency to neglect emotion expressions of others might prevent children with ASD to learn from their environment in recognizing their own emotions (Begeer, et al., 2008; Begeer, Rieffe, Terwogt, & Stockmann, 2006; Laurent & Rubin, 2004). Additionally, because these children express their own emotions to a lesser extend compared to their TD peers, they might receive less feedback from their environment (Laurent & Rubin, 2004). These factors make it difficult for children with ASD to learn from their environment in linking their own internal signals to a certain emotion. To illustrate, children with ASD appear to have difficulties with describing and identifying their emotions (Hill, Berthoz, & Frith, 2004; Rieffe, Meerum Terwogt, & Kotronopoulou, 2007a). For example, in a study by Rieffe, Meerum Terwogt, and Kotronopoulu (2007a) children with ASD were presented with a structured interview about their own emotion experiences. From this study it is shown that children with

ASD, besides having an impaired ability in differentiating between complex emotions, also show an impaired in understanding of causes of their own emotions. More precisely, although children with ASD were able to differentiate between the emotions happiness, sadness, anger, and fear, they had difficulties with respect to the awareness of more complex emotions, such as jealousy, pride or shame. Next to establishing the level of emotion awareness in children with ASD, we examine how emotion awareness is linked to the quality of peer relationships and internalizing symptoms.

ii) The second aspect of emotion regulation which we examine in this thesis is coping, which refers to regulating the emotional impact of a stressful event (Lazarus & Folkman, 1984). As described earlier, primary emotional reactions are not always accepted by the social environment. In order to modify these primary impulses, different (cognitive) coping strategies could be applied. For example, when a child is faced with a problem that accompanies negative emotions, it is more beneficial to stop and think of a possible solution, instead of venting anger through externalization (e.g., screaming or hitting doors). From a very young age, children are taught by their parents and caregivers how to modify these initial emotional impulses, and therefore meet the demands from society, without giving up their personal goals.

Children with ASD show different emotional reactions than those that would be expected in certain situations (e.g., laughing when a peer is crying), and they tend to overreact to arousing or threatening events with sometimes social withdrawal as a consequence (Loveland, 2005). During parent meetings for our research project, parents of children with ASD often told about instances where their children have out-of-control reactions and tantrums. Children with ASD experience difficulties in interpreting, recognizing and communicating emotions which prevents them from learning cognitive strategies to deal with their emotions. If a parent of a child with ASD does not know when their child is angry or scared, the parent is unable to support their child in regulating these emotions (e.g., "You are angry, count till ten and you will feel better".)

In this thesis we examine three kinds of coping styles, including approach coping, avoidant coping, and maladaptive coping in children with ASD. Approach coping styles include strategies in which the emotion evoking problem is approached, such as seeking social support, or trying to find a solution for the problem. Avoidant coping styles include strategies in which the problem is avoided, such as seeking distraction, or trivializing the problem. Maladaptive coping strategies include internalizing behaviors (e.g., worrying and rumination), and externalizing behavior (e.g., punching and screaming). In TD development, coping styles are strongly associated with psychological functioning. For example, approach coping styles are associated with less symptoms of depression (Wright, et al., 2010).

Research shows that children with ASD tend to use less approach coping styles than TD children (Rieffe et al., 2011). However, relatively few studies examined effects of different coping styles on psychological functioning. For example, whereas it is clear that maladaptive coping styles (e.g., rumination, acting out) are related to more internalizing symptoms in children with ASD and TD children (Rieffe, et al., 2011), it is still unclear what the effects of avoidant coping styles for psychological functioning are for children with ASD. Examining the effects of avoidant coping styles in children with ASD is especially important, because these children often make use of avoidance, or social withdrawal, when facing an emotion evoking situation (Loveland, 2005). As coping styles are indicative of psychological functioning (Rieffe, et al., 2011; Wright et al., 2010), in this thesis we examine coping styles in children with ASD and how these are related to symptoms of depression.

iii) The third aspect of emotion regulation which we examine in this thesis is empathy. Empathy refers to the ability to accurately perceive and understand another person's emotions and to react to these emotions appropriately (Rieffe, Ketelaar, & Wiefferink, 2010). Empathy is an important feature of human interpersonal behavior. Besides sharing and understanding other people's feelings and intentions, it also motivates to help others and to prevent people from hurting each other (Baron-Cohen & Wheelwright, 2004). Different layers of empathy can be distinguished (Leiberg & Anders, 2006). First, there is emotional contagion or affective empathy. While observing someone having a certain emotion, the same affective state is triggered in the observer.

Although children with ASD have several problems with the detection and apprehension of others' emotions, they are not insensitive to the distress of other people. For example, research showed that children with ASD get as emotionally (if not more) aroused in response to distress cues in pictures of faces, as TD children (Blair, 1999). This over-arousal could be caused by their limited ability to differentiate between one's own and other's emotions. This could lead to an inefficient empathic reaction to the emotions of others, because their own emotions instead of the others' are the main object of their attention. In recent research emotional contagion has been linked to mirror neuron activity in the parietal/frontal part of the brain (Cattaneo & Rizzolatti, 2009). These mirror neurons activate while performing a goal-directed action, but also when observing someone else perform an action. Studies on the activity of the mirror neuron system (MNS) in individuals with ASD show mixed results, with some studies showing that mirror neurons are inactive in people with ASD (e.g., Dapretto et al., 2006), and more recent research showing that the (MNS) is active (Fan et al., 2010; Press, Richardson, & Bird, 2010). Differences between results of these studies could be explained by the fact that children with ASD are less attentive to social stimuli by nature, rather than inactive mirror neurons (Press, 2010). The results from the study by Fan and colleagues (2010) and Press and colleagues (2010), combined with the results from Blair (1999) showing that children with ASD are not impaired in affective empathy point to the idea that empathic impairments in children with ASD have to stem from the other domain, namely cognitive empathy.

Cognitive empathy, or perspective taking is a higher-order level of empathy. In order to react empathically to another person's emotion, one should be able to understand the other's emotion and its antecedents. The cognitive ability to place oneself in someone else's mental state is also referred to as Theory of Mind (ToM). Theory of mind is the capacity to understand or predict others' behaviors based on the subjective desires and/or beliefs of that other person (Gordon, 1992). For an adaptive empathic response to occur, the other-oriented and self-oriented focus should be balanced (Eisenberg et al., 1996a). In other words, the observer should recognize that his/her own arousal is a consequence of the other's emotion and not one's own emotion, which requires a certain level of cognitive empathy. Personal or empathic distress occurs when the observer is unable to understand or react to the other's emotion. As a consequence, the observer is too caught up in their own emotions and is unable to tune into the other's emotional state.

In TD children, personal distress can be observed in very young children, when they lack the cognitive abilities to distinguish the other's emotions from their own emotions. However, personal distress decreases naturally with age when children's skills for cognitive emotion regulation develop (Rieffe et al., 2010). Eventually, empathy is supposed to induce prosocial behaviors, such as helping, sharing, comforting, in an attempt to alleviate the other person's distress. In TD development,

empathy is strongly related to social functioning and psychopathology (Blair, 2010; Eisenberg et al., 1996b).

It is well known that people with ASD show deficits in cognitive empathy and ToM development (Baron-Cohen, Leslie, & Frith, 1985; Dziobek et al., 2008; Jones et al., 2010; Rogers et al., 2007). Children with ASD appear to be less able to recognize mental states of others, and to understand causes of others' emotions (Dziobek, et al., 2008; Jones, et al., 2010). These ToM deficits also underlie their restricted capacity to differentiate between one´s own and others' emotions. Loveland (2005) argues that because of impaired cognitive empathy, these children are unable to use emotional information of the other person in order to adjust and regulate their own behavior. Furthermore, children with ASD are less aware of the consequences that their own behavior has on other people, which makes it even more difficult to 'fit in' with the social world (Loveland, 2005). It has therefore been argued that the imbalance between affective and cognitive empathy is responsible for decreased empathic or prosocial behavior in children with ASD (Smith, 2009). Although the consequences of impaired cognitive empathy are plausible, relatively few studies have examined this. In this thesis, we examine to what extent this imbalanced development of empathy in children with ASD is linked to several aspects of social functioning and psychopathology.

Research themes and thesis structure

Research concerning the link between impaired emotion regulation and social functioning and psychopathology is emerging (e.g., Laurent & Rubin, 2004). Increasing our knowledge about this link can potentially greatly impact the way that children with ASD are regarded, and how parents, professionals, and teachers interact with these children. In **chapter 2** we examine how different aspects of emotion processing are related to three indices of anxiety. Anger and shame experiences during social situations are taken into account in order to examine how feelings of anxiety in children with ASD arise. In **chapter 3** we examine coping styles, and how these are related to depression. Moreover, we examine whether certain aspects of social functioning independently contribute to symptoms of depression in children with ASD, compared to TD children. In **chapter 4** we examine empathy in children with ASD more thoroughly, and how different aspects of empathy are related to aggressive behavior. Our concern in this chapter is to examine whether aggressive behavior in children with ASD could be interpreted the same way as in TD children. Moreover, emotion regulation in the form of anger dysregulation is taken into account in order to gain more knowledge about the motives for aggressive behavior in children with ASD. In **chapter 5** we examine victimization and bullying in children with ASD, and how emotion dysregulation is related to these social aspects, as compared to TD children. In **chapter 6** we are concerned with the examination of the quality of peer friendships and how friendship quality is related to emotion awareness and empathy. Examining these associations enables us to say something about the emotional value of peer relationships in children/adolescents with ASD, compared to TD children. Finally, in **chapter 7** the impact and possible implications of the outcomes of the studies included in this thesis are discussed.

Chapter 2

Emotion understanding, emotion regulation, and anxiety in boys with an autism spectrum disorder

Abstract

High levels of anxiety are a common problem in children and adolescents with an autism spectrum disorder (ASD), and frequently associated with a range of other internalizing and externalizing problems. Higher levels of anxiety are often linked to an impaired emotion regulation. In this study, we examined the extent to which emotion understanding and regulation contributed to the prediction of lower levels of self-reported anxiety in boys with ASD (*N*=55, *M*age=141), compared to TD boys (*N*=48, *M*age=139). The results showed that a greater understanding of one's own emotions was related to less anxiety in both groups, but understanding of other's emotions was only beneficial in TD boys. Shame was positively related with social anxiety and sense of coherence in both groups. However, only in boys with ASD, anger related positively to social anxiety, suggesting that impaired emotion regulation skills are a strong predictor for internalizing problems in these children. Future research should focus on the longitudinal relation between emotion regulation and internalizing problems.

Introduction

Internalizing problems and in particular anxiety disorders are very common in children with an Autism Spectrum Disorder (ASD) (Russell & Sofronoff, 2005; Simonoff et al., 2008; Stewart et al., 2006; Weisbrot, Gadow, DeVincent, & Pomeroy, 2005). A variety of issues, such as changes in routine and environment, and social interactions could evoke feelings of anxiety in this particular group (Attwood, 1998). Higher levels of anxiety in children with ASD are associated with a range of additional problems in (later) life, such as isolation, depression, and aggression (Tantam, 2000). Yet, little is known about possible underlying factors in the development of anxiety in children with ASD. In typically developing (TD) children, internalizing problems are often linked to several aspects of emotion regulation (Rieffe & De Rooij, 2012; Rieffe, et al., 2011; Southam-Gerow & Kendall, 2002; Suveg & Zeman, 2005). Therefore, in this study we aim to examine which factors of emotion regulation contribute to the prediction of anxiety in boys with ASD, compared to TD boys.

Anxiety in children with ASD

Anxiety is an emotional response to perceived or anticipated danger or threat. Anxiety includes physiological responses such as freezing, startle, heart rate, blood pressure changes, and increased vigilance, which prepare the individual to quickly and adaptively react, thus facilitating avoidant or defensive behaviors (Frijda, 1986). Anxiety becomes an anxiety disorder and thus maladaptive when it is characterized by a high negative affect combined with a sense of uncontrollability, hypervigilance, irritability, and an inability to concentrate on normal daily tasks, or sleep disturbance (Rosen & Schulkin, 1998).

High levels of anxiety in children with ASD are a well-documented problem (Farrugia & Hudson, 2006; Kim et al., 2000; Sukhodolsky et al., 2008). Van Steensel, Bogels, and Perrin (2011) reviewed 31 studies that examined the prevalence of high levels of anxiety in children and adolescents (under 18 years) with ASD and found that nearly 40% of the children with ASD are diagnosed with at least one anxiety disorder. Among the most common anxiety disorders in children with ASD are specific phobia (29,8%), generalized anxiety (15,4%), and social anxiety (16,6%) (van Steensel, et al., 2011). Despite of the high prevalence of anxiety symptoms in ASD, clinicians find it difficult to determine whether these anxiety symptoms are part of the ASD, or whether they should be conceptualized as an anxiety disorder in itself. Van Steensel and colleagues (2011) argue that this is mainly due to diagnostic overlap and the use of measures of anxiety, which are not always applicable to children with ASD.

In TD children, anxiety problems are strongly based in impaired emotion understanding and regulation (Carthy, Horesh, Apter, & Gross, 2010). Children with impaired emotion understanding and regulation skills are less able to access and use emotional information effectively in order to adaptively respond to emotional experiences (Mennin, Heimberg, Turk, & Fresco, 2002). Problems in the emotion understanding and regulation are also frequently noted in children with ASD (Laurent & Rubin, 2004), and could therefore also be an important factor in the etiology of anxiety in this group. The aim in this study is to examine the extent to which various aspects of emotion understanding and regulation contribute to the prediction of anxiety in children with ASD as compared to their TD peers.

Understanding and regulation of emotions

Frijda (1986) states that an emotion experience can only arise in its situational context. In other words, an emotion is related to an external event, to which one should quickly and adaptively react. Therefore, one has to recognize this fact that one's own emotion is a reaction to an external event, rather than that an emotion is merely an affective state that just appears out of nothing. The ability to analyze emotions in relation to the emotion-evoking situation, which denotes an external focus on emotion experience, is related to more effective emotion regulation (Barrett, Gross, Christensen, & Benvenuto, 2001). Apparently, understanding how and why an emotion arises provides important information about how to deal with the situation that is causing it. In addition, children who pay more attention to internal signals such as bodily arousal during an emotion experience, are less focused on the outside world (i.e., the emotion-evoking situation) and are most at risk for developing internalizing symptoms, such as anxiety (Rieffe & De Rooij, 2012).

Children with ASD find it more difficult to identify and describe their feelings in relation to the emotion-evoking situation (Hill, et al., 2004), and are less able to thoroughly analyze the emotion-evoking event (Rieffe, et al., 2007a), which also indicates limited ability for emotion regulation. Indeed, another study by Rieffe and colleagues (2011) confirmed a more internal focus during an emotional state in children with ASD compared to typically developing children. Although it appears that an internal focus on emotions, in children with ASD, is related to depression (Rieffe, et al., 2011), it is not yet clear whether an internal focus on emotions is also related to anxiety in these children.

When emotions are not well processed and reacted on, dysregulation of emotions can occur. Dysregulation of anger seems to play an important role in anxiety disorders (Zeman, Shipman, & Suveg, 2002). Suveg and Zeman (2005) examined emotion regulation in children with anxiety disorders and found that children with anxiety disorders reported more intense and dysregulated feelings of anger. In addition, anger dysregulation is found to be associated with more internalizing symptoms, such as anxiety and depression (Zeman, et al., 2002). Children with ASD are known for their impaired emotion regulation skills, in terms of hypersensitivity to environmental and social stimuli, and strong fluctuations in arousal level (see for review Laurent and Rubin, 2004). Furthermore, children with ASD are often faced with heightened level of anger (Sofronoff, Attwood, Hinton, & Levin, 2007). Although parents notice that anxiety in children with ASD is often released in an angry or aggressive way, the relationship between anxiety and anger has not been studied yet (Ozsivadjian & Knott, 2011).

Besides an impaired understanding of one's own emotions, misunderstanding of others´ emotions could also create feelings of confusion and anxiety. Southam-Gerow and Kendall (2002) suggest a relationship between understanding causes for others' emotions, or so-called empathic understanding, and psychopathology. Or in other words, insight into and interest for how others' emotions work could be associated with better emotion regulation. However, to our knowledge, the direct relationship between empathic understanding and anxiety problems in TD children has not yet been studied yet. Children with ASD are less able to infer mental states and take another's perspective and therefore have a lesser degree of empathic understanding, compared to TD children (Baron-Cohen, et al., 1985; Jones, et al., 2010; Pouw et al., 2013; Rogers, et al., 2007). Difficulty in understanding others' emotions could create confusion about the (social) world around them. However, to date it is unknown to what extent impaired empathic understanding is indeed linked to more anxiety in children with ASD.

As children are trying to understand the other's emotions, they become more aware of other people's perspectives. A frequently denoted emotion associated with social anxiety in particular is shame. Shame underlies social anxiety whereas it induces fear of negative evaluation by others and nervousness for anticipated and actual interactions with others (Stein & Stein, 2008). Shame expression communicates an individual's awareness that s/he has jeopardized future acceptance and the intention to avoid the same happening again (Olthof, 2012; Tangney, 1991). Although shame is an adaptive emotion to keep people behaving within the norms and values of their cultural or social group, too much shame, or shame at inappropriate times can point at a self-awareness that is too strong, prohibiting the person to react adaptively, and thus, high levels of shame can become maladaptive.

Fergus, Valentiner, McGrath, and Jencius (2010) argue that shame proneness is an important underlying factor of anxiety disorders. Shame can be related to feelings of vulnerability, loss of social standing and rejection or criticism, and the concern about what others think about you, which could induce and maintain social anxiety (Gilbert, 2000). Although children with ASD report lower levels of shame compared to their TD peers (Rieffe et al., 2012), studies concerning the direct (longitudinal) relationship between shame and (social) anxiety in children with ASD are lacking. However, a strong relation is found between shame and social anxiety in TD adults (Gilbert, 2000), and in clinical samples diagnosed with an anxiety disorder (Fergus, et al., 2010).

Present study

The aim of this study was to examine the extent to which the same aspects of emotion understanding and regulation contribute to the prediction of anxiety in children with ASD and TD children. We included only boys in our study, because girls in the sample were too scarce in number to include them in the analyses. Three indices for anxiety were included: specific anxiety, social anxiety and sense of coherence (SoC). SoC refers to the extent to which negative situations are perceived as unstructured, unpredictable and therefore uncontrollable (Antonovsky, 1993). Children with a low sense of coherence have difficulty with understanding the meaning of situations, and find it hard to make sense of them, and controlling them (Jellesma, Rieffe, Terwogt, & Kneepkens, 2006). It can be expected that boys with ASD will score higher on specific and social anxiety, and lower on SoC. Because a multi-informant approach of measuring psychiatric symptoms in children (with ASD) has proven to be of great added value (e.g., Hurtig et al., 2009; MacNeil, Lopes, & Minnes, 2009), we used both boys and parents as informants to indicate differences in the levels of anxiety in boys with and without ASD.

Differences in the level of understanding and regulation emotions were examined. Based on previous studies, we expected lower levels on external focus on emotions and empathic understanding in boys with ASD compared to a TD group of boys (Jones et al., 2010; Rieffe et al., 2011). Furthermore, boys with ASD were also expected to score higher on anger (Sofronoff et al., 2007), and lower on shame (Rieffe et al., 2012) than their TD peers.

Second, the relations between anxiety, SoC, and emotion understanding and regulation were examined. We expected higher levels of external focus on emotions to be associated with lower levels of specific anxiety and social anxiety and positively associated with sense of coherence in both groups (Rieffe & De Rooij, 2012; Rieffe et al., 2011) . We expected empathic understanding to be negatively associated with specific anxiety and social anxiety and positively associated with sense of coherence in TD boys (Southam-Gerow & Kendall, 2002). Because studies examining the link

between empathic understanding and anxiety in children with ASD are lacking, there were no expectations concerning this link. However, results of a previous study in children with ASD found that empathic understanding does not have a protective role in externalizing behaviors in children with ASD (Pouw, et al., 2013). Possibly, this also accounts for internalizing behaviors.

Anger was expected to be associated with more specific and social anxiety in both groups (Suveg & Zeman, 2005; Zeman, et al., 2002), but this relation was expected to be more evident in boys with ASD, because of their poor emotion regulation skills. Examining the link between anger and sense of coherence in both groups was explorative. Shame was expected to be associated with social anxiety, and not specific anxiety in both groups (Green & Ben-Sasson, 2010). Again, examining the link between shame and sense of coherence in both groups was explorative.

Method

The ASD sample included 61 high functioning boys diagnosed with ASD (*M*age = 141 months, *SD* = 16.1, age range: 113 - 177 months) based on the Autism Diagnostic Interview-Revised (Lord, Rutter, & Lecouteur, 1994) by child psychiatrists. The ASD participants met the inclusion criteria (i) IQ scores above 80, (ii) diagnosed with ASD of the *DSM-IV* (American Psychiatric Association, 1995), and (iii) no other diagnosed psychiatric disorders. Participants were recruited from 1. Centre for Autism, Leiden, the Netherlands; 2. Dr. Leo Kannerhuis, Doorwerth, the Netherlands; 3. C.P. Van Leersumschool, Zeist, the Netherlands. These institutions are specialized in treating and diagnosing children with ASD. A letter was sent to all parents of children with an ASD diagnosis between 9 and 15 years of age. A total of 83 parents of ASD children (73 boys) gave their consent to participate in the study. Only children who completed all self-report questionnaires were included in this study.

The TD group included 59 typically developing boys (*M*age = 139 months, *SD* = 15.1, age range: 116 – 176 months) and was drawn from primary and secondary schools in the Netherlands. Inclusion criteria for the TD group were (i) IQ above 80, (ii) no diagnosed developmental disorders. Again, only children who completed all self-report questionnaires were included in this study. The TD group was matched with the clinical group on sex and mean age. From three ASD children and six TD children IQ scores could not be obtained. From 11 children with ASD and 12 TD children, parents did not answer questions concerning socioeconomic status and a total socioeconomic status could not be calculated. Of the remaining sample there were no differences found for age, IQ, and SES.

The children were visited at home or institutions. Children were asked to answer questions on a notebook. Questions were presented on the screen with underneath response buttons. Participants could answer the questions by clicking on the correct button. Children were ensured that their answers would be processed anonymously. Parents were asked to fill in questionnaires. The Ethics Committee of the Centre for Autism granted permission for the study.

Materials

Anxiety

Specific Anxiety was measured by a shortened version of the *Fear Survey Schedule for Children - Revised* (FSSC-R) (Ollendick, 1983). This self-report consists of 24 items that measure the intensity of children's (a) Fear of Failure and Criticism (e.g., “Getting a report card”), (b) Fear of the Unknown (e.g., “Dark places”), (c) Fear of Small Animals (e.g., “Lizards”), (d) Fear of Danger and Death (e.g., “Death, or dead people”), and (e) Medical Fears (e.g., “Getting a shot from the doctor”). Each item consists of a self-evaluation sentence with a score in the direction of severity from 1 (*not afraid*) to 3 (*very afraid*). As the questionnaire for Specific Anxiety consists of different subscales, the unidimensionality of the questionnaire was examined by means of a Principal Component Analysis (PCA). In order to test the unidimensionality of the total sum-score, a PCA with Oblimin restriction on the 24 items in the whole group (ASD and TD) was conducted. The outcome showed a two-factor model with Eigenvalues > 2. The items from the Fear of Failure and Criticism Scale loaded > 40 on a separate factor from all other items (Table 1). Because the Fear of Failure and Criticism could be seen as a measure for social anxiety rather than specific anxiety, it is decided to remove this scale in the total score for Specific Anxiety. A new total score for Specific Anxiety was computed existing of 20 items. The scale Fear of Failure and Criticism was not used further in this study, because we had no *a priori* hypotheses concerning this scale separately.

Table 1.
PCA loadings for the ASD and TD group together (N=120) on the Fear Survey Schedule for Children - Revised (FSSC-R)

Item	Factor 1	Factor 2
Fear of failure and criticism		
7. Getting poor grades		.68
13. Being called in by the teacher		.71
19. Getting a report card		.79
25. Making mistakes		.68
Fear of the unknown		
2. Thunderstorms	.58	
8. Going to bed in the dark	.50	
14. Being alone	.50	
20. Closed places	.53	
27. Dark places	.69	
Fear of small animals		
3. Lizards	.32	
9. Snakes	.66	
15. Spiders	.45	
22. Bats or birds	.41	
28. Worms or snails	.32	
Fear of danger and death		
4. Death or dead people	.60	
10. Getting lost in a strange place	.51	
17. Being hit by a car or truck	.59	
24. Falling from high places	.62	
29. Not being able to breath	.50	
30. Getting a serious illness	.60	
Medical Fears		
5. Having to go to the hospital	.59	
12. Getting a shot from the doctor	.60	
18. Going to the dentist or doctor	.47	
23. The sight of blood	.44	

Children filled in the *Emotion Awareness Questionnaire* (Rieffe, et al., 2007b), which consists of 30 items. For this study two scales of the questionnaire were used to assess the understanding of the own emotions; (a) Differentiation (e.g., "I'm often confused about what I'm feeling"), and (b) Bodily Awareness (e.g., When I am afraid or nervous, I feel it in my stomach"). Items from the Bodily Awareness Scale were reversed. The 12 items from the two scales were summed and a mean score was calculated. The questionnaire, was designed with a 3-point scale (1 = *not true*, 2 = *sometimes true,* 3 = *often true*).

Children filled in the *Empathy Questionnaire* (Pouw, et al., 2013) which measures different aspects of empathy. For this study, only the scale Understanding, which consists of 5 items, was used to measure the extent to which children have an understanding of others' emotions (e.g., "When a friend is sad, I usually know why"). The questionnaire was designed with a 3-point scale (1 = *not true*, 2 = *somewhat true*, and 3 = *true*).

To assess emotion regulation in the form of anger and shame in social situations we used an adapted version of the *Self –Conscious Emotions: Maladaptive and Adaptive Scales* (SCEMAS) (Ferguson et al., 2000). The current version of the questionnaire consists of five scales (Guilt, Shame, Anger, Happiness, Pride), of which only the Anger and Shame scales were used for this study. Ten scenarios were presented (e.g., 'A classmate is not able to finish her project in time. She asks for your help. You don't help her, because you don't feel like it.'). Children were asked to read the short stories, each followed by the question how much anger and shame they would feel in these situations, which they could answer on a 3-point scale (1 = *not at all*, 2 = *a little*, 3 = *a lot*).

An indication of a nonverbal IQ norm-score was computed with two nonverbal subtests of the *Wechsler Intelligence Scale* (WISC) (Kort et al., 2005; Wechsler, 1991): Block Design (copying small geometric designs with four or nine plastic cubes) and Picture Arrangement (sequencing cartoon pictures to make sensible stories). The mean of the norm-scores on the two subtests was used.

Socioeconomic Status Score (SES) was computed by adding up scores of questions concerning income, education and occupation of both parents/caregivers. When one of the questions was not answered or the answer was unknown, no score could be computed and these data were omitted from the results. Psychometric properties of all questionnaires used in this study are shown in Table 1.

Table 2.
Psychometric Properties of the Study Variables

Variable	*n* items	Cronbach's α		*M* and *SD*	
		ASD	TD	ASD	TD
Parent Report					
CSI Generalized Anxiety Disorder (Range 1-4)**	7	.79	.74	(*N* = 55) 2.14 (.60)	(*N* = 48) 1.37 (.36)
Child Report					
Specific Anxiety*	20	.89	.85	1.63 (.31)	1.48 (.31)
Subscales Specific Anxiety					
Fear of the unknown*	5	.73	.82	1.56 (.43)	1.40 (.41)
Fear of small animals*	5	.49	.73	1.37 (.33)	1.23 (.36)
Fear of danger and death*	6	.85	.78	2.01 (.67)	1.93 (.60)
Medical fears*	4	.72	.36	1.73 (.52)	1.56 (.34)
Social Anxiety	7	.71	.75	1.38 (.32)	1.39 (.35)
Sense of Coherence	6	.71	.67	2.26 (.40)	2.34 (.40)
External Focus	12	.79	.76	2.16 (.46)	2.45 (.42)
Empathic Understanding*	5	.70	.66	2.19 (.46)	2.45 (.42)
Anger	12	.71	.82	1.41 (.34)	1.45 (.38)
Shame**	12	.89	.77	1.87 (.48)	2.15 (.39)

Note. All questionnaires have a range from 1 – 3.
*p<.01 **p<.001

Statistical analyses

The internal consistency of all the scales and questionnaires used in this study were examined with Cronbach's alpha. Second, in order to make a comparison of the prevalence of internalizing symptoms (self-report: Specific Anxiety, Social Anxiety, Sense of Coherence; and parent-report of Generalized Anxiety Disorder), External Focus on Emotions, Empathic Understanding, Anger and Shame between the ASD and TD group, *t*-tests were carried out. Third, relations between all variables, including age and IQ, were established by means of Pearson Correlations. Differences in the strengths of the correlations between the groups were tested using Fisher *r*-to-*z* transformation. Fourth, three hierarchical regression analyses were carried out separately for children with ASD and TD children with Specific Anxiety, Social Anxiety, and Sense of Coherence as dependent variable and External Focus on Emotions, Empathic Understanding, Anger and Shame as independent variables. The program Statistical Packages for the Social Sciences version 19.0 was used.

Results

Differences between groups on the study variables

In order to examine possible differences between boys with ASD and TD boys on the variables, *t*-tests were carried out comparing the group means (Table 2). Boys with ASD scored higher than their TD peers on Specific Anxiety ($t(118) = 2.31$, $p \leq .023$). Unexpectedly, there were no differences between the groups on self-reports for Social Anxiety and Sense of Coherence. Additionally, boys with ASD scored lower on Empathic Understanding ($t(118) = -3.23$, $p \leq .002$), and Shame ($t(118) = -3.49$, $p \leq .001$) than the TD peers.

Associations of emotion processing with three indices for Anxiety

Table 3 shows the correlations of Specific Anxiety, Social Anxiety, and Sense of Coherence with External Focus on Emotions, Empathic Understanding, Anger, and Shame. Correlations between dependent variables and Age and IQ were not significant and are not shown in the table. Separate correlations per Group are only reported when significantly different by means of Fisher transformations. As expected, External Focus was negatively correlated with Specific and Social Anxiety and positively with Sense of Coherence. Anger and Shame were positively related to Specific and Social Anxiety, and negatively with Sense of Coherence. Group differences also appeared; Empathic Understanding was positively correlated with Specific Anxiety and negatively with SoC for children with ASD, but not in the TD group.

Table 3.
Summary of (Inter)correlations between Study Variables

	Specific Anxiety	Social Anxiety	Sense of Coherence
External Focus	-.32**	-.35***	.51***
Understanding	*.20*/-.23*	.02	*-.35**/.06*
Anger	.18*	.23*	-.22*
Shame	.19*	.40***	-.39***

Note. Correlations are provided separately for ASD and TD respectively when these were found o be significantly different for the two groups. Otherwise one value for the total group is given.
*p<.05 **p<.01***p<.001

Table 4 shows three multiple regression analyses for the two groups separately. External Focus was positively associated with all three indices for anxiety in both groups, except for Social Anxiety in boys with ASD. Surprisingly, Empathic Understanding was negatively associated with Specific Anxiety in the TD group, but despite its high correlations with Specific Anxiety and SoC for the ASD group (Table 3), Empathic Understanding failed to contribute uniquely in the regression analyses for the ASD group. Post/hoc partial correlations revealed that Shame was highly correlated with Understanding (r = .39, p = ≤ .005). The correlations between Specific Anxiety and SoC with Understanding were no longer significant when controlled for Shame (r = .10, p ≥ .439; r = -.20, p = .127). Anger was only associated with Social Anxiety in the ASD group. Shame was positively associated with Social Anxiety and negatively associated with SoC in both groups.

Table 4.
Hierarchical Multiple Regression Analyses Predicting Specific Anxiety, Social Anxiety, and Sense of Coherence from Emotion Processing

	Specific Anxiety		Social Anxiety		Sense of Coherence	
	ASD	TD	ASD	TD	ASD	TD
Adj. R^2	.12*	.16*	.29**	.21*	.34**	.43**
			β			
Ext. Focus	-.24*	-.24*	-.13	-.37**	.31**	.57***
Emp. Underst.	.12	-.22*	-.02	-.22	-.23	.16
Anger	.14	.03	.24*	-.08	-.11	.03
Shame	.10	.16	.42**	.28*	-.29*	-.27*

*p<.05 **p<.01

Discussion

The aim of this study was to examine which aspects of emotion understanding and regulation contribute to the prediction of anxiety in boys with ASD and how this differs from TD boys. As in previous studies, self-report questionnaires again showed moderate to good internal consistencies in both groups, supporting the validity of using self-report measures for boys with (Hill, et al., 2004; Pouw, et al., 2013; Rieffe, et al., 2011).

First, when group means were compared, boys with ASD did not differ from TD children on social anxiety, the feeling that life is controllable (SoC), external focus on emotions, and anger. Yet, boys with ASD scored higher than TD boys on specific fear and lower on empathic understanding and shame. The finding that children with ASD reported more specific fear and were scored higher on generalized anxiety disorder by their parents compared to the TD boys, confirms previous studies that anxiety is a problem in these children (Farrugia & Hudson, 2006; Kim, et al., 2000; van Steensel, et al., 2011). The finding is that children with ASD report higher levels on social anxiety and sense of coherence than TD boys is confirmed by another study from Hallet and colleagues (2013). Possibly, it is difficult for boys with ASD to recognize social anxiety, as it is inherent to their ASD, and far less concrete as opposed to specific anxiety.

Second, we examined the relationships between self-reported anxiety (specific anxiety, social anxiety, and sense of coherence) and emotion understanding and regulation. All indices for emotion understanding and regulation were related to all indices for anxiety in both groups and in the expected directions except for empathic understanding. Unexpectedly, more empathic understanding was related to more specific anxiety and less sense of coherence in boys with ASD. However, when controlled for shame, these relations became non-significant. This interesting outcome will be discussed later. Furthermore, not all indices also contributed uniquely in the regression analyses for the prediction of anxiety. In fact, both the correlations and the regression analyses show the importance of the external focus during the emotion episode which is related in both groups to fewer symptoms of anxiety and a stronger feeling of control (SoC). Additionally, shame was important in the prediction of social anxiety and SoC. Yet, differences between the groups also occurred: more empathic understanding was related to less specific anxiety, only in the TD group. At last, anger contributed positively in the prediction of social anxiety only in boys with ASD.

The results concerning the strong link between an external focus on emotions and all three indices for anxiety in the TD group as well as in the ASD group, confirm the idea and results from previous studies, such that linking an emotion to an emotion-evoking situation and thus understanding one's own emotions is important in preventing internalizing problems (Rieffe & De Rooij, 2012). Furthermore, linking an emotion experience to the emotion-evoking situation was related to children's sense that their thoughts, feelings, and environment are controllable and predictable. Apparently, linking an emotion to a situation or an awareness of the cause of the emotion, offers the child a sense of control and a suitable set of options to react on the fear-evoking situation.

Although children with ASD reported less shame experiences during social situations, which denotes some moral impairments, shame was related to more social anxiety and less SoC in *both* groups, confirming previous studies (Green & Ben-Sasson, 2010). Apparently, in boys with and without ASD, shame is related to a fear of negative self-evaluation and social failure. The role of shame and thus the awareness of the other's judgment in boys with ASD should not be underestimated,

only because they experience less shame. This is because in children with ASD who *do* experience shame, it has the same association with social anxiety and the feeling of control as it has in TD children. Future research should focus on what the differences are between children with ASD who do and do not experience shame to a certain level and what this means for the development of anxiety and other internalizing problems. It could also be that shame means something else for children with ASD than for TD children. In typical development shame is dependent on projecting intentional states on to others, thus perspective taking skills. As high functioning children with ASD often are aware of the fact that they are different or do not belong to the world, this could induce feelings of shame which do not rely on perspective taking skills, but just acknowledging the fact that they are or behave differently from their TD peers (Henriksen, Skodlar, Sass, & Parnas, 2010). This could explain the finding that children with ASD score lower on empathic understanding and higher on shame compared to their TD peers.

The finding that empathic understanding was related to less specific anxiety only in TD boys, but not in ASD boys, confirms results from a previous study of Pouw and colleagues (2013) that empathic understanding does not play a protective role in psychopathology in boys with ASD, as it does in TD boys. Possibly, focusing on the emotions and thus the emotional arousal of others in terms of trying to understand why someone is feeling that way is not that beneficial for children with ASD, because they are unable to adequately react on the other's emotion, while in TD children empathic understanding might be related to a better understanding and regulation of emotions in general and therefore less specific anxiety.

The fact that significant correlations between understanding the others' emotions and specific anxiety/Sense of Coherence in the ASD group disappeared when controlling for shame indicates that the relation between more empathic understanding, and more anxiety and less SoC, is explained by the feeling that one is negatively evaluated. In other words, when children with ASD have a better understanding of the emotions of others, they are more aware of the other's evaluation, therefore creating more fear and less SoC. Alternatively, specific anxiety in children with ASD creates more sensitivity, attention, and caution for their environment, including the awareness of other people's emotions and (negative) evaluations. Future longitudinal research should offer more clarity about the direction of these relations.

Although anger was correlated with all three indices for anxiety in both groups, unexpectedly, only the association between anger and social anxiety in ASD boys remained in the regression analyses. An explanation could be that in the current study self-report experiences of anger during shame-eliciting social situations were examined, whereas Suveg and Zeman (2005) examined actual anger dysregulation in terms of questioning what the child would *do* when he/she is angry. Apparently, actual dysregulation of anger rather than only the experience of anger is important in specific anxiety disorder in both groups. However, social anxiety was explained by experienced anger during social situations in boys with ASD. Possibly, social anxiety and anger have a reciprocal relationship in children with ASD. Heightened levels of anger could lead to failures and rejection in social situations and therefore to more social anxiety. Alternatively or simultaneously, social anxiety could lead to awkward social interactions and therefore rejection, which in turn could evoke feelings of frustration and anger. Future research should focus on the long-term relationship between anger and social anxiety in children with ASD, since this could give important insights in the etiology of social anxiety in these children.

Concluding remarks

The outcomes of this study show that there is certainly overlap between boys with ASD and TD boys in the pattern for anxiety, concerning the role of external focus on emotions and shame. Yet, unique patterns arose for empathic understanding and anger. Apparently, understanding emotions of others make boys with ASD more aware of others' negative evaluations. Possibly, children with ASD benefit from therapy that is focused on both the improvement of the self-image of these children as well as perspective taking skills, whereas the risk for the awareness of negative evaluations by others increases with gaining more perspective taking skills. Furthermore, as anger plays a unique role in social anxiety in children with ASD, future intervention should focus on better emotion regulation skills which could in turn improve the regulation of anxiety. Furthermore, longitudinal research should focus on the causality between emotion regulation and the development of anxiety. For example, whereas extreme feelings of shame could induce social anxiety, social anxiety could also lead to more feelings of shame, because children become aware of their unusual anxious behavior in social situations.

Chapter 3

The link between emotion regulation, social functioning, and depression in boys with ASD

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Abstract

Symptoms of depression are common in children and adolescents with an autism spectrum disorder (ASD), but information about underlying developmental factors is limited. Depression is often linked to aspects of emotional functioning such as coping strategies, but in children with ASD difficulties with social interactions are also a likely contributor to depressive symptoms. We examined several aspects of emotional coping (approach, avoidant, maladaptive) and social functioning (victimization, negative friendship interactions) and their relation to depression symptoms in children with ASD (*N*=63) and typically developing (TD) peers (*N*=67). Children completed a battery of self-report questionnaires. Whereas all three coping strategies (approach, avoidant, and maladaptive), and social functioning (victimization, negative friendship interactions) were significantly correlated with symptoms of depression in children with ASD, only approach and maladaptive coping and victimization were correlated with depression severity in TD boys. It seems reasonable to speculate that symptoms of depression in some children with ASD may arise in part from the child's perceived inability to effectively deal with stress evoking situations, and consequently, the avoidance and disengagement from social situations, but this remains a topic for future study.

Introduction

Autism spectrum disorders (ASD) are associated with a wide range of psychiatric symptoms and disorders, of which depression appears to be relatively common (Gadow, Guttmann-Steinmetz, Rieffe, & De Vincent, 2012; Kim, et al., 2000; Matson & Nebel-Schwalm, 2007b; Simonoff, et al., 2008). In non-ASD individuals depression is generally characterized by a diminished interest in activities, feelings of worthlessness or guilt, and a diminished ability to concentrate or make decisions. Kim and colleagues (2000) found higher levels of depression in children with ASD based on parent-report. Owing to phenotypic overlap (e.g., prefers to be alone) and atypical manifestation of depression in ASD, it is difficult to accurately recognize and diagnose depression in these children. For example, depression in children with ASD could also be accompanied and therefore indicated by aggressive behavior, hyperactivity, self-injurious behavior, and regression of previously learned skills (Magnuson & Constantino, 2011). Although there is no longitudinal research on childhood depression in children with ASD, we know that in TD individuals onset of depression during childhood is associated with antisocial behavior, substance use, and suicide in later life (King, Iacono, & McGue, 2004; McGee & Williams, 1988; Rao, Weissman, Martin, & Hammond, 1993). Given the relatively high rate of depression symptoms in children with ASD it is important to identify factors that may contribute to the development of depression as potential targets of intervention with the possibility of preventing later-onset mental health concerns.

Coping Strategies and Depression

In general, child self-reported symptoms of depression are strongly linked to certain aspects of emotion regulation such as coping strategies in both children with ASD and typically developing (TD) peers (Rieffe, et al., 2011; Wright, et al., 2010). Coping involves regulating the emotional impact of a stressful event (Lazarus & Folkman, 1984), which is a key element for adaptive functioning. Coping strategies can be divided into three categories; approach (e.g., seeking social support, trying to solve the problem), avoidant (e.g., cognitively restructuring a stressful event, distracting oneself from the problem, ignoring the problem), and maladaptive coping (internalizing, such as thinking something bad will happen again, or externalizing/acting out, such as screaming or hitting something). Whereas very young children mainly use avoidant coping strategies to distract or remove oneself from a stressor, older children are more likely to use approach strategies, such as problem solving (Fields & Prinz, 1997).

Research in TD children has shown that ineffective coping strategies and self-reported depressive symptoms are inter-related. For example, Abela, Brozina, and Haigh (2002) showed that one maladaptive strategy, rumination, was related to an increase of depressive symptoms in children (8-12 yrs.), whereas approach and avoidant strategies were not. Wright, Banerjee, Hoek, Rieffe, and Novin (2010) also found that approach (but not avoidant) strategies were associated with fewer self-reported depressive symptoms in TD children (8-13 yrs.), but the converse was true for maladaptive strategies. Importantly, a study by Rieffe and colleagues (2011) found that children with ASD (9-13 yrs.) used fewer self-reported adaptive strategies in terms of seeking social support and trying to find a solution, compared to TD children. Whereas adaptive strategies (e.g., approach strategies) were related to less depressive symptoms in the TD group, in children with ASD they were not. However, maladaptive strategies were related to more depressive symptoms in the ASD group.

Victimization and depression

In children with ASD, it is likely that impaired social skills and negative social experiences with peers (e.g., victimization, negative friendship interactions) also contribute to dysphoria (Rieffe, et al., 2012; Whitehouse, Durkin, Jaquet, & Ziatas, 2009). Victimization is often associated with self-reported anxiety and depression (Fekkes, Pijpers, & Verloove-Vanhorick, 2004; Klomek et al., 2007) and includes such behaviors as physical pestering, name-calling, backbiting, and ignoring. Children with ASD are victimized more often than their TD peers, possibly due to their difficulties with social interactions, atypical interests, and overreactions to provocations (Cappadocia, Weiss, & Pepler, 2012; Rieffe, et al., 2012). Whereas the relation between victimization and self-reported depression in TD children is well documented, Kelly, Garnett, Attwood, and Peterson (2008) did not find this to be the case in children with ASD. However, in their study both variables were assessed with parent-report, which may not be the best way to measure these constructs (Fekkes, Pijpers, & Verloove-Vanhorick, 2005; Moretti, Fine, Haley, & Marriage, 1985). For example, parents may be less able to distinguish typical adolescent mood problems from real depression. Furthermore, a large percentage of school-age children do not tell their parents if and when they are bullied (Fekkes, et al., 2005).

Negative friendship interactions and depression

Although friendships high in positive behaviors have a nurturing influence on children's mental health, friendships high in negative interactions such as domination, conflicts, and rivalry are related to depressive symptoms in TD adolescents (Berndt, 2002; Kouwenberg, et al., 2012; La Greca & Harrison, 2005). Berndt (2002) hypothesizes based on his earlier study showing a longitudinal relationship between negative friendship interactions and disruptive behaviors, that negative friendship interactions can lead children to adopt this interaction style in other social interactions. Therefore, they have fewer social successes, which in turn could lead to internalizing problems.

Children with ASD are known for their difficulties in forming and maintaining peer relationships. For example, they score higher on self-reported negative friendship interactions such as conflict and betrayal compared to their TD peers (Whitehouse, et al., 2009). Deficits in communication and social insight may prevent them from developing strategies to overcome interpersonal difficulties and conflicts (Carrington, Templeton, & Papinczak, 2003). Moreover, Whitehouse and colleagues (2009) found that peer conflicts and betrayal are indeed associated with symptoms of self-reported depressive symptoms in adolescents with ASD.

Present study

The aim of this study is to examine the extent to which different aspects of self-reported emotional and social functioning are uniquely related to self-reported symptoms of depression in boys with ASD, as compared to TD boys. Specifically, we examined the interrelations among coping strategies, victimization, and negative friendship interactions. Based on previous research, we expected (1) more symptoms of CDI depression in boys with ASD compared to TD boys (Kim, et al., 2000; Matson & Nebel-Schwalm, 2007b; Simonoff, et al., 2008). Furthermore, we expected (2) less use of approach strategies in boys with ASD compared to TD boys (Rieffe, et al., 2011) but did not expect differences in the use of avoidant and maladaptive strategies (Rieffe, et al., 2011). Additionally, (3) boys with ASD were expected to score higher on victimization (Cappadocia, et al., 2012; Rieffe, et al., 2012) and

negative friendship interactions (Locke, Ishijima, Kasari, & London, 2010) than their TD peers.

In both groups, we expected higher levels of maladaptive strategies to be associated with higher levels of depression (Rieffe, et al., 2011; Wright, et al., 2010). Whereas in the TD boys we expected higher levels of approach strategies to be associated with lower levels of depression, in ASD boys we did not expect a relation between approach strategies and the level of depression (Rieffe, et al., 2011). We did not expect to find a relationship between avoidant strategies and depression in TD boys (Wright, et al., 2010), yet examining the relationship between avoidant strategies and depression in the ASD group was explorative. Furthermore, we expected positive associations between victimization and depression and between negative friendship interactions and depression in both groups of youth (Berndt, 2002; Hawker & Boulton, 2000; Kouwenberg, et al., 2012; Whitehouse, et al., 2009).

Lastly, because social deficits are a defining feature of ASD, we expected these variables to uniquely contribute to the prediction of depressive symptoms. In TD boys, we predicted that the relation between social problems and depressive symptoms is mediated by the child's ability to effectively regulate his emotions (i.e., coping strategies) (Wright, et al., 2010).

Method

Participants

The ASD sample included 63 high functioning boys diagnosed with ASD (*M*age = 139 months, *SD* = 15.1). Diagnoses were based on the Autism Diagnostic Interview-Revised (Lord, et al., 1994) administered by child psychiatrists. All boys had IQ scores above 80 and were recruited from facilities that specialized in treating and diagnosing children with ASD. The TD group was comprised of 57 typically developing boys (*M*age = 138 months, *SD* = 15.4) and was drawn from primary and secondary schools in the Netherlands. TD boys had to have IQ > 80,and no diagnosed developmental disorders. Only boys who completed all self-report questionnaires were included in this study. Groups did not differ in age, IQ, and SES.

Procedure

A letter was sent to all parents of children with an ASD diagnosis between 9 and 15 years of age. A total of 83 parents (73 boys) gave their consent to participate in the study. The boys were visited at home or institutions and were asked to answer computer-presented questions in a notebook. Questions were presented on the screen with possible answers in boxes underneath. Participants could answer the questions by clicking on the laptop. Children were ensured that their answers would stay anonymous. Parents were asked to complete questionnaires. The Ethics Committee of the Centre for Autism granted permission for the study.

Measures

Depression. Depression was measured with an adapted version of the *Child Depression Inventory* (CDI) (Kovacs, 1985), which contains 26 multiple choice items about a specific symptom of depression (for example: "I feel alone"; "I am happy with the way I look"). We removed the item about suicide. The original version consists of three sentences per item. We converted these sentences to one sentence with three short possible answers, in order to make it easier for children with ASD (Theunissen et al., 2011) . An example item is "I am tired", which children could answer on a 3-

point scale (1 = *sometimes*, 2 = *often*, 3 = *always*). Scores on positively formulated items were reversed. The internal consistency of the adapted version was good (Table 1).

Coping strategies. Coping strategies were measured by the *Coping Scale* (Wright, et al., 2010) which consists of 34 items. Boys were asked what they would do if something bad has happened. Three different coping strategies are assessed: Approach Coping (example items: "I tell a family member or a friend what has happened", "I try to find a solution for the problem"), (b) Avoidant Coping (example items: "I'll do something that makes me forget the problem", "I would say that I don't care"), and (c) Maladaptive Coping (example items: "I get angry and I'll throw or hit something", "I'll think about it so much that I cannot sleep"). Response choices were *almost never*=1, *sometimes*=2*, and often*=3.

Social functioning. Victimization was measured by the *Bully Questionnaire* (Rieffe, et al., 2012), which consists of 20 items with a 3-point scale: 1 = *almost never*; 2 = *sometimes,* 3 = *often*). For this study only the 10 items concerning victimization were used. First, boys were given an elaborate introduction on bullying and informed that their answers would be kept secret. They were then asked if, in the last 2 months, they had been bullied (e.g., "Did someone say mean things to you?", "Did someone say mean things about you behind your back?').

Nine items referring to negative friendship from the Best Friend Index (BFI) (Kouwenberg, et al., 2012) were used to measure negative features such as conflict, dominance, jealousy, and betrayal (e.g.., "I don't like it when my friend does something better than I do", and "My friend decides what we are going to do"). First, boys were asked whether they have a best friend (*yes/no)*. Second, they were asked to write down their best friend's name, after which they could answer the items on a 3-point scale (1 = *(almost) never* to 3 = *often)*.

IQ. IQ was computed with two nonverbal subtests of the *Wechsler Intelligence Scale* (WISC) (Kort, et al., 2005; Wechsler, 1991): Block Design (copying small geometric designs with four or nine plastic cubes) and Picture Arrangement (sequencing cartoon pictures to make sensible stories). The mean of the norm-scores on the two subtests was used. In a study from Theunissen and colleagues (2013) it is found that the total scores of the two subtests highly correlate with complete IQ test scores.

Statistical Analyses

T-tests were conducted comparing the two groups of boys for level of CDI depression, coping strategies, victimization, and negative friendship interactions. Next, Pearson correlations were performed to assess relations among study variables. Age and IQ were not significantly correlated with any of the dependent variables and were therefore not considered in these or remaining analyses. As a rule of thumb for determining the magnitude of correlations, Cohen (1988) suggests the following: *r* >0.50=large, 0.50-0.30=moderate, and 0.29-0.10=small. Finally, two hierarchical regression analyses were carried out separately for each group of boys with CDI depression as the outcome variable and coping strategies and aspects of social functioning as predictors using SPSS version 19.0.

Table 1.
Psychometric Properties of the Study Variables

Variable	*n* items	Cronbach's *α*		*M* and *SD*	
		ASD	TD	ASD	TD
Depression*	26	.78	.71	1.42 (.22)	1.34 (.19)
Approach coping	12	.83	.82	1.94 (.43)	2.08 (.42)
Avoidant coping	12	.85	.71	1.91 (.46)	1.89 (.33)
Maladaptive coping	10	.77	.55	1.54 (.39)	1.43 (.26)
Victimization*	10	.81	.77	1.63 (.39)	1.47 (.32)
Negative friendship features*	9	.72	.68	1.30 (.30)	1.20 (.21)

Note. All questionnaires have a range from 1 – 3
*$p<.05$

Results

Differences between groups on the study variables

All dependent variables showed moderate to good internal consistencies (Chronbach's alpha) in both groups (see Table 1). There were no differences between the groups for the three coping strategies. Yet as expected, children with ASD had higher levels of self-reported symptoms of depression ($t(118) = 2.01$, $p \leq .05$, $d = .39$), victimization ($t(118) = 2.56$, $p \leq .05$, $d = .45$), and negative friendship interactions ($t(118) = 2.21$, $p \leq .05$, $d = .39$). The variables accounted for 55% of the variance

Associations of Depression with Coping, Victimization, and Negative Friendship Features

There were moderate to strong correlations between self-reported depressive symptoms and all the other variables in the ASD group. In the TD group, only maladaptive coping and victimization correlated moderately with depression, and maladaptive coping correlated strongly with self-reported symptoms of depression in the TD group (Table 2).

Table 2 shows the regression analyses for ASD and TD groups seperately. For boys with ASD, approach and avoidant coping negatively predicted symptoms of depression, but maladaptive coping positively predicted symptoms of depression. Independently of coping strategies, victimization and negative friendship interactions positively predicted symptoms of depression in ASD boys. These variables accounted for 52% of the variance in depression in the ASD group. In the TD group, only approach coping negatively predicted symptoms of depression, and maladaptive coping positively predicted symptoms of depression. These variables accounted for 37% of the variance in depression severity.

Table 2.

Correlations and Hierarchical Multiple Regression Analyses Predicting Depression of Coping Strategies, Victimization, and Negative Friendship Features

	Depression							
	ASD				TD			
	r	Adj. R^2	*β*	*p*	*r*	Adj. R^2	*β*	*p*
Approach coping	-.37**	.52***	-.36	.000	-.30*	.37***	-.23	.048
Avoidant coping	-.34**		-.29	.002	-.12		-.13	.243
Maladaptive coping	.40**		.24	.025	.57***		.44	.001
Victimization	.54***		.26	.018	.43**		.20	.105
Negative Friendship	.37**		.25	.012	.05		.00	.986

p<.05 **p<.01*p<.001*

Discussion

The aim of this study was to examine the extent to which aspects of emotional and social functioning are (uniquely) related to symptoms of depression in children with ASD, as compared to TD peers. Boys with ASD scored higher on depression, victimization, and negative friendship features than TD boys, which is consistent with prior research (Cappadocia, et al., 2012; Kim, et al., 2000; Rieffe, et al., 2012) and supports the notion that the social deficits associated with ASD influence social relations with peers. Furthermore, boys with ASD reported to use approach, avoidant, and maladaptive strategies just as often as their TD peers, which was only partly in line with our expectations.

We examined the strength of the relation of depression with the use of coping strategies and victimization and negative friendship interactions. Regulating the emotional impact of a stressful event by finding a solution or seeking social support (e.g., approach coping) was associated with less severe symptoms of depression in both groups. Additionally, maladaptive coping was related to more symptoms of depression, which confirms the idea that in children with ASD depression could be indicated by for example externalizing behaviour (Magnuson & Constantino, 2011). Yet, only in ASD boys, was avoidant coping correlated with higher levels of depression. Furthermore, being bullied or having low quality friendships also uniquely contributed to depression in children with ASD. Although victimization was also highly correlated to symptoms of depression in the TD group, this association was no longer significant in the regression model including also coping measures.

The fact that approach coping strategies were related to less symptoms of depression in both groups partly contradicts findings from the study from Rieffe and colleagues (2011). In their study they found that certain adaptive strategies such as acceptance (e.g., “I think that I can’t do anything about it”), and positive reappraisal (“I think I can learn from it”) were related to less depressive symptoms in TD children but not ASD. This contradicting finding could be explained by the use of different coping questionnaires. Whereas both coping questionnaires tap into adaptive strategies, the questionnaire used by Rieffe and colleagues (2011) only measures cognitive coping strategies (e.g., “I think of the best way to handle it”), whereas the questionnaire used in this study measures behavioural coping strategies (e.g., “I’ll do something that makes it alright again.”). The finding that behavioural but not cognitive coping strategies are beneficial in children with ASD might prevent them from regulating their emotions in situations that are beyond their control, thus in which behavioural strategies cannot be applied (e.g., with the death of a beloved person).

However, our findings also indicate that avoidant strategies are beneficial for children with ASD. Avoidant coping in TD children is often a consequence of appraising an emotion evoking situation as being uncontrollable (Rieffe, Meerum Terwogt, & Jellesma, 2008). In other words, when TD children encounter an emotion provoking situation that they perceive as being beyond their ability to successfully manage, they more often shy away from the problem without experiencing depressive symptoms (Wright, et al., 2010). This might apply to many situations for children with ASD, especially when they are social. Thus, avoidance may decrease the overarousal associated with a stressful situation in children with ASD. This idea is in alignment with a finding from a previous study by Rieffe and colleagues (2011) showing that hiding one’s own emotions is related to fewer emotional symptoms, such as worry and rumination in ASD children, whereas the opposite holds for TD peers. Again, this points to the idea that children with ASD seem aware (in terms of self-reported coping strategies) of the fact that turning away from a stressful situation or problem decreases discomfort and prevents inappropriate reactions to the stress

evoking situation. However, in the long term avoidant coping may be a risk for impaired social development. Future longitudinal research should examine how avoiding stressful situations influences social functioning in children with ASD.

Although there were no differences found between the use of coping strategies between the two groups, outcomes show that boys with ASD score higher on victimization and negative friendship interactions than TD peers. Additionally, both indices for negative peer experiences contributed uniquely to more symptoms of depression, but this was not the case for TD boys. This illustrates the unique effect of social deficits in ASD (Rieffe, et al., 2012). Possibly, as a consequence of these negative experiences and accompanied feelings of depression children with ASD avoid social situations and therefore exclude themselves even more from social processes, which presents itself in higher levels of loneliness in children with ASD (Bauminger & Kasari, 2000). Again, these results point to the idea that whereas avoiding stress evoking social situations could be effective in the short-term, adopting avoidant coping strategies as a general strategy for managing social interactions could create social exclusion, feelings of loneliness, and therefore depressive symptoms in the long-term (Ottenbreit & Dobson, 2004).

Interestingly, whereas negative friendship interactions were associated with symptoms of depression in boys with ASD, in TD boys they were not, which contradicts the findings of a study by Kouwenberg and colleagues (2012). However, in the study from Kouwenberg and colleagues boys and girls were included, which could have led to other results. Possibly, negative friendship interactions have a differentially greater impact on girls in terms of developing depression. An explanation could be that in TD boys friendships are by nature characterized by more negative features, such as conflicts or competition. Whereas boys with ASD are more vulnerable to these negative friendships features due to impaired social understanding or overarousal, TD boys might be more accustomed to these kind of behaviours. In other words, conflicts and competitions in TD boys' friendships do not necessarily have to lead directly to internalizing problems, because these behaviours are possibly more akin to the way TD boys interact with each other (Rose & Rudolph, 2006).

Strengths and Limitations

An important strength of the present study is the use of self-report measures. Most research in this area relies heavily on information obtained from caregivers. However, studies of TD youth indicate only modest convergence between parent and child self-report of depression (Epkins & Meyers, 1994). Although many youth with ASD have low intellectual ability posing a serious challenge to self-report , higher functioning youth appear to be able to provide reliable and valid information. For example, as in previous studies, self-report questionnaires showed moderate to good internal consistencies in both groups, supporting the validity of these measures for children with ASD (Hill, et al., 2004; Pouw, et al., 2013; Rieffe & De Rooij, 2012).

Because the present study was cross-sectional, we are unable to draw conclusions about the causality of reported relations among variables. Nevertheless, it seems reasonable to hypothesize that children who experience depressive symptoms such as a sense of hopelessness and reduced social motivation, tend to use fewer coping strategies such as problem solving and social support, but instead vent their stress through rumination or acting out which in turn could exacerbate depressive symptoms (Wright, et al., 2010). Furthermore, the relation between victimization and depression also appears to be reciprocal in a sense that children become more depressed as a consequence of being bullied, and that children with depressive symptoms are more withdrawn and less able or motivated to defend themselves, and

are therefore increasingly at risk to be victimized (Storch & Ledley, 2005). Future studies should further examine these causal relationships.

Clinical Implications

Based on the personal experiences of the first author during the testsessions, it seems that parents of children with ASD also apply avoiding strategies when their children are overaroused. A specific example during a test session is that of a child who did not want to continue playing a frustration-evoking puzzle and got mad and started yelling. The mother, who was in the room, picked up her child and turned him away from the table and told him to count to ten. Although this strategy was effective in the short-term, the long-term benefits of avoiding strategies in children with ASD are questionable. Both children with ASD and their parents seem aware of the child's inability to effectively deal with a stressful situation. An alternative strategy for the child in this example is to teaching him/her to ask for help when he cannot solve a puzzle, thus prevention of being cut off from the social situation.

Concluding Remarks

The results of this study show that for children with ASD, aspects of emotion regulation as well as aspects of social functioning are related to symptoms of depression. It appears as if negative peer experiences and ineffective coping strategies contribute to or exacerbate social deficits and depression. Such children might benefit from learning alternative strategies that promote social interaction and 'using' their social environment for their own benefits. Hopefully these findings will encourage future research into better prevention and treatment trajectories for depression in children with ASD.

Chapter 4

Reactive/proactive aggression and affective/cognitive empathy in children with ASD

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Abstract

The main aim of this study was to examine the extent to which affective and cognitive empathy were associated with reactive and proactive aggression, and whether these associations differed between children with an Autism Spectrum Disorder (ASD) and typically developing (TD) children. The study included 133 children (67 ASD, 66 TD, *M*age = 139 months), who filled out self-report questionnaires. The main findings showed that the association between reactive aggression and affective empathy was negative in TD children, but positive in children with ASD. The outcomes support the idea that a combination of poor emotion regulation and impaired understanding of others' emotions is associated with aggressive behavior in children with ASD.

Introduction

Aggressive behaviors have been frequently observed in children with Autism Spectrum Disorder (ASD) (Bronsard, Botbol, & Tordjman, 2010; Farmer & Aman, 2011; Kanne & Mazurek, 2011), which are also related to more frequent mental health referrals (Mash & Barkley, 2003). Clinicians sometimes argue that aggressive behaviors in children with ASD should not be interpreted the same way as in typically developing (TD) children (Matson & Nebel-Schwalm, 2007a). In fact, despite the high prevalence of aggressive behaviors in young and/or intellectual disabled children with ASD, little research has been done to examine aggressive behavior in high-functioning young adolescents with ASD. In TD children, a lack of empathy is associated with higher levels of aggression (e.g.,Jolliffe & Farrington, 2006). Although children with ASD are known for their atypical empathic development (Jones, et al., 2010), it has never been studied in relation to their aggressive behavior. Therefore, in this study, the main aim was to examine the relationship between empathy (affective and cognitive) and aggression in children and young adolescents with ASD, as compared to their TD peers.

Aggression in children with ASD

Research is suggesting that aggression is a common problem in children with ASD (Farmer & Aman, 2011; Kanne & Mazurek, 2011). For example, young and older children with ASD exhibit various externalizing behaviors such as damaging others' belongings, tantrums, and self-injurious behaviors (Horner et al., 2002). Kanne and Mazurek (2010) investigated 1380 children with ASD from 4 to 17 years old and found that 68% displayed aggressive behavior towards a caregiver and 49% towards non-caregivers. However, these studies examining aggressive behavior in children with ASD mainly include intellectual disabled children with ASD. Despite this high prevalence of aggressive behaviors in this population of children with ASD, to date, little research is done on aggressive behavior in high functioning young adolescents with ASD. Furthermore, not much is known about possible causes or motives of these behaviors.

Aggressive behavior can be divided into reactive and proactive aggression. Reactive aggression is seen as defensive behavior in reaction to real or perceived external provocation without thought to personal gain (Crick & Dodge, 1996). It is a response to poor emotion regulation, feelings of anger, and hostile (mis)attributions or misunderstandings (Marsee & Frick, 2007). Proactive aggression refers to instrumental aggression, which children engage in to reach a certain goal (e.g., material or territorial gain or social control), without being provoked (Crick & Dodge, 1996). It has been argued that proactive aggression is not necessarily anger-driven (e.g., Crick & Dodge, 1996). However, Hubbard and colleagues (2002) showed that children who display higher levels of proactive aggression also report higher levels of anger. Yet, these children appear to be particularly skilled in controlling their anger expressions.

Since children with ASD are known for their poor emotion regulation especially in social situations (Laurent & Rubin, 2004), one would expect higher rates of reactive aggression in this group. Farmer and Aman (2011) analyzed parent reports on different subtypes of aggression in children and adolescents with ASD (from 3 to 20 years old) and indeed found higher instances of behaviors linked to reactive aggression, such as hot-headedness, impulsive reactions, and difficulties with cooling off (Farmer & Aman, 2011). Children and adolescents with ASD are also reported to use more physical aggression, such as pinching, biting, and throwing objects towards others, compared to children without ASD (Farmer & Aman, 2011). These behaviors

are especially seen in stress-evoking situations further emphasizing the intent of reactive aggression (Bronsard, et al., 2010). Note, however, that a higher intelligence is related to less reactive aggression (Brereton, Tonge, & Einfeld, 2006; Nas, De Castro, & Koops, 2005), and that the presently cited studies examined low functioning individuals with ASD.

There is not much known about whether children with ASD display more proactive aggression than TD children. However, there are some studies examining bullying behavior in children with ASD, which could be seen as a form of proactive aggression, because bullies initiate aggressive behavior in order to dominate others (Camodeca, Goossens, Meerum Terwogt, & Schuengel, 2002). Furthermore, bullies show and report high rates of proactive aggression (Salmivalli & Nieminen, 2002). A study of Farmer and Aman (2009) investigated different subtypes of aggressive behavior in children with ASD and other intellectual/developmental disabilities and found that parents of children with ASD score their children higher on bullying, compared to children without ASD. Yet, other studies based on parents or self-report showed no differences in the frequency of bully behaviours between children with ASD and TD children (Montes & Halterman, 2007; Rieffe, et al., 2012; Twyman et al., 2010). Conclusively, there are no clear study results supporting children with ASD would display more proactive aggression compared to TD children.

Empathy in children with ASD

Empathy refers to the ability to accurately perceive and understand another person's emotions and to react to these emotions appropriately (Rieffe, et al., 2010). It is an important feature of human interpersonal behavior, necessary to interact effectively in the social world. Furthermore, empathy is a complex construct that exists of lower order (affective empathy) and higher order processes (cognitive empathy) (Leiberg & Anders, 2006).

Affective empathy, or contagion (Hoffman, 1987), is linked to mirror neurons in the parietal-frontal region of the brain. These mirror neurons are activated whilst observing another's goal directed action (Cattaneo & Rizzolatti, 2009), also creating arousal in the observer. Although earlier studies suggested mirror neuron abnormalities in children with ASD (Dapretto, et al., 2006), recent studies indicate that the mirror neuron system in children with ASD is intact (Fan, et al., 2010; Press, et al., 2010). Children with ASD are as emotionally aroused (based on skin conductance activity) when witnessing another's distress as TD children (Blair, 1999), and did not score lower than TD children on a self-report questionnaire measuring affective empathy (Jones, et al., 2010). Furthermore, children with ASD have been found to score equally to TD children on affective empathy tasks (Dziobek, et al., 2008).

Additionally, for an adaptive empathic response, the focus of concern should be other-oriented rather than self-oriented (Eisenberg, et al., 1996a). In other words, observers should recognize that their own arousal is a consequence of the other's emotion and not their own. When observers are unable to locate the source of the arousal and misinterpret its cause, this will cause personal distress in the observers. In TD children, personal distress can be observed in very young children, but it decreases naturally with age when children's skills for emotion regulation develop (Rieffe, et al., 2010). Furthermore, a certain level of cognitive empathy is required to decrease personal distress. Cognitive empathy refers to the ability to adopt another's point of view, and represent the other's thoughts, intentions, beliefs, and knowledge, which facilitates the observer to interpret and understand others' emotions. The ability to infer mental states, also known as Theory of Mind (ToM) (Blair, 2005), is the capacity to understand or predict others' behaviors based on the subjective desires and/or

beliefs of that person (Gordon, 1992). A ToM is typically established around the age of four. Children with ASD are known for their impairments in this domain (Baron-Cohen, et al., 1985; Dziobek, et al., 2008; Jones, et al., 2010; Rogers, et al., 2007), and in fact, seem well aware of this impairment and also score lower than TD children on self-report items that measure understanding others' emotions (Dziobek, et al., 2008; Jones, et al., 2010).

Empathy is supposed to cause prosocial behaviors, such as helping, sharing, comforting, in attempt to alleviate the other person's distress. Especially these kinds of behaviors seem overly absent or limited in children with ASD (Sigman, Kasari, Kwon, & Yirmiya, 1992). It is argued that the lack of prosocial behaviors is mainly caused by impaired cognitive empathy and poor emotion regulation. In other words, children with ASD are unable to regulate their own empathic arousal (contagion) because they fail to understand why the other person is upset. It appears that emotions of others are confusing and unpredictable for children with ASD, which causes distress and prevents them from behaving empathically (Blair, 1999; Jones et al., 2010; Smith, 2009).

Aggression and empathy

In TD children, reactive aggression is associated with lower levels of affective empathy (contagion). Children who become distressed by witnessing the negative state of another person, usually stop harming the other in order to reduce their own (empathic) distress (Mayberry & Espelage, 2007). Reactive aggression is also linked to lower levels of cognitive empathy. Rieffe and Meerum Terwogt (2006) argue that children who are more able to take another's perspective, react less aggressively. In contrast, personal distress could be expected to be positively related to reactive aggression, because personal distress is indicative for poor emotion regulation (Eisenberg, 2000). Whereas it is clear in TD children that reactive aggression is inhibited by both affective and cognitive empathy (Mayberry & Espelage, 2007; Rieffe & Meerum Terwogt, 2006), no studies have yet examined this linkage of reactive aggression and empathy in children with ASD.

Proactive aggression is associated with lower levels of affective empathy in TD adolescents (Lovett & Sheffield, 2007). Yet, the relation between proactive aggression and cognitive empathy is less clear. It has been argued that proactive aggression in the form of bullying is associated with higher levels of cognitive empathy compared to reactive aggression (Sutton, Smith, & Swettenham, 1999). However, others could not support this claim and found a negative association between bullying and cognitive empathy instead (Gini, Albiero, Benelli, & Altoe, 2007; Mayberry & Espelage, 2007; Rieffe & Camodeca). To our knowledge, no studies examined how proactive aggression is related to affective and cognitive empathy in children with ASD.

This study and its aims

This study was a first attempt to examine the link between empathy and aggression in children with ASD. We focused on the relationship of reactive and proactive aggression with affective and cognitive empathy. We chose to examine this relationship in middle childhood because from the age of nine, children's cognitive and emotional functioning develops fast and they are increasingly able to reflect upon their own emotions and behaviors (Harris, 1989). Self-reports were used to measure aggression and empathy. Additionally, children's ToM capacity was also indexed through an age-appropriate false belief task (Theunissen, et al., 2011). We added the level of self-reported daily anger as an index for emotion regulation.

First, differences between children with ASD and TD children in the level of self-reported reactive and proactive aggression and parent-report of externalizing behavior (CD and ODD) were examined. Differences in the level of empathy (contagion, personal distress, and understanding), ToM capacity, and emotion regulation (daily anger) were also examined. Based on previous studies, we expected to find higher rates of reactive but not proactive aggression in children with ASD compared to TD children (Farmer & Aman, 2011). We did not expect differences in rates of affective empathy between the two groups. However, we expected higher rates of personal distress and daily anger, and lower rates of cognitive empathy and their ToM ability in children with ASD compared to TD children, based on previous discussed literature (Baron-Cohen & Wheelwright, 2004; de Vignemont & Singer, 2006; Jones, et al., 2010; Laurent & Rubin, 2004).

Second, the relations of reactive aggression and proactive aggression with the different aspects of empathy and daily anger were examined, using group (ASD/TD) as a moderator. We expected negative associations of reactive aggression with affective and cognitive empathy and a positive association of reactive aggression with personal distress and daily anger. However, we expected a moderating effect of group on the relation between affective empathy and reactive aggression, in a way that the negative relation between affective empathy and reactive aggression is evident in TD children, but not in children with ASD. Previous studies indicate that the empathic arousal created by affective empathy, is not well regulated in children with ASD because of impaired cognitive empathy and emotion regulation (Blair, 1999; Smith, 2009). Therefore, it was expected that affective empathy does not have that inhibiting role in aggressive behavior, as it does in TD children.

Although literature is contradictory regarding proactive aggression (Crick & Dodge, 1996; Hubbard, et al., 2002; Mayberry & Espelage, 2007; Rieffe & Camodeca; Sutton, et al., 1999), we expected a negative association with affective and cognitive empathy, and a positive association with daily anger. We were unable to formulate expectations concerning moderating effects of group on the link between proactive aggression and empathy.

Method

Participants and Procedure

The ASD sample included 67 high functioning children (8 girls, 59 boys) diagnosed with ASD (*M*age = 139 months, *SD* = 15.1, age range: 109 - 176 months) based on the Autism Diagnostic Interview-Revised (Lord, et al., 1994) by child psychiatrists. The ASD participants met the inclusion criteria (i) IQ scores above 80, (ii) diagnosed with ASD of the *DSM-IV* (Association, 1995). Participants were recruited from 1. Centre for Autism, Leiden, the Netherlands; 2. Dr. Leo Kannerhuis, Doorwerth, the Netherlands; 3. C.P. Van Leersumschool, Zeist, the Netherlands. The children were diagnosed with

ASD by psychiatrists of these institutions. These child psychiatrists are specialized in treating and diagnosing children with ASD. A letter was sent to all parents of children with an ASD diagnosis between 9 and 15 years of age. A total of 73 parents of ASD children (63 boys) gave their informed consent to participate in the study. Only children who completed all self-report questionnaires were included in this study.
The TD group included 66 typically developing children (9 girls, 57 boys; *M*age = 138 months, *SD* = 15.5, age range: 109 – 176 months), and was drawn from primary and secondary schools in the Netherlands. The parents of the children gave their informed consent to participate in the study. Inclusion criteria for the TD group were (i) IQ above 80, (ii) no diagnosed developmental disorders. Again, only children who completed all self-report questionnaires were included in this study. The TD group was matched with the clinical group on sex and mean age. From four ASD children and seven TD children IQ scores could not be obtained. From 13 children with ASD and 17 TD children, parents did not answer questions concerning socioeconomic status and a total socioeconomic status could not be calculated. Of the remaining sample there were no differences found for IQ and SES scores. Children with ASD scored lower on language skills then TD children $t(119) = -2.23$, $p = .028$. However, language scores did not interfere with the outcomes of the regression analysis and were therefore left out in the final analyses. Demographic statistics of the participants are shown in Table 1.

The children were visited at home or their institutions. They were asked to answer questions in a notebook and were ensured that their answers would stay anonymous. Children were also informed before testing that they could ask questions if they did not understand a test question, and that they could withdraw from the test session at any moment without explanation. Test sessions were taped on video. Parents were asked to fill in questionnaires. The Ethics Committee of the Centre for Autism granted permission for the study.

Table 1.
Demographic Profile of Participants

	ASD	TD
No. of children	67	66
Age, months, mean (SD)	139 (15.1)	139 (15.5)
Gender, no.		
Boy	59	57
Girl	8	9
Socioeconomic status, mean (SD)	12.6 (2.58)	13.1 (3.02)
	(N = 54)	(N = 49)
Socioeconomic score, range	5.7 – 18.3	5.33 – 19.0
Nonverbal IQ		
IQ normscore Picture Arrangement, mean (SD)	11.1 (4.01)	10.9 (3.33)
	(N = 64)	(N = 59)
IQ normscore Block Design, mean (SD)	11.2 (3.57)	10.9 (3.04)
	(N = 63)	(N = 59)

Materials

Self Report

Children rated their own aggressive behavior with the *Self Report Instrument for Reactive and Proactive Aggression* (IRPA) (Rieffe et al., in revision). Children were presented with six types of aggressive behavior (kicking, pushing, hitting, name calling, arguing, and saying bad things or lying about someone else). Children were asked to report how often they performed this behavior in the last four weeks on a 3-point scale from 1 (*(almost) never*) to 3 (*often*) for three reasons related to reactive aggression (I was mad; I was bullied; I was name-called) and three reasons related to proactive aggression (I wanted to be mean; I took pleasure in it; I wanted to be the boss). The questionnaire consists of 18 proactive and 18 reactive items.

In the validation study by Rieffe and colleagues (in revision) a Principal Component Analysis (PCA) on the questionnaire in a larger TD group (*N* = 587) showed good results. Furthermore, to help ensure ASD and TD children in this sample were also able to differentiate between reactive and proactive aggression, a PCA with Oblimin restriction on the 36 items with the factor count limited to the assumed two factors was used (Table 2). All items load >.30 on their keyed factor when both groups were included. PCA in the ASD group showed that all but three items failed to load sufficiently on the intended scale Proactive Aggression, which is still good given the relatively small sample size for a PCA. In the TD group, two items failed to load sufficiently on Reactive Aggression and two items for Proactive Aggression loaded higher on Reactive Aggression. Additionally, both scales showed good internal consistencies in the ASD and TD group (Table 2), so no items were removed from the

scales. The correlations between the two aggression scales were high (Table 3), but not to the extent that there was reason to suspect co-linearity.

The *Empathy Questionnaire* (Overgaauw et al., in prep.) with a total of 21 items filled in by the children, was designed with a 3-point scale (1 = *not true*, 2 = *somewhat true*, and 3 = *true*). In this study we used the three scales to measure: (a) Contagion (e.g., "When a friend cries, I have to cry too"), (b) Personal Distress (e.g., "I am afraid when someone is in a fight"), and (c) Understanding (e.g., "When a classmate is angry, I usually know why"). The Contagion scale refers to affective empathy. The Understanding scale refers to cognitive empathy.

The Anger scale of the *Mood Questionnaire (MQ)* (Rieffe, Terwogt, & Bosch, 2004) was used to assess children's self-reported feelings of anger, which is indicative for their emotion regulation. The children were asked to indicate how they had been feeling over the last four weeks ("I felt furious"). As a total the questionnaire consists of 20 items on a Likert-type scale (1 = *(almost) never*, 2 = *sometimes*, 3 = *often*). For the current study only the scale Anger Mood (four items) was used for analyses.

First, the participants were pre-selected on an IQ above 80 with help from the centers for autism. We only selected high-functioning children with an IQ above 80 and the TD children were on regular schools by which an IQ above 80 can be assumed. Second, in order to examine whether the children with ASD differed in IQ scores from TD children, we used two nonverbal subtests of the *Wechsler Intelligence Scale* (WISC) (Kort, et al., 2005; Wechsler, 1991): Block Design (copying small geometric designs with four or nine plastic cubes) and Picture Arrangement (sequencing cartoon pictures to make sensible stories). From the two subtests two norm-scores can be derived. The mean of the norm-scores on the two subtests was used.

In order to asses language skills two tasks of the Clinical Evaluation of Language Fundamentals – Fourth Edition (CELF-4) (Semel, Wiig, & Secord, 2003) were used; the Sentence Comprehension Task and the Narrative Comprehension Task. In the Sentence Comprehension Task children were presented with sentences and four multiple choice answers and were instructed to select the answers that matched with the sentence. In the Narrative Comprehension Task children were told short stories after which questions were asked. Of these two subtests two norm-scores can be derived. The mean of the two norm-scores was used in order to examine differences in language skills between the two groups.

Table 2.
PCA loadings for ASD/TD group, ASD group, and TD group on the Questionnaire for Reactive and Proactive Aggression

Item number	Reactive Aggression	Proactive Aggression	Reactive Aggression	Proactive Aggression	Reactive Aggression	Proactive Aggression
	ASD/ TD		ASD		TD	
Ag1a	.54		.56		.56	
Ag1b	.64		.78		.47	
Ag1f	.78		.81		.79	
Ag2a	.71		.74		.66	
Ag2b	.73		.70		.73	
Ag2f	.74		.75		.68	
Ag3a	.62		.60		.67	
Ag3b	.66		.75		.42	
Ag3f	.69		.77		.59	
Ag4a	.56		.58		.48	
Ag4b	.73		.74		.66	
Ag4f	.65		.71		.61	
Ag5a	.57		.61		.51	
Ag5b	.72		.81		.52	
Ag5f	.69		.76		.59	
Ag6a	.37		.51			
Ag6b	.31		.54			
Ag6f	.56		.74		.49	
Ag1c		.59	.37	.50		.72
Ag1d		.71		.81		.62
Ag1e		.90		.95		.88
Ag2c		.77		.86		.76
Ag2d		.62		.41		.68
Ag2e		.78		.68		.79
Ag3c		.64	.49	.43		.84
Ag3d		.74		.53		.77
Ag3e		.83		.82		.79
Ag4c	.36	.55	.62	.31		.77

Ag4d		.77		.67		.83
Ag4e		.84		.87		.83
Ag5c		.70		.51		.82
Ag5d		.65	.31			.84
Ag5e		.68		.30		.82
Ag6c		.67	.44	.44		.74
Ag6d		.51	.55			.72
Ag6e	.31	.31	.35		.45	.32

Theory of Mind Task

Two false belief tasks (Theunissen, et al., 2011) were used based on the principles of the Sally-Ann Task (Baron-Cohen, et al., 1985). In the Sally-Ann task, Sally has a basket and Anne has a box. Sally puts a marble into her basket. When Sally goes out for a walk, Anne puts Sally's marble in the box. The participant is asked where Sally will look for her marble when she returns to the scene. To correctly answer the question, participants need to take Sally's false belief into account and predict that Sally will look into her basket (Baron-Cohen, et al., 1985). The Theory of Mind tasks used in this study are based on the same principles of taking a false belief into account but more age-appropriate for the participants in this study. Children were first told they would be answering a few questions before watching two short video clips of Mr. Bean. In these short clips, Mr. Bean also created false beliefs in another story character. In an attempt to eliminate a possible confound of verbal ability, the video clips were free from sound or spoken word. After having watched a video clip, two questions were asked; one about the story character's false belief and a control question. Both questions had to be answered correctly in order to obtain one point for that particular task. In total, a score of two points could be obtained.

Parent Report

To examine parent-report on externalizing behaviors, the Child Symptom Inventory (CSI) (Gadow & Sprafkin, 1994) was used. The CSI is a behavior-rating scale designed to assess childhood disorders based on DSM-IV criteria. Eight items assessed the symptoms of Oppositional Defiant Disorder (ODD) (e.g., "Does things to deliberately annoy others", "Is angry and resentful") and 14 items assessed symptoms of Conduct Disorder (CD) (e.g., "Has deliberately start fires"; "Has run away from home overnight"). Parents were asked to rate each symptom on a 4-point scale (1 = never and 4 = very often). Table 2 shows how many parents filled in the questionnaire and psychometric properties of all the questionnaires.

Socioeconomic Status Score (SES) was computed by adding up scores of different questions concerning income, education, and occupation. The first question entailed what the net household income per year was (1 = *Less than 15.000 Euro*, 2 = *15.000 – 30.000*, 3 = *30.000 – 45.000*, 4 = *45.000 – 60.000*, 5 = *More than 60.000*, or 6 = *Do not know/want to say*). The second question involved the highest level of education both parents/caregivers had completed (1 = *No / primary education*, 2 = *Lower general secondary education*, 3 = *Higher general secondary education*, 4 = *Higher vocational education / University*, or 5 = *Do not know/want to say*). The final question was what the job of both parents/caregivers was (1 = *No job*, 2 = *Part-time job*, 3 = *Full-time job*, or 4 = *Do not know/want to say*). When one of the questions was not answered or the answer was unknown, no score could be computed and these data were omitted from the results. All questionnaires show moderate to good internal consistencies in both groups (see Table 3), except for the CD scale of the CSI, due to low occurrence.

Table 3.
Psychometric Properties and Group means of the Questionnaires for Aggression, Empathy, Anger Mood, Psychopathy, ODD and CD

	n items	Cronbach's α		*M* and *SD*	
		ASD	TD	ASD	TD
		Child Report			
Reactive Aggression	18	.94	.88	1.36 (.42)	1.38 (.32)
Proactive Aggression	18	.91	.96	1.12 (.24)	1.13 (.32)
Contagion	4	.77	.70	1.58 (.50)	1.60 (.47)
Personal Distress	6	.64	.68	1.64 (.42)	1.76 (.45)
Understanding	5	.67	.65	2.19 (.45)	2.48 (.41)**
Anger Mood	4	.90	.80	1.58 (.60)	1.52 (.47)
		ToM Task			
Theory of Mind *(Range 1-2)*	4			1.59 (.61)	1.78 (.45)*
		Parent Report			
Psychopathy	20	.73 (N=59)	.74 (N=50)	1.71 (.27)	1.34 (.19)**
CD (*Range 1-4)*	14	.58 (N=60)	.57 (N=51)	1.13 (.15)	1.03 (.07)**
ODD (*Range 1-4)*	8	.83 (N=60)	.80 (N=51)	2.21 (.53)	1.64 (.37)**

Note. All questionnaires have a range from 1 - 3, except for the ToM Task and parent reports.
*$p < .05$ **$p < .001$

Statistical analyses

First, in order to make a comparison of the prevalence of externalizing behaviors (self-report: Reactive and Proactive Aggression; and parent-report: CD, and ODD), levels of empathy, ToM, and anger (Anger Mood) between the ASD and TD group, *t*-tests were carried out. The strength of the relations between the variables was established by means of Pearson correlations and regression analyses. Reactive and Proactive Aggression were the dependent variables, and aspects of empathy, the ToM task and Anger Mood, stood as independent variables. Group differences in the strength of the

relationships between the dependent and independent variables were tested with a multi-group approach to regression analysis (Rieffe, et al., 2011) using Structural Equation Modeling (SEM). In such an approach, first a model is tested with equality restrictions on the regression parameters over the groups, i.e., the null hypothesis states that the matrices of regression parameters contain identical values. Model fit can be evaluated by means of a chi-square test and several fit indices such as the Root Means Square Error of Approximation (RMSEA, which should not exceed the .80 level). If the test statistics reach significance, the null hypothesis of equal regression parameters is rejected. Second, univariate tests of specific parameters (the so-called modification indices) can be used to identify the specific differences. If the two sets of regressions parameter indeed differ, group membership had a moderating effect on the relation between the variables. The programs *SPSS* version 19.0 and *Lisrel 8.80* were used. In Figure 1 a schematic overview is given of the study variables and the examined relations.

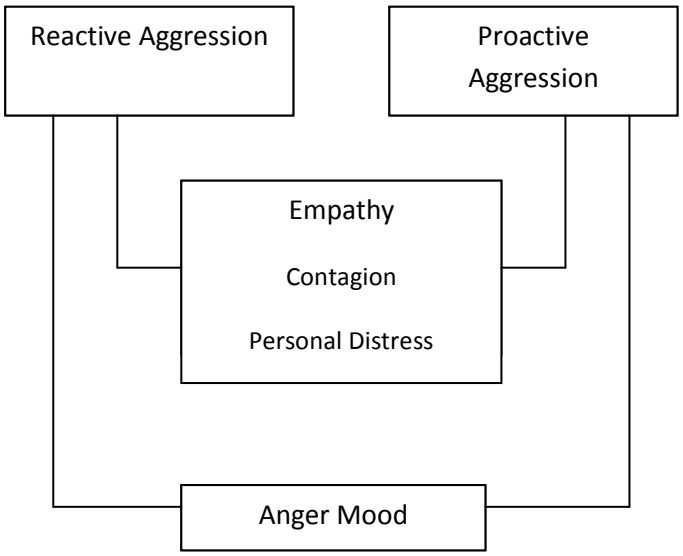

Figure 1. Schematic overview of study variables

Results

Differences between groups in externalizing behaviors, Empathy, ToM, and Anger

The mean scores in Table 3 show higher scores on parent reports ODD, $t(109) = 6.433$, $p \leq .001$ and CD, $t(109) = 4.192$, $p \leq .001$ in the ASD group compared to the TD group. The groups did not differ on the self-report measures for Reactive and Proactive Aggression, Anger Mood, or the empathy scales Contagion, and Personal Distress. Yet, children with ASD reported lower scores than their TD peers on the empathy scales of Understanding $t(131) = -3.866$, $p \leq .001$ and on the ToM task $t(131) = -1.993$, $p \leq .05$.

Relations between Reactive and Proactive Aggression with Empathy, ToM, and Anger

Table 4 shows the correlations between the Reactive and Proactive Aggression scales, Contagion, Personal Distress, Understanding, Theory of Mind, and Anger Mood. In both groups, all three scales of the Empathy Questionnaire were interrelated. In TD children, Contagion was negatively correlated with Reactive Aggression. In contrast, all empathy scales were positively correlated with both forms of aggression in children with ASD, except for Understanding with Proactive Aggression. Using Fisher transformation the correlation between Contagion and Reactive and Proactive Aggression differed significantly between the two groups ($p \leq .05$). Furthermore, the correlation coefficients between Reactive Aggression and Personal Distress and Understanding were significantly different between the two groups. Theory of Mind was negatively correlated with Reactive and Proactive aggression in children with ASD, and negatively correlated with only Proactive Aggression in the TD group. However, the correlation coefficients did not significantly differ between the two groups. Anger Mood correlated positively with both forms of aggression in both groups. In both groups reactive and proactive aggression were interrelated (ASD: $r = .64$, $p = \leq .000$; TD: $r = .42$, $p = \leq .000$). Correlations between age, IQ, and Reactive/Proactive aggression were also computed. Only age correlated with Proactive Aggression in the TD group ($r = -.27$, $p = \leq .05$).

Table 4.
Correlations and regression coefficients for Empathy scales, ToM and Anger scale on Reactive and Proactive Aggression

	Contagion	Personal Distress	Understanding	ToM	Anger Mood
			Correlations ASD		
Reactive Aggression	*.50****	*.38***	*.27**	-.27*	.54***
Proactive Aggression	*.36***	.31*	-.02	-.30*	.50***
			Correlations TD		
Reactive Aggression	*-.32***	*.05*	*-.11*	-.08	.35**
Proactive Aggression	*-.09*	.05	-.18	-.39**	.40**
			Standardized regression coefficients (multi-group analysis, n=133)		
Reactive Aggression	*-.23**	.25*	*.17**	*-.17**	.51*
Proactive Aggression	-.04	.16	-.07	-.34*	.45*

*p < .05; ** p < .01 ***p<.001
Note. Using Fisher transformation, the correlations coefficients in italics denote significant group differences. The regression coefficients in grey/italics denote significant group differences.

Table 4 also shows the regression coefficients for the Empathy scales, the ToM task and Anger scale in both groups. The R^2 values are moderately high for Reactive and Proactive Aggression (.30 and .35 respectively). It can be seen that all three Empathy scales contribute to explaining variance in Reactive Aggression, but not in Proactive Aggression. Additionally, ToM contributes negatively and Anger Mood contributes positively to explaining variance in both dependent variables.

The equality of this regression model of the Empathy scales, ToM task and Anger scale on Reactive and Proactive Aggression was tested with a multi-group analysis with equality constraints on all parameters. The chi-square reached significance (χ^2 = 49.27, df = 28, p < .007), and also other fit measures show violations of equality (RMSEA = .094; GFI = .91) suggesting a misfit. This indicates that there are significant differences in the parameters between the two groups, but only for Reactive Aggression. The modification indices imply that removing the equality restriction in

the regression of Reactive Aggression on Contagion, Understanding and ToM will result in the largest decreases in chi-square value. The correlation coefficients in Table 4 indicate a negative contribution in the TD sample and a positive contribution in the ASD sample for Contagion to the prediction of Reactive Aggression. Additionally, the negative correlation with Understanding and the positive correlation with ToM seem only significant in the ASD group. However, when the equality restriction was removed for Contagion, this resulted in a good model fit (χ^2 = 27.37, *df* = 27, *p* < .44; RMSEA = .00; GFI = .95), whilst additional removal of the restrictions for Understanding and ToM did not significantly improve the model fit.

Discussion

Should we interpret aggressive behaviors in children with ASD the same as in their TD peers? The main aim of this study was to examine the extent to which affective and cognitive empathy are associated with reactive and proactive aggression, and whether these associations are moderated by group.

Before interpreting the outcomes of this study, it should be noted that the self-report questionnaires used in this study showed moderate to good internal consistencies in both groups, supporting previous studies in which self-report was also applied with good results in children with ASD (Hill, et al., 2004; Rieffe, et al., 2011). Additionally, the good factor structure of the PCA, given the relatively small sample size for this kind of analysis, confirmed that both groups of children had distinguished different motives for their aggressive acts while filling out this self-report.

First, when group means were compared, children with ASD did not report more aggressive behaviors than their TD peers as was partly expected (Farmer & Aman, 2009), even though their parents noted more symptoms on the measure we used for externalizing problems than parents of TD children (Gadow, DeVincent, Pomeroy, & Azizian, 2004). Whereas aggressive behaviors seem very common in low-functioning children with ASD, this study shows that this is less evident in high-functioning children with ASD. Children with ASD reported less cognitive empathy (understanding and ToM) compared to TD children. There were no differences in scores of affective empathy (contagion) and personal distress between the ASD group and the TD group. These findings support the view that although children with ASD are impaired in the cognitive aspect of empathy, they are not impaired in the affective aspect of empathy (Dziobek, et al., 2008; Jones, et al., 2010; Smith, 2009).

Second, we examined the strength of the relationships between affective and cognitive empathy (understanding and ToM), and the level of anger with reactive and proactive aggression, where group (ASD vs. TD) was used as moderator. Group indeed showed a moderating effect for reactive aggression, but not for proactive aggression. The correlations for the ASD group showed that higher levels of self-reported contagion, personal distress, anger mood, and a lower capacity for inferring mental states (ToM) were related to more reactive *and* proactive aggression. As personal distress and anger mood both refer to an impaired capacity for emotion regulation, this could suggest that both types of aggression in children with ASD could be explained by impaired emotion regulation. Surprisingly, a stronger focus on the understanding of others' distress was related to more reactive aggression in the ASD group, whereas their actual capacity to infer mental states (ToM) was negatively related to reactive aggression. We will discuss this paradoxical outcome later.

Reactive aggression

The multi-group regression model showed that impaired emotion regulation (personal distress and anger mood) was related to more reactive aggression in TD children, consistent with the literature (Eisenberg, 2000; Marsee & Frick, 2007). However, contagion was related to less reactive aggression in this group. These outcomes emphasize unique or independent roles of impaired emotion regulation (i.e., personal distress and anger) and diminished compassion for others' suffering in the etiology of reactive aggression in typical development (Hubbard, McAuliffe, Morrow, & Romano, 2010; Rieffe, Faber, Kouwenberg, & Güroğlu; Rieffe, et al., in revision). Consistent with previous findings, our results further indicate an inhibiting role of empathy in reactive aggression in TD children (Mayberry & Espelage, 2007).

In contrast, unique for children with ASD was the positive contribution of contagion to reactive aggression. This outcome emphasizes that any kind of (empathic) arousal can be a trigger for an aggressive reaction in these children. Also a lower capacity to infer mental states (ToM) was related to more reactive aggression in children with ASD. Difficulties in social cognitions, thus misunderstanding the social world, seeing others as irrational human beings with unpredictable behaviors and emotions, could evoke aggressive behaviors towards others. Since the outcomes of this study are only cross-sectional, a longitudinal study could give more insight in the causality of this relationship and the underlying motives for this aggression in children with ASD.

Understanding others' emotions and/or behaviors was uniquely related to reactive aggression in children with ASD, but not for TD children. This finding seems to oppose the formerly discussed negative relationship with children's ToM capacity and reactive aggression. Yet, the ToM task employed in this study did not involve emotions. Instead, children were asked to predict false beliefs in a protagonist from short video clips that most of the children specifically enjoyed watching. Trying to understand another's distress as was required for responding to the items representing the scale Understanding Others' Emotions in the Empathy Questionnaire, might be problematic for children with ASD since they need to focus on an emotionally aroused situation.

A growing body of literature indicates children with ASD seem to point at impaired emotion regulation when focusing on an emotionally charged situation. These findings suggest that cognitive empathy (ToM) could be a problem for children with ASD that prevents them from reacting empathically, simply because they cannot handle their own level of arousal. As pointed out by Rieffe and colleagues (2010) in order to react adaptively to the emotion of another person, one needs to understand that their arousal is caused by the other person's emotional expression, rather than an event in relation to oneself. Additionally, one needs the capacity for down-regulating their own arousal, knowing that it will disappear once the other person is calmed again. In other words, the focus should be other-oriented and not self-oriented (Eisenberg, Spinrad, & Sadovsky, 2006). This outcome supports previous research (Blair, 1999; Jones et al., 2010), suggesting that problems in emotion regulation and impaired ability to infer mental states play a significant role.

Future studies should further confirm these preliminary outcomes and our interpretation of these results. We want to remind the reader that the moderating effect of group was most strongly evident for the relationship between contagion and reactive aggression, because the fit of the model was best when only this equality restriction was lifted. Therefore, the role of understanding others' emotions in relation to reactive aggression in children with ASD needs more investigation.

Proactive aggression

Unexpectedly, a lack of empathy was unrelated to proactive aggression in TD children. In children with ASD, those who reported engaging in more proactive aggression also reported more arousal when witnessing another's pain or stress. However, these associations did not hold in a regression model predicting the level of variance in proactive aggression. Yet in both groups, heightened levels of anger and a lower level of Theory of Mind contributed to the prediction of proactive aggression. As noted before, the design of this study is cross-sectional which prevents us from drawing conclusions about the causality of these relationships. Future research should focus on possible motives behind displaying proactive aggression in children with ASD, whereas it is still unclear whether these children are able to instrumentally apply aggression in order to reach a certain goal.

Limitations

This study was mainly based on self-report, because only participants could be expected to have direct knowledge of their own emotions and behavior. Although observational studies are reliable in examining actual aggressive behavior, they do not inform about motives for these behaviors. Distinguishing between reactive and proactive aggression in the observation and coding of behavior is difficult because reactive aggression could easily be mistaken for proactive aggression, and vice versa (Kempes, Matthys, de Vries, & van Engeland, 2005). Another way to differentiate between reactive and proactive aggression is through psychophysiological reactions, such as heart rate and skin conductance levels. Unfortunately, psychophysiological differences between proactive and reactive aggression have been minimally studied, and results are contradictory (Hubbard, et al., 2002). Future research should combine self-report, parent-report, observations, and psychophysiological measurements to give us insight in the motivational differences between reactive and proactive aggression, especially in children with ASD. Furthermore, due to a relatively small sample size we were unable to draw firm conclusions. Besides combining different methods, future research should also include a larger sample size.

Conclusions and implications

The outcomes of this study show that reactive aggression in children with ASD should not be interpreted the same way as in TD children. Reactive aggression in children with ASD seems mainly associated with impaired skills for emotion regulation or an over-stimulating environment. Intervention programs for children with ASD could focus on improving their capacity for emotion differentiation and regulation. Children with ASD might benefit from learning that to a certain level, emotions of others can also influence their own emotion arousal. Therefore, we need to develop and study ways in order to make children with ASD aware of the factors associated with observing others' emotions. Hopefully these findings will help to implement better prevention, counseling, and treatment trajectories for aggression in children with ASD.

Chapter 5

Don’t anger me! Bullying, victimization, and emotion dysregulation in young adolescents with ASD

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Abstract

The purpose of this study was to increase our knowledge regarding the role that emotional functioning can play in the genesis of bullying and victimization at school for children with ASD. Therefore, we examined the unique associations of basic emotions (anger and fear) and moral emotions (shame and guilt) with bullying and victimization in children with an Autism Spectrum Disorder (ASD) and a control group with Typically Developing (TD) children. The study included 130 children and young adolescents (64 with ASD, 66 TD, *M*age 140 months), who filled out self-report questionnaires. The main findings showed that in both groups less guilt and more anger were associated with more bullying. More fear was associated with more victimization in TD children only. Yet, more anger was also strongly and uniquely associated with more victimization in children with ASD, but not in TD children. These outcomes support the idea that lack of guilt is a pivotal antecedent of bullying for TD and ASD children. However, unlike TD children, the dysregulation of anger seems to play an important role in victimization as well as bullying in children with ASD.

Introduction

By definition autism is characterized by social impairments American Psychiatric Association (1995) The negative impact of these social impairments is well documented. Compared to typically developing (TD) children, children with an autism spectrum disorder (ASD) spend more time alone, are less often involved in social interactions, and report fewer reciprocal friends (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010; Wainscot et al., 2008). Furthermore, children with ASD are less liked by peers, rejected and excluded more often, and worse, they are also more often bullied with verbal, physical and relational means (Cappadocia, et al., 2012; Carter, 2009; Humphrey & Symes, 2010; Little, 2002; Sofronoff, Dark, & Stone, 2011; Twyman, et al., 2010; Wainscot, et al., 2008). With many parents being unaware of it, recent studies have shown the relatively new form of cyber-bullying entering into the lives of children and adolescents with ASD and/or ADHD (Cappadocia, et al., 2012; Kowalski & Fedina, 2011).

Yet, victimization is only one side of the coin. Among TD children many victims are also bullies, which can also be observed in adolescents with ASD (Unnever, 2005; van Roekel, Scholte, & Didden, 2010). Nevertheless, although children with ASD are more often victims of peer bullying than TD children, it is not clear whether they themselves also bully others more often. Volker and colleagues (2010) found that parents rated their high-functioning children with ASD higher on bullying than parents of TD children, but this difference between ASD and TD children was absent when controlled for ADHD (Montes & Halterman, 2007). Also, results based on self-reports showed no differences in the frequency of bully behaviours between children with ASD and TD children (Twyman, et al., 2010).

Regardless of whether the absolute levels of bullying and victimization differ between ASD and TD children, the question that might be equally important to answer in order to improve our understanding of peer bullying is which factors are associated to these behaviours in children with ASD, since they do not necessarily coincide with those related to the same behaviours in TD children (Rieffe, et al., 2011). An important factor related to the occurrence of bullying and victimization in TD children is emotion dysregulation (Camodeca & Goossens, 2005; Spence, De Young, Toon, & Bond, 2009). Besides their social problems, impairments in the domain of emotion regulation are also frequently noted in children with ASD (Begeer, et al., 2008; Scarpa & Reyes, 2011; Singh et al., 2011; Sofronoff, et al., 2011), but it is unknown to what extent these problems can also account for victimization and bullying in this group. In other words, it is unclear to what extent the relationship between emotional functioning and bullying/victimization in TD children also applies to children with ASD, which was the focus of investigation in this study.

Bullying and emotion dysregulation

In a typical development, both bullies and victims are known for their heightened levels of anger (Kochenderfer-Ladd, 2004; Mahady Wilton, Craig, & Pepler, 2000), but this anger might come from different underlying factors, such as a desire for dominance in bullies and an attempt to defend themselves in victims. Additionally, anger in bullies and victims alike might also stem from a tendency towards reactive aggression, reflected in hot-headed behaviours in easily aroused children defending themselves (Camodeca, et al., 2002; Salmivalli & Nieminen, 2002), possibly due to a (hostile) misinterpretation of others' intentions (Camodeca & Goossens, 2005).

Besides anger, victims are also characterized by other negative emotions such as anxiety and sadness (Camodeca & Goossens, 2005; Fleming & Jacobsen, 2010; Hawker & Boulton, 2000). Fear is a particularly dominant emotion, related to going to school, getting involved in new activities, or fear of future victimization (Boulton,

Trueman, & Murray, 2008). Clearly, victims' negative emotions may largely stem from their negative social interactions. Yet, a study from Spence and colleagues (2009) showed that higher levels of emotion dysregulation predicted the level of victimization, emphasizing that the causal relationships could be either way or reciprocal.

Compared to TD children, children with ASD display higher levels of negative emotions, more difficulties with emotional self-control, especially anxiety and anger (Singh, et al., 2011; Sofronoff, et al., 2007; Volker, et al., 2010), and more mood disorders (Gadow, et al., 2012), denoting problems in their emotion regulation. A combination of more negative and more socially inept emotional displays could make children with ASD more vulnerable to peer victimization.

Moreover, anecdotic material, provided by parents in the study by Sofronoff and colleagues (2011), but also from personal conversations, point to the idea that many parents think that their child with ASD is easily provoked. Misunderstandings in social communication (e.g., literally following something), but also the fact that children with ASD are easily aroused, can be triggers for others to tease them. Parents note that their children with ASD frequently react angrily or even violently to these provocations, thereby getting more and more upset. Preliminary outcomes based on parent reports in this study by Sofronoff and colleagues (2011) seem to suggest that anger is related to more victimization in children with ASD. Additionally, these heightened levels of anger in children with ASD could also be linked to more bullying behaviours, as it is the case for TD children (Camodeca & Goossens, 2005), but to date there is no empirical support for this claim.

Bullying and moral emotions

In investigations into the role of emotion dysregulation in the aetiology of bullying and victimization, moral emotions are usually considered equally important as the basic emotions such as anger and fear (Gasser & Keller, 2009; Menesini & Camodeca, 2008). More than the basic emotions, moral emotions are aimed at regulating social interactions and make people feel repentant for their moral transgressions (guilt), or concerned about appearing in front of an audience in an undesired or not approved way (shame) (Menesini & Camodeca, 2008; Olthof et al., 2000). Moral emotions, such as shame and guilt, develop when children become aware of rules, social standards and their responsibility in meeting them, and are elicited when children experience their own failure in conforming to them (Lewis, 1995). They also require a clear self-other distinction, and the ability to perceive oneself through the eyes of the other(s), which is exactly what in children with ASD is commonly found to be impaired (Begeer, et al., 2008).

Although bullies may understand social situations well and present good perspective-taking skills (Caravita, Di Blasio, & Salmivalli, 2009; Gasser & Keller, 2009; Gini, 2006), they show deficits in moral engagement (Gini, 2006; Menesini & Camodeca, 2008; Pornari & Wood, 2010), moral compassion (Gini, Pozzoli, & Hauser, 2011), and moral emotions (Menesini & Camodeca, 2008). It is especially lower levels of guilt and shame that seem to characterise bullies (Menesini & Camodeca, 2008), allowing them to harm others more easily. In contrast, victims show no impairments in their levels of guilt compared to other children, but often report more shame, which makes them more vulnerable to being ridiculed by their peers (Menesini & Camodeca, 2008; Morrison, 2006).

The few studies on moral emotions in children with ASD seem to indicate a less developed understanding or application of these emotions in daily life situations, whereby children with ASD take a more egocentric perspective when interpreting social events and additionally show an impaired understanding of common social

rules (Andanson, Pourre, Maffre, & Raynaud, 2011). Regarding guilt, children with ASD score lower than TD children on the display of guilt in a guilt eliciting observational task (Hobson, Chidambi, Lee, & Meyer, 2006), and refer to interpersonal transgressions less often than TD children (Kasari et al., 2001). Additionally, when asked to recall shameful events, children with ASD mention an audience less often than TD children, and the events more often involve an external locus of control (Capps, Yirmiya, & Sigman, 1992; Kasari, et al., 2001), although children with ASD seem to acknowledge the importance of an audience equally often as TD children when asked about embarrassment in someone else (Hillier & Allinson, 2002).

Our study

The main aim of the study presented here was to examine the associations between emotional functioning and bullying/victimization in children with ASD, as compared to their TD peers. The study included the two major moral emotions that play a crucial role in TD children's bullying behaviour: guilt and shame. We expected shame and guilt to be negatively associated with bullying in the TD group. Furthermore, we expected that only shame was positively associated with victimization in the TD group.

To the best of our knowledge the relation between moral emotions and bullying or victimization in children with ASD has not received any attention in the literature yet, but on the basis of the notion that the impact of moral emotions in ASD children's daily life is limited, one would expect the association of shame and guilt with bullying to be weaker in children with ASD compared to TD children, and that shame plays a less influential role when children with ASD are being bullied.

Additionally, we examined the role of emotion dysregulation over and above the association of these two moral emotions with bullying/victimization. Here, the focus was on the two basic emotions mentioned most frequently in connection with TD children's bullying: anger and fear, which are also the two emotions most frequently mentioned in connection with emotion dysregulation in children with ASD. As stated earlier, anger might serve different means in bullies and victims. Anger in bullies might be related to a desire for dominance, but anger in victims might be related to the attempt to defend oneself (Camodeca, et al., 2002). However, anger is the more dominant emotion in bullies, whereas fear is more dominant in victims. Fear arises in victims in anticipation of more peer harassment, but anxious children are easy and rewarding targets for bullies, thus the relationship is reciprocal (Spence, et al., 2009). Therefore, we expected in both groups anger to be related to more bullying, whereas fear was expected to be associated with more victimization.

The lack of literature on bullying and emotion regulation in children with ASD makes it difficult to make specific predictions on the moderating effect of group (i.e. ASD vs. TD). Yet, based on parent reports about the aggressive reactions that children with ASD can have towards peer provocation, we expected higher levels of anger to be associated with more victimization in the ASD group.

We choose to use (anonymous) self-report measures for bullying and victimization, because we thought that children themselves would be better informants about these behaviours for two reasons. First, children might feel embarrassed about being bullied or about their own bullying behaviours, thus parents or teachers might underreport these behaviours. Additionally, most children with ASD are in small classes in special education. Yet, the bullying might occur in their neighbourhoods, in the streets, but not necessarily in the classroom. Therefore, information by classmates could also give an underestimation. Age, SES and IQ were controlled for, but no specific hypotheses were formulated in this respect.

Method

Participants

A total of 130 children participated in this study. The sample included 64 high functioning children with ASD (57 boys, 7 girls – *M*age = 141 months, *SD* = 15.1; age range: 113 - 177 months), diagnosed on the basis of the *Autism Diagnostic Interview-Revised* (Lord, et al., 1994) by child psychiatrists. Participants were recruited from the Centre for Autism, Leiden, the Netherlands; the Dr. Leo Kannerhuis, Doorwerth, the Netherlands; and the C.P. Van Leersumschool, Zeist, the Netherlands. These institutions are specialised in treating and diagnosing children with ASD.

A TD group (66 boys, 8 girls – *M*age = 138 months; *SD* = 15.5, age range: 114 – 176 months) was drawn from primary and secondary schools in the Netherlands. Inclusion criteria for the TD group were an IQ above 80 and no diagnosed developmental disorders. The TD group was matched with the clinical group on sex and mean age.

An IQ norm score was computed by means of two nonverbal subtests of the *Wechsler Intelligence Scale* (WISC) (Kort et al., 2002; Wechsler, 1991): Block Design (copying small geometric designs consisting of four or nine plastic cubes) and Picture Arrangement (sequencing cartoon pictures to make sensible stories). The mean of the norm scores on the two subtests was used. Of two ASD children and eight TD children IQ scores could not be obtained. In the remaining sample there were no differences between children with ASD and TD children on the mean of the two IQ subtest scores.

SES was computed by adding the scores on questions concerning income, education and occupation of both parents/caregivers. When one of the questions was not answered or the answer was unknown, no score could be computed and these data were omitted from the results. For 17 TD children information about socioeconomic status was not provided by their parents. In the remaining sample there were no differences between children with ASD and TD children on SES scores. Therefore, IQ and SES scores were left out in further analyses. The Ethics Committee of Leiden University and the Centre for Autism granted permission for the study and all parents gave their written consent before testing.

Procedure

The children were tested at home, at school or in their institutions (in the case of children with ASD). At the start of the testing session children were informed that their responses would be processed anonymously and that they could opt out at any time without further explanation. Children were asked to fill out the questionnaires using a laptop computer. Each item was presented separately, and children could select their response below each item with the mouse. The next item would appear automatically. A testing session lasted approximately one hour. The data presented here are part of a larger research project, and during the sessions more tests (including observation measures) were administered which are not included in this study.

Materials

The *Bully Questionnaire* is based on the *Bully/Victim Inventory* (Olweus, 1997). Before filling out the questionnaire the children were given an elaborate introduction on bullying and informed that their answers would be kept secret (see Appendix 1). Children were asked 'Did you, with the aim to bully someone, over the last two months…' and nine items featuring bullying behaviours were presented (for example, 'hit, push, or kick somebody', 'call somebody names', 'say mean things', or 'ignore a

person'). Children were asked to respond to each item on a 3-point scale (1 = *(almost) never*, 2 = *sometimes*, 3 = *often*).

The *Victim Questionnaire* was presented after the Bully Questionnaire and consisted of a short introduction about bullying, now asking the children if they were bullied sometimes, and the same nine items of the Bully Questionnaire were presented, but now the items were formulated asking children if, in the last two months, they had been bullied (e.g. 'Did someone call you names?') Because deliberately making someone invisible can be a strategy to bully, one extra item was added to tap into this 'Are you invited to birthday parties?', that was scored reversed. The children could answer to each item on a 3-point scale (1 = *(almost) never,* 2 = *sometimes,* 3 = *often*).

The *Mood Questionnaire* (Rieffe, Meerum Terwogt, & Bosch, 2004) is a self-report about children's affective states over the last four weeks, including the basic emotions Fear, Anger, Sadness and Happiness. Children are asked to indicate how they have been feeling recently. In all, the questionnaire consists of twenty items on a 3-point scale (1 = *(almost) never*, 2 = *sometimes*, 3 = *often*). The scales used in this study were Anger and Fear, each consisting of four items.

To assess *Moral Emotions* we used an adapted version of the *Maladaptive and Adaptive Scales* (SCEMAS) (Ferguson, et al., 2000) to measure shame and guilt. The current version of the questionnaire consists of five scales (Guilt, Shame, Anger, Happiness, Pride), of which only the Guilt and Shame scales were used for this study. Six scenarios depicted moral situations in which harm was inflicted on someone else, and were intended to elicit guilt (e.g., 'You're riding your bike really fast. You crash into a little girl'). Another six scenarios were intended to elicit shame, in which the social image of the agent was damaged, but no harm was done to others (e.g., 'You have to give a presentation. Everyone is staring at you. You forget what you wanted to say.'). Children were asked to read these twelve vignettes, each followed by the question how much of the intended emotion (guilt or shame) they would feel in these situations, to be answered on a 3-point scale (1 = *not at all*, 2 = *a little*, 3 = *a lot*).

The internal consistencies of all scales used in this study were good (see Table 1).

Table 1.
Psychometric Properties and Mean Scores for Bullying Roles, Moral Emotions, and Mood Scales in Children with ASD and TD Children.

	No of items	Cronbach's Alpha		Mean scores (*SD*)	
		ASD	TD	ASD (*n* = 64)	TD (*n* = 66)
Bullying roles					
Bully	9	.81	.80	1.59 (.38)	1.64 (.36)
Victim*	10	.81	.75	1.61 (.39)	1.47 (.31)
Moral emotions					
Guilt**	6	.76	.63	2.07 (.50)	2.28 (.40)
Shame**	6	.79	.77	1.98 (.52)	2.33 (.51)
Mood states					
Anger	4	.91	.83	1.58 (.61)	1.53 (.49)
Fear**	4	.66	.76	1.52 (.43)	1.25 (.37)

* $p < .05$; ** $p < .01$

Statistical Analyses

First, in order to make a comparison of the prevalence of Bullying and Victimization (dependent variables) and levels of moral emotions (Guilt and Shame), and mood states (Anger and Fear) (independent variables) between the ASD and TD group, *t*-tests were carried out. Second, relations between dependent variables and independent variables were established by means of Pearson Correlations. Fisher transformations were used to examine the differences between the correlation coefficients for both samples. Third, Group was recoded into a dummy variable (TD = 0; ASD = 1) and the independent variables were centred to have a mean of zero. Two hierarchical regression analyses were carried out with Bullying and Victimization as dependent variables, Group, Guilt, Shame, Anger, and Fear in step 1. In step 2, the interaction terms with Group were added to examine whether the effects of the independent variables vary as a function of Group.

Results

The mean scores in Table 1 show that children with ASD reported more victimization than TD children, but children in both groups reported bullying others equally often. Additionally, children with ASD reported higher scores on Fear than TD children, but not on Anger. Children in the TD group reported more guilt and shame than their peers with ASD.

Relations between bullying roles, moral emotions and mood states

Table 2 shows Pearson's correlations of the bullying roles with the moral emotions, and the scales of the Mood questionnaire for the ASD and TD group separately. Bullying and Victimization were associated in the ASD group ($r = .38$, $p \leq$

.01), but not in the TD group (r = .14, $p \geq .25$), yet the difference in the strength of the correlation between the groups was not significant.

The correlations in Table 2 also show that, for Bullying, correlations emerged in both groups in the expected direction with Guilt and Anger. The strength of the associations did not differ between the groups. The regression model (Table 3) confirmed that Guilt contributed negatively and Anger positively to Bullying. Group did not significantly interact with either of the independent variables, suggesting there was no moderating effect of Group on the association between these independent variables and Bullying.

The correlations in Table 2 show that Fear was associated with Victimization, but for the TD children only. Anger was associated with Victimization in the ASD group, but not in the TD group. However, using Fisher transformation, only the correlation coefficients between Anger and Victimization differed between the two Groups ($p \leq .001$). Only Anger contributed to Victimization. For Victimization, Group interacted with Anger ($p \leq .001$) and Fear ($p \leq .016$). The significant interaction terms suggest that group moderated the effect of Anger and Fear on Victimization. To examine these interaction effects, the effects of Anger on Victimization, and Fear on Victimization were plotted for the ASD group and the TD group separately, following the Aiken and West (1991) procedure. Figure 1 shows that Anger was associated with Victimization in the ASD group and that this association was absent in the TD group. Figure 2 shows that Fear was associated with Victimization in the TD group and that this association was absent in the ASD group.

These regression analyses were also carried out controlling for Victimization in the prediction of Bullying, for Bullying in the prediction of Victimization, and for Age and IQ for both dependent variables. The inclusion of these variables did not lead to significant differences and were therefore omitted from the results. Additionally, the regression analyses were carried out for boys only and showed the same outcomes. Therefore, also these outcomes are not further reported here.

Table 2.
Correlations Between Bullying Roles, Moral emotions and Mood Scales for Children with ASD and TD Children.

	ASD		TD	
	Bully	Victim	Bully	Victim
Moral emotions				
Guilt	-.35**	.15	-.43***	.00
Shame	-.18	.09	-.10	.15
Mood states				
Anger	.49***	*.59****	.21	*.13*
Fear	.13	.19	.14	.39**

Note. Using Fisher transformation, the correlation coefficients between Anger and Victimization differed between the two Groups.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3

Hierarchical Regression Analyses for Moral Emotions, Mood Scales, and Interactions with Group on Bullying and Victimization in Children with ASD and TD

	Bullying			Victimization		
	Δ R^2	***B***	***p***	**Δ R^2**	***B***	***p***
Predictor						
Model 1	.24		.000	.24		.000
Group		-.15	.033		.12	.060
Guilt		-.28	.000		.06	.440
Shame		.01	.939		.04	.504
Anger		.19	.001		.24	.000
Fear		.12	.141		.12	.111
Model 2	.02		.524	.08		.011
Group × Guilt					.15	.319
Group × Shame					-.03	.803
Group × Anger					.36	.001
Group × Fear					-.36	.016
Total adj. R^2	.20			.26		

Note. B-coefficients only shown when Δ R^2 for Model was significant.

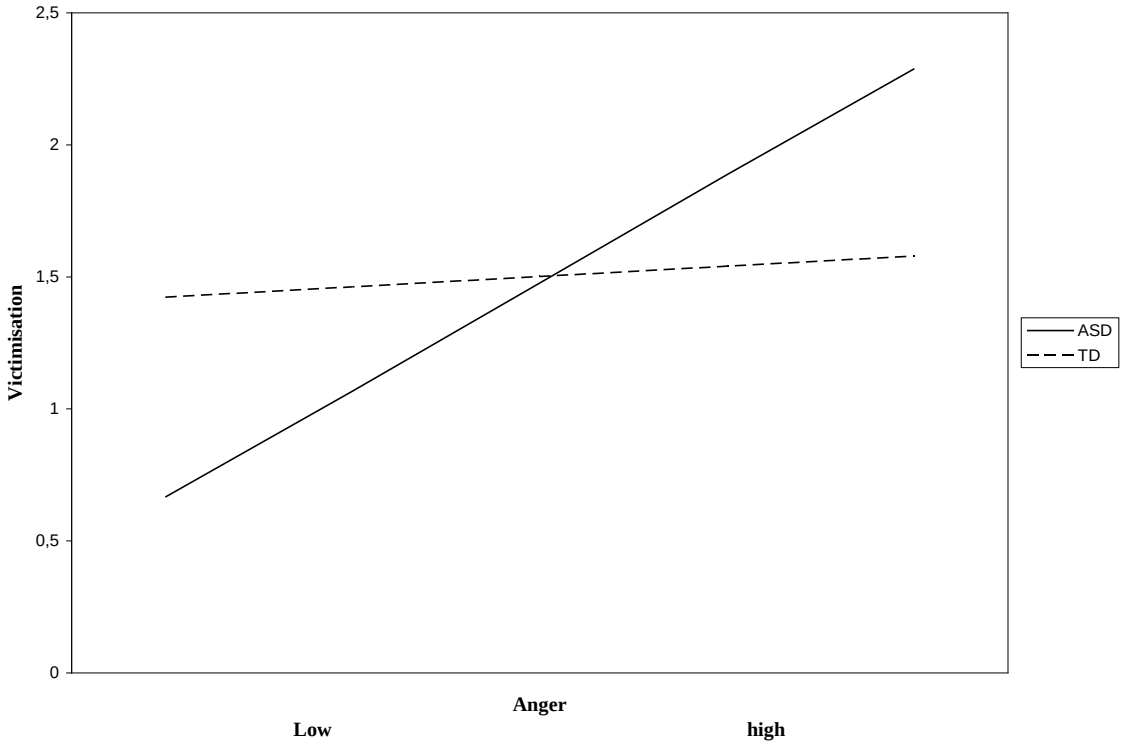

Figure 1. Group moderates the effect of Anger on Victimization.

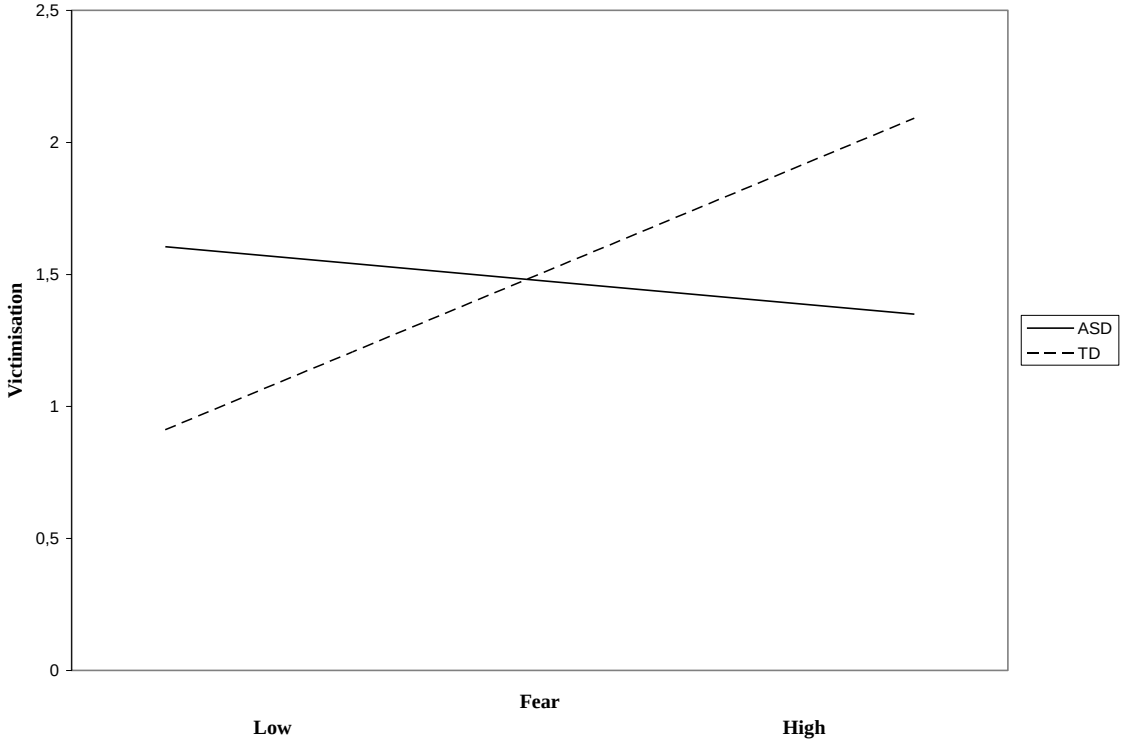

Figure 2. Group moderates the effect of Fear on Victimization.

Discussion

First of all, it should be noted that children with ASD seem very capable of responding to self-report questionnaires about their own internal states and their social behaviours, as we also observed in previous studies (Berthoz & Hill, 2005; Rieffe, et al., 2011). This was indicated by the moderate to high outcomes for internal consistency of the scales that were used in this study.

Confirming the outcomes in previous studies, children with ASD reported a higher rate of victimization than their TD peers (Humphrey & Symes, 2010), but they reported to bully others equally often. The self-reported levels of shame and guilt in children with ASD were lower than in their TD peers (Kasari, et al., 2001).

When we examined the moderating effect of group we found no effect on bullying. Consistent with the literature, self-reported bullying behaviour by TD children in this study was also related to fewer feelings of guilt and more anger (Camodeca & Goossens, 2005; Menesini & Camodeca, 2008). Yet, we found the exact same pattern in children with ASD. However, differences occurred for victimization. Whereas more fear was related to more peer harassment in TD children, anger made the strongest contribution to the prediction of victimization in children with ASD.

Bullying

Anger played a dominant role in bullying for ASD and TD children. It has been argued that anger in bullies may be related to a (hostile) misinterpretation of others' intentions in TD children (Camodeca & Goossens, 2005) and this might also be true for children with ASD. The well-documented impairments in acknowledging and understanding others' mental states in children with ASD negatively affects their daily social interactions (Garnett, Kelly, & Attwood, 2009), which might have also played a role in this relationship we found between anger and bullying behaviours.

Nevertheless, the motive for the anger could also be partially different in the two groups. In TD bullies anger can be useful in establishing or maintaining social dominance and in avoiding retaliation (Olthof et al., 2011; Pellegrini & Long, 2002). Yet, it is less likely that this strategic use of anger would also be found in children with ASD (Begeer et al., 2011). Bullying and victimization have been found to be significantly interrelated in children with ASD, but not in TD children, implying that children with ASD might be both targets and perpetrators of peer harassment more often than TD children (van Roekel, et al., 2010). In other words, they do not seem to be the bullies that maintain a dominant, albeit negative, role as leader. It seems plausible that their anger is more related to frustration and misunderstandings than to controlled anger expressions for dominance. This could imply that bullying in children with ASD is less strongly related to antisocial behaviours, as observed in TD children (Baldry & Farrington, 2000; Bender & Losel, 2011; Sigfusdottir, Gudjonsson, & Sigurdsson, 2010), but to emotion dysregulation instead.

Personal experiences by the last author, in his profession as child psychiatrist, working exclusively with children and adolescents with ASD, give rise to the idea that an important strategy for children with ASD is to gain control over socially difficult or unpleasant situations which cause uncontrollable arousal in the child. The way to obtain this control can result in aggressive behaviours towards others, trying to evoke those negative reactions, so that the child knows when and what to expect. Parents with a child with ASD confirm this view, but to date there is no empirical evidence for this. Future studies may further explore this avenue, which could give important insights into the effect of the over-arousal and problems of emotion dysregulation in children with ASD.

Despite the lower level of guilt in children with ASD, our results indicated that guilt was strongly related to bullying behaviours in TD and ASD children, over and above

children's level of anger. As it appeared, a lack of guilt is a common feature in ASD and TD bullies, who have difficulties in feeling remorse and responsibility for their conduct, and present deficits in morality. The fact that in our study *higher* levels of guilt were also related to *less* bullying in children with ASD suggests that these children are well capable of understanding the level of responsibility or blame that one can attribute in negative social situations (Grant, Boucher, Riggs, & Grayson, 2005).

Previous studies suggest that children with ASD show a lesser understanding of shame and guilt in the appropriate social contexts compared to TD children, which seems to contradict our results. Yet, these studies were based on children's spontaneous responses and explanations regarding guilt- or shame-evoking events (Capps, et al., 1992; Hobson, et al., 2006). Because many children with ASD are characterised by an inhibition to take the initiative in social situations, this inhibition could also hinder them in responding spontaneously (Begeer, Rieffe, Terwogt, & Stockmann, 2003). Nevertheless, the outcome in our study that children with ASD, as we had expected, reported less guilt and shame in response to the norm-violating vignettes they were presented with, emphasises some moral impairments in ASD children's daily functioning that should be examined in more detail in future studies.

Victimization

Although a positive association was found between shame and victimization in TD children, we were surprised that it was not statistically significant. In fact, a previous study (Menesini & Camodeca, 2008), employing a similar measure to assess non moral shame in Italian preadolescents, found a clear association between shame and victimization. A cultural aspect may have played a role: it is possible that Dutch victims feel less social pressure than Italian adolescents to behave or appear in a certain way as is typical for more honour oriented cultures, like Mediterranean cultures (Mosquera, Manstead, & Fischer, 2002). Therefore, Dutch adolescents might not display the same levels of shame when they fail to conform to these kinds of norms. It may also be likely that Italian victims think they can be further humiliated because of their unwanted identity, gaffes or failures, whereas this may not be the case for their Dutch counterparts. However, given the contrasting findings, further studies are needed to shed light on links between shame and victimization.

We were able to confirm our hypothesis that TD victims also reported more fear related to victimization. As noted, TD children who are often harassed by their peers might become anxious to go to school or participate in other child-related activities in order to avoid negative experiences. Yet, highly anxious children are also easy targets for potential bullies and thus the relationship of fear and victimization could be reciprocal. Several intervention programs were developed based on this possible relationship with the goal to make children less vulnerable and more socially and emotionally skilled (Bierman et al., 2010; Salmivalli, Garandeau, & Veenstra, in press). In contrast to these findings regarding victimization in TD children, and despite the finding that children with ASD reported more fear in this study than their TD peers, this general fear was unrelated to being bullied in children with ASD. Instead, it appeared that anger was an influential emotion in children with ASD, strongly related to victimization. The role that anger plays in the victimization of children with ASD is not clear yet, and could in fact be reciprocal as well. Victims may react angrily to being provoked, ridiculed or feeling misunderstood, and may resort to anger because they lack social competence, or have no solutions to respond to provocation. However, children with poor anger management can also become victims more likely because they are easily triggered to over-react as was noted by many parents of a

child with ASD. Future studies could compare the instrumental use of anger in TD children to the function or possible dysfunction of anger in children with ASD.

Experience of more frequent harassment could be an effect of the widely noted social impairments in children with ASD. Children with ASD display difficulties in understanding nonverbal behaviours, jokes, and others' feelings, and their atypical behaviours might be perceived as awkward and clumsy and therefore are more easily ridiculed (Carter, 2009; Little, 2002). Children with ASD also display difficulties in regulating their own level of arousal, especially in negative peer interactions. These symptoms, combined with poor social skills and tendency for idiosyncratic contacts, could make these children easy targets for bullies. Future studies could further explore these aspects into one integrated model.

Concluding remarks

Anger implies the tendency to confront others with the harm that has been done, and demand of these others to restore the damage (Rieffe & Meerum Terwogt, 2006). Adequate anger management might still be an important goal to obtain for many children with ASD(Singh, et al., 2011). Yet, also when expressed maladaptively, either out of frustration or because of feeling provoked, anger expression does imply a tendency and willingness to set and guard one's limits, i.e., to confront the social world and stand up for oneself. In other words, children with ASD who face social problems such as bullying and/or victimization do not seem to be the types that withdraw, as implicated by a fear reaction. Instead, we observed patterns of anger, which imply that these children seek a connection with the outside world more often than their less angry peers and may be indicating a stronger, though less productive, desire to express themselves. Thus, these outcomes seem to suggest that children with ASD who are more frequently involved in bullying and/or victimization are also more inclined to seek the confrontation in their social interactions. In our study we did not find whether the anger in children with ASD is the cause or the effect of both bully behaviours and victimization, but we hope to establish this link with future longitudinal studies.

Our current work also raises some other questions that could be explored in future studies. A one-dimensional category for victims was used in this study, but literature suggests that two types of victims can be detected: more passive and withdrawn versus more aggressive and provocative victims (Olweus, 1993; Unnever, 2005). It is possible, for instance, that whereas fear is more typical of the first type, anger mainly characterizes the second type of victims. Given the high correlation between bullying and victimization in our ASD sample, this distinction might also be valid for this group. Besides this point, future research could also focus on investigating different types of bullying and victimization, such as physical, verbal, relational and electronic.

In conclusion, the outcomes of this study suggest that TD and ASD bullies share a common lack of guilt and high levels of anger, whereas victimization is only associated to fear for TD children. Instead, both bullying and victimization in ASD children appear to be linked with the dysregulation of anger. As noted earlier, the causality of these relationships as assumed in this paper has to be established longitudinally in future studies.

Chapter 6

Friendships of children and adolescents with ASD: Quality, stability, and emotional value

Abstract

Children with autism spectrum disorder (ASD) are known for their difficulties in initiating and maintaining affective relationships. Still little is known about the quality and stability of friendships in children with ASD. In Therefore, in this study we examined friendship quality, friendship stability, and emotional value of friendships in children with ASD (*N*=74, *M*age=11.6 years) as compared to TD children (*N*=113, *M*age=11.5 years). Children with ASD reported less stability, more negative friendship features and less positive friendship features, compared to TD children. However, friendships in children with ASD appeared to have an emotional value in a sense that emotional functioning was related to friendship quality. Although children with ASD seem to appreciate having friendships, impaired emotion understanding and social difficulties seem to hamper the development and stability of friendships.

Introduction

High-quality friendships have positive effects on children in terms of increasing self-esteem, improving social adjustment and coping skills (Berndt & Keefe, 1995). Children with autism spectrum disorder (ASD) are known for their difficulties in initiating and maintaining affective relationships (Hobson, 2005). Especially during adolescence, a time during which peer influence increases, social problems may increase and that could prevent children with ASD from developing high-quality and long-lasting friendships. Although research on friendships in children with ASD is emerging, still little is known about the quality of their friendships, in terms of positive *and* negative friendship features. In Typically Developing (TD) children friendship stability partly determines the relationship between friendship quality and psychosocial factors (Savin-Williams & Berndt, 1990). Therefore, in this study we aim to examine friendship quality as well as friendship stability in children with ASD as compared to TD children. Additionally, in order to explore to what extent friendships in children with ASD have an emotional value, we examined associations between emotion awareness, empathy and friendship quality.

What we know about friendships in ASD

In TD development friendships involve a strong, affective and reciprocal bond between two people, and are considered as significant for social development (Hartup & Stevens, 1997). By nature, friendships are characterized by positive features such as companionship, support, and intimacy, but they also include negative features such as conflict, dominance, and jealousy (Berndt & Keefe, 1995). Both positive and to some extent negative friendship features offer children and adolescents the possibility to develop social and cognitive skills. However, friendships characterized by many conflicts and negative emotions could also have adverse effects, such as an increase in disruptive behavior (Berndt & Keefe, 1995).

Autism Spectrum Disorders are characterized by impairments in social interaction and communication. Therefore, it is not surprising that children with ASD experience difficulties in peer relationships. To illustrate, children with ASD are found to have fewer friendships than their TD peers (Rowley et al., 2012), and to experience difficulties with establishing friendships (Daniel & Billingsley, 2010). A case study with seven boys with ASD (aged from 10 to 14 years) showed that the main reasons for difficulties in establishing friendships emerge from the fact that they rather not initiate contact with a potential friend. Furthermore, they are not sure which child has the potential to be their friend in terms of social hierarchy or the risk to being exploited (Daniel & Billingsley, 2010). Additionally, friendships of children with ASD are marked by less positive features, as compared to TD children's friendships (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011; Locke, et al., 2010; Whitehouse, et al., 2009). Whitehouse and colleagues (2009) also found that friendships of children with ASD are characterized by more conflict/betrayal. Whereas the study from Whitehouse (2009) included only conflict/betrayal as a negative friendship feature, this study also includes other negative friendship features such as dominance and jealousy. Another aspect of friendship which is relatively understudied in children with ASD is friendship stability. In TD development friendship stability is related to higher friendship quality and better coping skills (Bowker, 2004; Furman, 1996). Possibly, friendship stability is also relevant in friendships of children with ASD. Therefore, we examine friendship quality as well as friendship stability in children with ASD compared to TD children.

The emotional value of friendships

(Best) friends are expected to help, praise, and share with each other, which all contain a certain emotional value (Berndt, 2002). In other words, in order to meet these requirements, certain skills in emotional functioning are needed. This idea is imbedded in the idea that emotions have a communicative function to both the person communicating as well as the person that is communicated to. In order to successfully exchange emotional information it is important to be aware of both one's own emotions as well as the other's emotions. Therefore, emotion awareness and empathy are two aspects that are important and related to the quality of TD friendships (Kouwenberg, et al., 2012; Smith & Rose, 2011). Emotion awareness refers to the differentiation between different emotions, determining antecedents and possible consequences of emotions, and the verbal sharing of emotions (Rieffe, et al., 2007b). A better emotion awareness decreases internalizing problems (Rieffe & De Rooij, 2012). Additionally, research has shown that awareness of the own emotions is linked to more positive and less negative friendship features (Kouwenberg, et al., 2012). Children with ASD are less aware of their emotions compared to TD children (Rieffe, et al., 2007a). Although we know that lower levels of awareness in children with ASD are related to more internalizing problems (Rieffe, et al., 2011), the association between lower levels of emotions awareness and friendship quality has not been studied yet.

Besides being aware of the own emotions it is also important to tune into the emotions of others in order to form qualitative social relationships. Empathy refers to the ability to accurately perceive and understand another person's emotions and to react to these emotions appropriately (Rieffe, et al., 2010). Usually, empathy is divided into affective empathy and cognitive empathy (Leiberg & Anders, 2006). Affective empathy or emotion contagion refers to a lower order process in which the observer is affected by the emotional state of the other. Cognitive empathy refers to the ability of the observer to adopt another's point of view or take the other's perspective, and therefore understand causes and consequents of the other's emotion. From an evolutionary perspective empathy is supposed to induce prosocial behaviors, such as helping or comforting (Leiberg & Anders, 2006). In TD children, both affective and cognitive empathy are found to be positively linked to more positive friendship features, such as intimacy and helping, and less negative friendship features, such as conflict and rivalry (de Wied, Branje, & Meeus, 2007; Kouwenberg, et al., 2012). Furthermore, a study from Smith and Rose (2011) showed that especially more cognitive empathy was associated with more positive friendship features.

Research on empathy in children with ASD points to the idea that these children are mainly impaired in cognitive empathy as opposed to affective empathy (Jones, et al., 2010; Pouw, et al., 2013). This so-called empathy imbalance theory refers to the idea that although children with ASD are affected by the other's emotions, they are unable to adequately react on other's emotions because they have a limited understanding of how and why the other's emotions emerge. Therefore, the empathic arousal they experience become self-focused and as a consequence they misinterpret other's emotions as their own (Smith, 2009). Consequently, children with ASD appear to show less prosocial behaviors, because they are less able to attend to the other one's needs (Sigman, et al., 1992). How this imbalanced development of empathy is related to their friendship quality has never been studied. By examining emotion awareness and empathy in relation to friendship quality in children with ASD, we gain more knowledge about the emotional value of their friendships, which is currently an understudied topic.

Present study

The overall aim of this study was to examine friendship quality in children with ASD compared to TD children. First, we examined friendship quality in terms of negative and positive friendship features by means of self-reports and parent-reports. Second, we examined the stability of the children's friendship. Third, in order to examine the emotional value of friendships, we examined the link between friendship quality and emotion awareness and empathy (affective, cognitive, and prosocial behavior).

We expected children with ASD to have less positive friendship features and more negative friendship features than TD children (Kasari, et al., 2011; Locke, et al., 2010; Whitehouse, et al., 2009). In line with this hypothesis, we expected children with ASD to experience less stable friendships, compared to TD children. Furthermore, we expected emotion awareness, affective/cognitive empathy, and prosocial behavior to be positively associated with positive friendship features and negatively associated with negative friendship features in the TD group (Kouwenberg, et al., 2012; Smith & Rose, 2011). In the ASD group, examining the relationship between friendship quality and emotion awareness and empathy was explorative. However, based on a previous study showing a positive relationship between affective empathy and (Pouw, et al., 2013), we expected that affective empathy is positively related to negative friendship features.

Based on previous research it was expected that language scores were positively associated with positive friendship features in both groups (Bauminger et al., 2008; Bauminger, Solomon, & Rogers, 2010; Durkin & Conti-Ramsden, 2007). Examining the relation between friendship quality and IQ as well as the relation between negative friendship features and IQ and language was explorative by nature.

Method

Participants

The total sample included 187 children (74 ASD, 113 TD). The clinical sample included high functioning children (9 girls, 65 boys), diagnosed with ASD (M_{age} = 139 months, *SD* = 15.4 months, age range: 110 – 177 months) based on the Autism Diagnostic Interview-Revised (Lord, Rutter, & Lecouteur, 1994) by child psychiatrists. The ASD participants met the inclusion criteria (i) IQ scores above 80, (ii) diagnosed with ASD according to the DSM-IV (American Psychiatric Association, 1995). Participants were recruited from 1. Centre for Autism, Leiden, the Netherlands; 2. Dr. Leo Kannerhuis, Doorwerth, the Netherlands; 3. C.P. Van Leersumschool, Zeist, the Netherlands. These institutions are specialized in treating and diagnosing children with ASD. A letter was sent to the parents of children with an ASD diagnosis between 9 and 15 years of age. A total of 83 parents of ASD children (73 boys) gave their consent to participate in the study. Only children who completed all self-report questionnaires were included in this study.

The TD group included 114 (54 girls, 59 boys) typically developing boys (M_{age} = 138 months, *SD* = 14.8 months, age range: 107 – 176 months) and was drawn from primary and secondary schools in the Netherlands. Inclusion criteria for the TD group were: (i) IQ above 80, (ii) no diagnosed developmental disorders. Again, only children who completed all self-report questionnaires were included in this study. The ASD group was matched with the TD group on mean age, IQ, and language scores. From two ASD children and fifteen TD children IQ scores could not be obtained. From seven children with ASD and fourteen TD children language scores could not be obtained. Nine months later, at Time 2, 64 children with ASD and 96 TD children were tested again.

The children were visited at home or institutions. Children were asked to answer questions on a notebook. Questions were presented on the screen with underneath the possible answers in boxes. Participants could answer the questions by clicking on the corresponding box. Children were ensured that their answers would stay anonymous. Parents were asked to fill in questionnaires. The Ethics Committee of the Centre for Autism granted permission for the study.

Materials

IQ

An indication for IQ was computed with two nonverbal subtests of the Wechsler Intelligence Scale (WISC) (Kort, et al., 2005; Wechsler, 1991): Block Design (copying small geometric designs with four or nine plastic cubes) and Picture Arrangement (sequencing cartoon pictures to make sensible stories). The mean of the norm-scores on the two subtests was used. In a study from Theunissen and colleagues (Theunissen, et al., 2013) it is found that the total scores of the two subtests highly correlate with complete IQ test scores.

Language

Language skills of the children were assessed; (a) sentence comprehension task and (b) a narrative comprehension task. These subtests are part of the *Clinical Evaluation of Language Fundamentals – Fourth Edition* (CELF-4) (Semel, Wiig, & Secord, 1987).

Self-report friendship quality and stability

Friendship quality was measured by the *Best Friend Index* (BFI) (Kouwenberg, et al., 2012) consisting of 20 items. The Positive Friendship Features (PFF) Scale consists of 11 items which measure positive friendship features such as companionship and support (i.e., "My friend and I have fun together"). The Negative Friendship features (NFF) Scale consists of 9 items, which measure negative features such as conflict and dominance (i.e., "My friend and I are angry at each other"). First, children were asked whether or not they had a best friend. Only if the answer was 'yes', they were asked to fill in the questionnaire. Children could answer the items on a 3-point scale ranging from 1 = *(Almost) Never*, to 3 = *Often*. In order to examine the stability of friendships, children were asked to write down their best friend's name during two time measurements with 9 months in between.

Parent-report friendship quality

The *Parent-Report Friendship Quality* (PFR) (Kouwenberg, et al., 2012), consisting of 6 items was used to measure positive features of the child's friendship reported by parents (e.g., "The friendship of your child makes your child happy"). The items could be rated on a 5-point scale ranging from 1 = *Never*, to 5 = *Very often*.

Emotional Functioning

Children filled in the *Emotion Awareness Questionnaire* (Rieffe et al., 2008; Rieffe, et al., 2007b), consisting of 30 items. For this study the scale ´Emotions of Others` was excluded from the analyses, due to overlap with the Empathy Questionnaire. The 25 items from remaining the five scales; (a) Differentiation (e.g., "I am often confused about how I feel"), (b) Verbal Sharing (e.g., "I find it difficult to tell other people how I feel", (c) Hiding Emotions (e.g., "Other people don't have to know how I feel"), (d) Bodily Symptoms (e.g., "If I'm sad, my body feels weak"), and (e) Awareness own Emotions (e.g., "My feelings help me understand what has happened") were summed and a mean total score was calculated. The questionnaire was designed with a 3-point scale (1 = *Not true,* 2 = *Sometimes true*, 3 = *Often true*).

The *Empathy Questionnaire* (Overgaauw, Rieffe, Güroğlu, Crone, Lelieveld, & Banerjee, in prep.), with a total of 21 items was filled in by the children, of which three scales were used: (a) Affective Empathy was measured by the Contagion scale (e.g., "When my mother is happy, I am happy too"), and (b) Cognitive Empathy was measured by the Understanding scale (e.g., "I often don't understand why someone is angry"), and (c) Prosocial Behavior (e.g., "When a friend is sad, I want to do

something to make it better"). The questionnaire was designed with a 3-point scale (1 = *Not true*, 2 = *Somewhat true*, and 3 = *True*). Cronbach's Alpha's for all the questionnaires were moderate to good and are shown in Table 1.

Statistical Analyses

First, in order to make a comparison of Positive Friendship Features (PFF), Negative Friendship Features (NFF), Parent-report Positive Friendship Features (PPFF), Emotion Awareness, and Empathy (Affective, Cognitive, and Prosocial Behavior) between children with ASD and TD children, ANOVA's were carried out with main effect for group (1. ASD boys; 2. TD boys; 3. ASD girls; 4. TD girls). Second, in order to examine the stability of friendships it was checked whether they kept the same best friend over nine months ('stable'), changed best friend (non-stable), or no best friend on the two time measurements ('no friends'). Differences between the groups on the three categories were tested with the chi-square test. For this analyses, only boys were included, because the sample of girls with ASD was too small. Finally, correlation analyses were carried out for each group (ASD;TD) separately, in order to test relations between PFF, NFF, and PPFF on the one hand, and Emotion Awareness and Empathy on the other hand. Again, also for this analyses only boys were included.

Results

1. Does friendship quality differ between ASD and TD group?

With respect to differences between the scores on the study variables, results show that boys with ASD scored lower on PFF (ANOVA, $F(3, 172) = 14.28$, $p < .001$), and PPFF (ANOVA, $F(3, 138) = 9.45$, $p < .001$), and higher on NFF (ANOVA, $F(3, 172) = 3.00$, $p < .05$) than TD boys. There were no differences in friendship quality between girls with ASD and TD girls. Additionally, there were no differences found between the groups in terms of IQ, language, Emotion Awareness, and Affective Empathy. As expected, boys with ASD scored lower on Cognitive Empathy (ANOVA, $F(3, 183) = 7.92$, $p < .001$). At last, both boys with ASD as well as girls with ASD scored lower on Prosocial Behavior compared to their peers from the same gender in the TD group (ANOVA, $F(3, 183) = 13.20$, $p < .001$).

Table 1

Mean, SD, and T-tests for IQ, Language Scores, Friendship Quality and Emotional Functioning

	N items	Cronbach's α		*M, SD,* and *N*			
		ASD	TD	Boys		Girls	
				ASD	TD	ASD	TD
IQ				11.38[a] (3.87)	10.68[a] (3.11)	10.22[a](4.21)	10.54[a] (3.86)
				N = 63	N = 53	N = 9	N = 46
Language				8.83[a] (2.87)	9.64[a] (2.31)	8.38[a] (3.22)	10.07[a] (2.17)
				N = 59	N = 53	N = 8	N = 47
Friendship							
PFF	11	.75	.64	2.40[a] (.32)	2.60[b] (.22)	2.70[a] (.27)	2.72[a] (.23)
				N = 60	N = 58	N = 8	N = 50
NFF	9	.74	.66	1.31[a] (.30)	1.20[b] (.20)	1.10[a] (.16)	1.21[a] (.22)
				N = 60	N = 58	N = 8	N = 50
PFR	6	.90	.82	3.23[a] (.87)	3.90[b] (.61)	3.57[a] (.83)	3.83[a] (.42)
(Range 1-5)				N = 52	N = 45	N = 5	N = 40
Emotional Functioning							
Emotion Awareness	25	.64	.74	1.99[a] (.24)	2.11[a] (.28)	2.07[a] (.22)	2.09[a] (.26)
				N = 65	N = 59	N = 9	N = 54

Affective empathy	4	.75	.75	1.57[a] (.49)	1.53[a] (.44)	1.75[a] (.52)	1.86[a] (.51)
				N = 65	N = 59	N = 9	N = 54
Cognitive empathy	4	.67	.67	2.18[a] (.46)	2.45[b] (.42)	2.20[a] (.47)	2.53[a] (.39)
				N = 65	N = 59	N = 9	N = 54
Prosocial Behavior	6	.83	.71	2.32[a] (.50)	2.60[b] (.37)	2.54[a] (.50)	2.78[b] (.26)
				N = 65	N = 59	N = 9	N = 54

Note. Means in the same row that do not share subscript letter differ at $p<.05$ (ANOVA).

2. How stable are the friendships in boys with ASD as compared to TD boys?
Figure 1 shows the stability in friendships for boys with ASD and TD boys. Of the boys with ASD, 29 % report having the same friend over a period of 9 months, against 48 % of the TD boys, which was significantly different between the two groups (χ^2= 3.72, df = 1, p = .042). Sixty-one percent of the boys with ASD against fifty percent of the TD boys did not have the same friend nine months later (χ^2= .403, df = 1, p = .326). They either changed friends or they went from having a friend to no friend and vice versa. Ten percent of the boys with ASD report having no best friend at Time 1 and Time 2 against two percent of the TD boys (χ^2= 2.42, df = 1, p = .128).

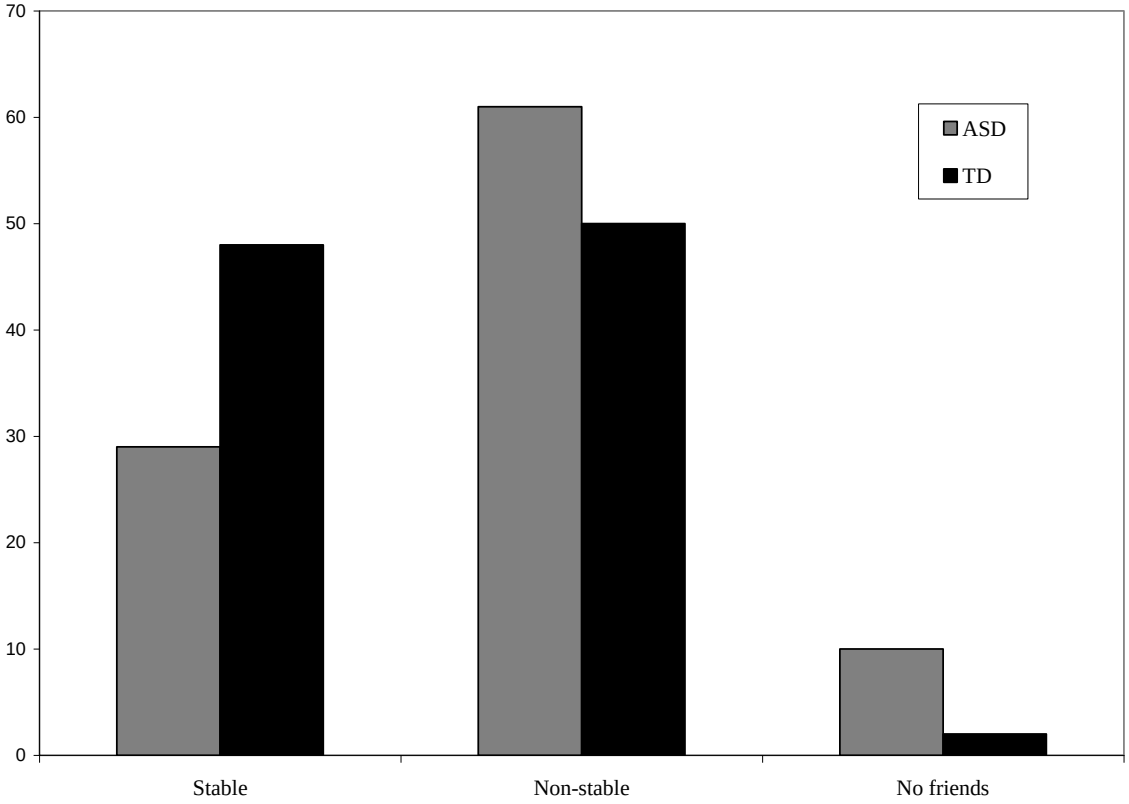

Figure 1. Histogram with percentages for continuity in friendship.

3. To what extent do friendships have an emotional value in ASD boys as compared to TD boys?
To examine the emotional value of the friendships of boys with ASD and TD boys, we carried out correlation analyses between friendship quality and IQ, Language, Emotion Awareness, and Affective and Cognitive Empathy for the ASD group and TD group separately (Table 2). There were no significant correlations for IQ, and Language only correlated negatively with NFF in ASD boys. In both groups, Cognitive Empathy and Prosocial Behavior correlated positively with PFF. Interestingly, Affective Empathy only correlated positively with PFF in TD boys, but not in ASD boys. Furthermore, Affective empathy as well as Cognitive Empathy correlated positively with Negative Friendship Features, only in ASD boys. Emotion awareness correlated negatively with Negative Friendship Features only in ASD boys. Whereas for TD boys there were no correlations for PFR, in ASD boys only Emotion Awareness correlated

positively. Using Fisher transformation, the correlation coefficient between PFF and Language and between PFF and Affective Empathy differed significantly between the boys with ASD and TD boys

Table 3

Correlations Between Friendship Quality and IQ, Language, and Emotional Functioning

	IQ	Language	Emo. Aw.	Aff. Emp.	Cogn. Emp.	Prosocial
			Correlations ASD boys			
PFF	-.10	*.21*	.22	*.16*	.34**	.34**
NFF	.13	-.35**	-.34**	.28*	.16	.28*
PFR	-.12	.21	.34*	-.21	.15	.07
			Correlations TD boys			
PFF	-.04	*-.26*	.20	*.52****	.43**	.42**
NFF	-.10	-.13	-.20	.02	-.03	.01
PFR	.01	-.12	.14	-.05	.08	.20

Note. When correlations were found to be significant different for the two groups, they are shown in italics.

*p<.05 **p<.01***p<.001

Discussion

This study examined the quality, stability, and emotional value of friendships in children with ASD, compared to their TD peers. First, the friendships of boys with ASD were found to be lower in quality than of TD boys, i.e., less positive friendship features as reported by the boys themselves and by their parents, and more self-reported negative friendship features. This result are consistent with previous studies, such that they also found children and adolescents with ASD to have lower friendship quality than their TD peers (Kasari, et al., 2011; Locke, et al., 2010; Whitehouse, et al., 2009). Note however, that we did not find any differences in friendship quality between TD and ASD girls. Because this study included a very small sample size, this result could only be considered as tentative. Due to the high male to female ratio in ASD, not much is known about the presentation of ASD in girls, compared to boys. However, research did found that girls with ASD have better (superficial) social skills, and less hyperactivity and aggression than ASD boys (Gillberg & Coleman, 2000), which could account for relatively better friendship quality. Future research should look at social functioning and friendships in girls with ASD more closely by using larger sample sizes.

Second, boys with ASD were found to have less stable friendships than TD boys. Research shows that there is an association between friendship quality and friendship stability (Bukowski, Hoza, & Boivin, 1994), and it is therefore not surprising that boys with ASD experience less stability in their friendship. Locke and colleagues (2010) argue that although friendship quality in children with ASD appears to be lower, to have a best friend could be just as valuable for children with ASD as it is for TD children. The motivation for having friends also becomes clear in the study from Locke and colleagues (2010), showing higher rates of loneliness in children with ASD compared to TD children. Additionally, most of the children with ASD reported to have a best friend. Note however, that this result is based on self-report. Possibly, and accordingly to what parents say about their children with ASD, some boys with ASD misinterpret their relation with a peer as a friendship. Future research should examine reciprocity in friendships in children with ASD, whereas in TD children this appears to contribute to the beneficial outcomes of friendships (Vaquera & Kao, 2008).

Third, we examined the emotional value of friendships in boys with ASD compared to TD boys. An important finding is that whereas a better understanding of other's emotions and more prosocial behavior were related to more positive friendship features in both groups, an important difference emerged between the groups in the relation between affective empathy and positive friendship features. In TD boys to emotion contagion was related to more positive friendship features and in ASD boys these variables were unrelated. Previous research has also shown that affective empathy in children with ASD does not have the same beneficial outcomes as it has for TD boys (Pouw, et al., 2013). Plausibly, impaired cognitive empathy in children with ASD, which our results along with results from other studies seem to indicate (Jones, et al., 2010), could account for this lack of beneficial outcomes of affective empathy. In other words, being affected by the other's emotions could be confusing if one does not understand the cause of these emotions. This situation becomes even more troubling if you are unable to comfort or react to the other's emotions, especially in friendships were caring and sharing are important prerequisites (Berndt, 2002). The finding that more affective empathy is related to more negative friendship features in boys with ASD and not in TD boys further supports this idea.

Another interesting finding is that more prosocial behavior is related to more negative friendship features in boys with ASD. Note that the questions concerning prosocial behavior (e.g., "I want everyone to feel alright" and "I want to help when a friend is angry") are actually about the *motivational* aspect of prosocial behavior and it does not say that much about the actual prosocial behavior. To illustrate, research shows that children with ASD do show less prosocial behavior compared to TD children (Sigman, et al., 1992). Possibly, for a child with ASD wanting to help someone, but not succeeding in that, could be frustrating. Personal experiences from the first author underline this idea. During a test session a child was talking about his peers and said: "When another child in class is sad, I really don't know what to do. Especially when he is crying, it's just weird. Sometimes I start laughing because I get nervous. Not because I think it's funny." If these interactions occur between two friends it is imaginable that this could lead to negative interactions, such as anger or arguing. Future research should include observations of prosocial behavior in order to examine its relation with friendship quality.

Emotion awareness was found to be related to both more positive friendship features and less negative friendship features, although not all associations in TD boys reached significance. Given the significant association between emotion awareness and friendship quality in a previous study with a larger but partly the same sample, it is presumable that a larger sample size would account for significant associations (Kouwenberg, et al., 2012). These findings underline the idea that to be aware of your own emotions and to be able to communicate them adequately to the other, defines the quality of the friendship. That these associations also appeared in ASD boys show that friendship in ASD also have an emotional value, such that aspects of emotional functioning, and emotion awareness in particular, determines the nature of friendship interactions. Except for emotion awareness in ASD boys, parent-report positive friendship features were not related to any other study variable. Despite the fact that this is partly due to low power, this underlines the idea that the influence and monitoring of parents decrease as children get older. It also confirms that as children reach adolescence, self-reports are a reliable and appropriate way to measure both behavior as well as emotions.

We also examined the relation between IQ and language scores and friendship quality. Whereas there were no correlations with IQ, better language skills were related to less negative friendship features and (although not significant) to more positive friendship features, only in the ASD group. This confirms the idea that children with ASD have to lean on neurophysiologic processes, such as language, to compensate for their affective impairments (Kasari, et al., 2001).

Conclusions and implications

This study shows that however friendships of children with ASD are of less quality and stability, they have an emotional value in a sense that emotional functioning is related to friendship quality. Recent research shows that children with ASD behave less concerned about their social reputation, and this could partly account for their difficulties in peer relationships (Izuma, Matsumoto, Camerer, & Adolphs, 2011). However, personal experiences from the last author point to the idea that children with ASD have a strong wish for friendship, but they lack a capacity to initiate and maintain such relationships, mainly due to the fact that they are less able to take the other's perspective (Theory of Mind). Furthermore, these children often experience difficulties with simple 'friendship activities', such as role playing or making jokes. It is important to find out what the difficulties in friendships exactly are for children with ASD, in order to implement better counseling in how to establish and maintain peer relationships. For example, counseling could concentrate on

improving self-presentation in children with ASD. Furthermore, children with ASD should be taught about causes and consequences of others' emotions in order to reduce empathic arousal.

Chapter 7
General Discussion

The goal of this thesis was to examine how different aspects of emotion regulation are linked to social functioning and psychopathology in children and adolescents with ASD as compared to their Typically Developing (TD) peers. In this thesis three aspects of emotion regulation were included in order to gain a complete picture of how emotion regulation is associated with social functioning and psychopathology in children with ASD; i) Emotion awareness; ii) Coping strategies; iii) Empathy. In this final chapter, the findings of the studies are summarized and reflected upon in light of limitations of the thesis, clinical implications, and directions for future research.

Differences between children with ASD and TD children

Every chapter's research question began with examining differences between children with ASD and TD children on the absolute level of the studied variables. With respect to some aspects of emotion regulation children with ASD did not score significantly different from TD children. First, children with ASD reported the same levels of emotion awareness as TD children (chapter 6), similar to previous findings (Rieffe, et al., 2011). Second, children with ASD reported to use three coping styles (approach, avoidant, and maladaptive) as often as their TD peers (chapter 3). Third, children with ASD reported to be as affected by others' emotions as TD children (chapter 4), confirming previous studies (Dziobek, et al., 2008; Jones, et al., 2010). These findings underline the idea that children with ASD are not impaired in affective empathy (Smith, 2009). However, children with ASD did score lower than their TD peers on indices for cognitive empathy, namely empathic understanding, theory of mind (ToM), and prosocial behavior (chapter 4 and 6), confirming previous studies (Baron-Cohen & Wheelwright, 2004; Jones, et al., 2010).

With respect to social functioning, children with ASD significantly differed from their TD peers on almost every aspect of social functioning that was measured in this thesis. Children with ASD reported to have poorer friendship quality and to be victimized more often than their TD peers (chapter 3, 5, and 6). Additionally, children with ASD reported to experience a lower level of social emotions, such as shame and guilt (chapter 5). These results were as expected and confirm previous studies suggesting that these children experience social deficits which in turn influence peer relationships (Bellini, 2004; Frith, 1989; Locke, et al., 2010).

Interestingly, by examining differences between the two groups on the measures for psychopathology, no differences emerged on externalizing behaviors. Children with ASD did not score themselves higher on anger, reactive and proactive aggression, and bullying compared to TD children (chapter 4 and 5), although their parents did score them higher on externalizing behaviors. With respect to internalizing behaviors, children with ASD reported higher levels of depression and specific anxiety (except fear of failure and criticism) than their TD peers, but significantly similar levels of sense coherence.

However, the aim of this thesis was to go beyond examining absolute differences between the two groups, by examining differences in the associations between these variables. The outcomes will be discussed in more detail in the next section.

The link between emotion regulation and social functioning

Some resemblances in the relation between emotion regulation and social functioning emerged between children with ASD and TD children. For example, **chapter 6** showed that higher levels of emotion awareness were related to more positive and less negative friendship features in both groups. Apparently, the ability to differentiate and communicate the own emotions is as important for the quality of friendships in children with ASD, as it is in TD children (Kouwenberg, et al., 2012). Besides differentiating the own emotions, understanding others' emotions also appeared to be associated with higher quality friendships in both groups. These findings show that friendships in children with ASD do have a certain emotional value, in a sense that sharing emotions and reacting to each other's emotions define the quality of friendships. Although children with ASD seem to have a strong wish for friendship, they lack the capacity for creating qualitative relationships with their peers. Chapter 6 showed that this is mainly due to the fact that they are less able to take the other's perspective. Impaired perspective taking skills could lead to inadequate judgments of other's intentions. For example, putting an arm around the shoulder could be considered as intimidating, especially in the case of sensory sensitivities (Laurent & Rubin, 2004). Furthermore, role playing or jokes, which are common friendship activities, could be a problem when the child does not understand the other's perspective. Klin and Volkmar (2003) argue that children with ASD are less able to communicate their emotions in a socially adaptive way, which hampers continuation of peer relationships.

In both groups, feelings of anger were positively related to bully behavior (**chapter 5**). However, from this finding the question arises whether the motive for anger is the same in both groups. From previous research it seems that while TD children make a strategic use of anger in order to gain dominance, in children with ASD anger is more likely to be caused by frustration and misunderstandings in social situations (Begeer et al., 2011; Olthof et al., 2011). Important to note is that although observed behavior of children with ASD may resemble that of their TD peers, the motives for that behavior could differ between the two groups. If we look at the differences in the relation between emotion regulation and social functioning between the two groups, these motives become clearer.

To illustrate, contagion and prosocial behavior were associated with more negative friendship interactions, but only in the ASD group (**chapter 6**). From this finding it appears that to be affected by others' emotions could be confusing for children with ASD, and could even be associated with negative interactions, such as arguing or anger (Smith, 2009). In addition, the positive relationship between prosocial behavior and negative friendship interactions shows that for children with ASD trying to help their friend in distress, but possibly not succeeding in that, is related to negative interactions with their friends, such as arguing and conflicts. Smith 2009 offers an insight into this mechanism, arguing that children with ASD are affected by other's emotions, but lack the cognitive ability to transfer this affect into empathic behavior. The following situation is an example of this mechanism:

Peter and William are playing with cars. Once the car of William is broken, William starts to cry. Peter sees William crying and experiences empathic arousal. Because Peter knows that William is sad because his car is broken, Peter hands over his own car to William. William is relieved and as a consequence, Peter is also.

Now imagine another situation:

Peter sees William crying and experiences empathic arousal. However, Peter does not understand why William is crying. The fact that William is crying is a totally unpredictable situation for Peter. Moreover, Peter does not know how to react and as is not able to down-regulate his arousal.

These situations illustrate that for a child or adolescent with ASD to be confronted with the other's emotion could be very stressful. Instead of empathic behavior, alternative self-regulating strategies could exist of looking away, lashing out of stereotypic behavior (Laurent & Rubin, 2004). If we combine these findings with the finding that anger is positively related to bullying behavior in the ASD group, we can conclude that frustration caused by being confronted with the other's distress (in a conflict with best friend, or peer), is related to negative acts towards the other, whether it is in the form of bullying or anger towards a friend. These findings provide an important answer to why social difficulties in children with ASD exist. More importantly, it shows that children with ASD are motivated to form meaningful relationships with their peers, but become frustrated and act out when they do not succeed in that.

The link between emotion regulation and psychopathology

When examining the relationship between emotion regulation and psychopathology, we found some important similarities between children with ASD and TD children in the relation between emotion regulation and internalizing behavior. For example, **chapter 2** showed that an external focus on emotions, or linking an emotion to an emotion-evoking event, was associated with less specific anxiety and more sense of coherence in both groups. Although we already knew this accounts for TD children (Rieffe & De Rooij, 2012), this finding provides information about why such a high rate of anxiety in children with ASD emerges. Apparently, anxiety in children with ASD is related to a confusing and unpredictable idea of the social world (Bellini, 2004, 2006). When a child is unable to see a certain emotion is related to a certain event (whether it is the own or the other's emotion), emotions and the environment may be unpredictable and confusing. A qualitative study from Trembath and colleagues (2012) shows that unexpected changes in the environment create a lot of fear in children with ASD. Rieffe et al. (2011) found that children with ASD scored higher on bodily awareness compared to TD children, which means that children with ASD are more aware of the bodily changes related to a certain emotion. Possibly, due to this relatively high bodily awareness children with ASD are focused on themselves, instead of the other and the emotion-evoking situation. Due to this self-oriented focus, they are less able to relate an emotion to its cause. Relating an emotion to an emotion-evoking situation is important for choosing the right emotion regulating strategy (e.g., The girl's screaming makes me scared, so I will ask the girl to stop screaming). Eventually, the self-oriented focus in children with ASD will account for a diminished ability to apply metacognitive strategies for regulating emotions (Laurent & Rubin, 2004).

Another similarity was found between the two groups for the relationship between emotion regulation and depression (**chapter 3**). Trying to find a solution or seeking social support when facing a problem was associated with lower levels of depression in both groups. Despite the fact that these coping strategies are cognitive strategies, rather than behavioral, it shows that for children with ASD having a *sense* that they can control or handle a stressful situation, is an important protector against internalizing symptoms. Furthermore, maladaptive coping, such as worrying or acting

out, was related to higher levels of depression in both groups. This finding confirms the idea that acting out and worrying are indicators for depressive symptoms, both for TD children as for children with ASD (Magnuson & Constantino, 2011; Zeman, et al., 2002). If we sum up these similarities between the two groups regarding the relation between emotion regulation and internalizing behavior (**chapter 2 and 3**), we can conclude that it is important for both groups to have the idea that they control and deal with stressful situations. Understanding where a certain emotion is coming from (external focus) and knowing how to deal with them (cognitive approach coping) provides important tools for children in order to protect them from internalizing problems.

With respect to the relation between emotion regulation and externalizing behavior, it is shown in both groups that overarousal in the form of anger and personal distress was positively related to aggressive behavior in both groups (**chapter 4**), confirming previous studies (Hubbard, et al., 2002; Marsee & Frick, 2007). This confirms the idea that emotion dysregulation is an important indicator for aggressive behavior in children (see also **chapter 5**). Interestingly, children with ASD did not score higher on reactive and proactive aggression compared to TD children. It is important to note that all the items from the child questionnaires examining externalizing behavior were related to a certain event (e.g., "I hit another child, because I was bullied"). It could be that children with ASD do show more aggressive behaviors, but that they are less able to link this behavior to a certain event. Moreover, if a child with ASD acts aggressively when hearing a hard sound, the items from the used questionnaire will not capture this. The fact that parents of children with ASD did score their children higher on externalizing behavior, shows that they probably act more aggressively. Furthermore, the ability to take the other's perspective was associated with less proactive aggression in both groups. Thus, next to poor emotion regulation, a diminished ability to take the other's perspective into account is related to more aggressive behavior. These findings are in line with other studies showing that less cognitive empathy is related to more proactive aggression (Gini, Albiero, Benelli, & Altoe, 2007; Mayberry & Espelage, 2007; Rieffe & Camodeca). This means that when children are less aware of the cognitions or feelings of the other, they tend to be more aggressive. In sum, both an impaired ability to regulate feelings of anger and a diminished capability of taking the other's perspective into account are related to more externalizing behaviors in children with and without ASD.

When examining differences in the link between emotion regulation and psychopathology between the two groups, an interesting pattern emerged for children with ASD as opposed to their TD peers. It appears that approaching or confronting a certain problem (i.e., the other's or own distress), rather than avoiding it, is associated with higher levels of psychopathology in children with ASD. There are several findings in this thesis that underline this idea, which will be discussed in the next section.

First, when examining the relation between emotion regulation and internalizing problems, we can conclude that approaching a certain problem is not the only beneficial strategy for children with ASD. In fact, we found that besides approaching a problem (in this case a situation related to oneself), avoiding a problem could also be beneficial for children with ASD, as it is related to lower levels of depression (**chapter 3**). Regardless of the question whether it is beneficial on the long or the short term, it shows that avoiding a problematic situation by neglecting or trivializing it, could also be an effective strategy to decrease distress, especially in the case where the child does not expect to be able to successfully manage the situation.

Second, contagion, or to be affected by the other's emotional state, was positively associated with reactive aggression, but only in children with ASD (**chapter 4**). The same applied for (the attempt to) understanding others' emotions. From the fact that higher levels of both contagion and empathic understanding were related to more reactive aggression in children with ASD, it appears that any kind of confronting or approaching the other's distress is related to more distress in the child itself. A lack of cognitive understanding or ToM (which we also found) is indicated as a possible cause of this distress (Blair, 1999; Jones, et al., 2010). A prerequisite for adequately reacting to another's distress, is to have a balance between a self-oriented and an other-oriented focus. This means that for a child to be able to comfort another child in distress, the child has to be aware of the fact that the distress is caused by the emotional expression of that other child, rather than a distressing event related to the child her/himself (Rieffe, et al., 2010). Moreover, in order to comfort the other child effectively, the child has to understand how and why the other child is feeling that way. When confronted with the other's distress, but not knowing how to react to it, could logically turn into frustrations and therefore aggressive behavior for children with ASD. This idea is supported by the previously discussed finding that trying to understand the other's emotion is related to more negative friendship interactions. In conclusion, these findings indicate that in children with ASD psychopathology, in the form of internalizing and externalizing, is related to a diminished cognitive and affective ability to deal with distressing situations related to the self or to the other. It appears that children with ASD are motivated to engage in social interactions, but experience fewer successes in these interactions, compared to their TD peers. These failures and subsequent feelings of anger and frustration can be the onset of internalizing and externalizing behaviors, such as depression and aggression. In order to protect themselves from these problems, children with ASD tend to use avoiding strategies, which proves to be beneficial at least on the short term. The question remains whether these avoiding strategies may prevent children with ASD from learning from social situations and eventually isolate them from the social world.

The link between social functioning and psychopathology

This thesis also examined relations between some aspects of social functioning and psychopathology. Interestingly, children with ASD showed very different results regarding this link compared to their TD peers. Unlike in TD children, negative friendship interactions and victimization uniquely contributed to higher levels of depression in children with ASD. Furthermore, feelings of fear were positively related to victimization, only in children with ASD (**chapter 5 and 6**). Possibly, difficulties and failures in peer interactions increase loneliness, depression, and anxiety. On the other hand, internalizing problems in children with ASD may isolate them from their peers and therefore increase difficulties in peer interactions and become victimized. These findings illustrate the unique effect of social functioning on the emotional well-being of children with ASD. Possibly, failures in social development create a downward spiral in a sense that social failures lead to social avoidance, which lead to more negative affect, which lead to social failures again.

Chapter 2 showed that externalizing problems, namely dysregulated anger, are related to more social anxiety in children with ASD. Possibly, by expressing too much anger children with ASD experience difficulties in peer relationships. In turn, these difficulties or social failures may account for developing or increasing social anxiety. An alternative explanation could be that due to an impaired Theory of Mind in children with ASD, social situations are unpredictable and create arousal, which is difficult for these children to down regulate. Unregulated anxiety may turn into frustration and anger. Thus, anxiety and anger may be two sides of the same coin. In

conclusion, these findings show that social deficits play a unique role in the psychological development in children with ASD.

General Conclusion

In this thesis we examined how different aspects of emotion regulation are linked to social functioning and psychopathology in children and adolescents with ASD as compared to their Typically Developing (TD) peers. We divided the concept emotion regulation into three parts: i) Emotion awareness, ii) Coping , and iii) Empathy. With regard to absolute differences between the two groups, we saw that children with ASD mainly scored lower on social functioning and higher on internalizing problems, compared to their TD peers. Furthermore, we can conclude that all three aspects of emotion regulation are linked to social functioning and psychopathology in both groups, emphasizing the importance of emotion regulation for the emotional and social well-being of children.

Regarding children with ASD, although they are motivated to engage in peer interactions and friendships, it appeared that cognitive and affective impairments may prevent them from effectively deal with the own and other's emotions. During an emotion, children with ASD are too self-oriented and are unable to relate the emotion to the emotion-evoking situation which prevents them from applying an effective emotion regulation strategy. As a consequence, these children will continue to apply idiosyncratic and maladjusted behavior to regulate their emotions. In turn, these behaviors will lead to social failures and rejection, which may increase feelings of sadness, loneliness, and frustration. Although in both groups, overarousal and anger is related to externalizing behavior, only in the ASD group the confrontation with the other's emotion is already proved to be a distressing situation. In fact, not knowing how to react to the own and other's distress is frustrating for them and is associated with aggressive behavior. Avoiding strategies may prevent these children from social failures on the short-term, but may turn into more isolation and internalizing problems on the long-term.

This thesis also showed that observable behavior of children with ASD should be interpreted differently from that of TD children. For example, aggressive behavior in children with ASD mainly appeared to relate to frustration and the cognitive and affective impairment to deal with stressful situations, whereas TD children also appeared to be able to apply aggressive behavior in order to dominate or gain control. Children with ASD might feel misunderstood due to misinterpretations of their behavior. In turn, this may lead to more unpredictability in social situations.

Limitations and directions for further research

The current thesis has contributed to existing knowledge regarding the link between emotion regulation and social functioning and psychopathology. However, some limitations should be discussed. First, results from this thesis were mainly based on self-report questionnaires. Although only the children themselves are expected to have direct knowledge about their own thoughts and feelings, a combination of self-report, parent-report, observations, and physiological measures might give us more insight into how children with ASD experience the world around them, and how psychopathology arises. For example, future research should focus on the physiological effects in children with ASD of being confronted with the other's distress. If we can combine these findings with examining the cognitive ability of differentiating between the own and other's emotions, we can define what exactly makes experiencing others' emotions so stressful for these children.

Second, in order to draw conclusions about the causality and direction of the relation between emotion regulation, social functioning, and psychopathology, future

research should include longitudinal analyses. For example, do social deficits in children with ASD increase internalizing problems? Or are internalizing problems the cause of social isolation and failures? Most likely, social deficits and internalizing problems are reinforcing each other.

Third, girls with ASD are relatively understudied in this thesis, due to a small sample size. Future research should concentrate on this group more, especially because ASD symptoms seem to be manifested differently in girls, compared to boys. For example, girls with ASD appear to experience greater communication deficits and more internalizing problems, compared to boys with ASD (Hartley & Sikora, 2009).

Clinical implications

The findings of this thesis allow us to make some tentative recommendations for the treatment of children with ASD and their families. First, children with ASD appear to experience a great deal of distress when being confronted with other's emotions. Therapy efforts need to focus on creating awareness in parents and their children about the fact that other's distress, to some level, influences the own emotional state of the child. If parents are better able to understand the causes and consequences of others' emotions for their children, they could give their children more insight into their own emotions and could therefore make social situations more predictable and manageable for them. Ideally and if possible, children with ASD should be taught that they are able to decrease their own empathic distress by comforting the other. However, it may already be very helpful if parents are aware of cause and effects of their children's emotions.

Second, anger expression in children with ASD implies a tendency to guard one's limits and to confront the social world. However, this behavior might scare their peers off and even isolate them. In line with other research, suggesting that children with ASD are less sensitive for their social reputation (Izuma, Matsumoto, Camerer, & Adolphs, 2011; Scheeren et al., 2010), therapy should focus on teaching them how to present themselves to the social world. Children with ASD should be taught that their emotional expressions influence the emotional state of their peers and vice versa. Teaching these children how to administer self-regulation strategies may decrease the intensity of their emotional expressions, and therefore increase their social reputation. A recent study already showed promising results by applying this type of self-regulation therapies, on preschool children with ASD (Thompson & Johnston, 2013).

Third, as children with ASD tend to avoid stressful situations because they possibly do not expect they are able to manage them, therapy efforts should focus on improving their problem-solving skills. When children with ASD are able to trust upon their own coping skills, they might be less tended to avoid stressful situations. For example, they should be taught how to ask for social support in order to manage stressful situations. On the other hand, therapy should also focus on families and peers of children with ASD in order to make them aware of the fact that these children might need more time before they can adequately respond in certain stressful situations. It might help children with ASD to first distantiate themselves from the situation, in order to relieve some stress, before approaching the situation adaptively. Children with ASD will always show some emotional and social deficits to a certain level, and we as society should accommodate them as much as we can in order to make life easier for them.

Chapter 8

Dutch summary/Nederlands samenvatting

Autismespectrum stoornissen (ASS) zijn een groep neurobiologische ontwikkelingsstoornissen die voorkomen bij ongeveer 1 % van de wereldpopulatie. Beperkingen in de sociale interactie, communicatie en stereotype gedragingen en interesses zijn officieel geclassificeerd als symptomen van ASS. Daarnaast ondervinden kinderen en adolescenten met een ASS beperkingen in het omgaan met veranderingen, nieuwe situaties, en in het participeren in sociale activiteiten. Steeds meer onderzoek wijst uit dat tekortkomingen in de emotionele ontwikkeling, met name emotieregulatie, voor een groot deel ten grondslag liggen aan problemen die kinderen en adolescenten met een ASS ondervinden. Emotieregulatie verwijst naar interne processen die beïnvloeden wanneer en hoe we emoties ervaren en hoe we onze emoties uiten. De centrale vraag in dit proefschrift is hoe verschillende aspecten van emotie regulatie invloed hebben op het sociaal functioneren en psychopathologie in kinderen en adolescenten met een ASS.

In **hoofdstuk 1** wordt een theoretisch kader gegeven van wat een emotie is en welke processen daarbij betrokken zijn. Daarbij wordt uitgegaan van het idee dat elke emotie een communicatieve en functionele waarde heeft. Vervolgens wordt er uiteengezet welke aspecten van emotieregulatie onderzocht worden in dit proefschrift, namelijk (i) emotioneel bewustzijn, (ii) coping en (iii) begrip van de emoties van anderen, empathie.

In **hoofdstuk 2** is onderzocht hoe begrip van de eigen en andermans emoties, boosheid en schaamte, bijdragen aan angst in jongens met een ASS vergeleken met typisch ontwikkelende jongens. Ten eerste lieten de resultaten zien dat jongens met een ASS zichzelf hoger scoren op specifieke angst en lager op empathisch begrip en schaamte. Ten tweede wezen de resultaten uit dat een beter begrip van de eigen emoties, i.e. het beter kunnen relateren van een emotie aan een externe situatie, gerelateerd is aan minder angst in beide groepen. Daarnaast bleek schaamte een sterke positieve relatie met sociale angst en een negatieve relatie met het gevoel van samenhang te hebben in beide groepen. Een opvallende bevinding was dat een beter begrip van andermans emoties gerelateerd was aan minder angst, alleen in typisch ontwikkelende jongens. Een mogelijke verklaring hiervoor was dat het focussen op andermans emoties, i.e. andermans emoties proberen te begrijpen, voor jongens met ASS problematisch is, omdat ze minder goed weten hoe op deze emoties te reageren vergeleken met typisch ontwikkelende jongeren. In de discussie van hoofdstuk 2 worden de bevindingen verder bediscussieerd.

In **hoofdstuk 3** zijn symptomen van depressie in kinderen en adolescenten met een ASS onderzocht en hoe deze gerelateerd zijn aan coping strategieën (benaderende stijl, vermijdende stijl, maladaptieve stijl) en sociaal functioneren (gepest worden en negatieve vriendschap interacties). Kinderen en adolescenten met een ASS scoorden zichzelf hoger op symptomen van depressie dan typisch ontwikkelende kinderen en adolescenten. Hoofdstuk 3 liet zien dat een benaderende coping stijl (bijv. een oplossing zoeken voor het probleem of steun vragen van andere mensen) gerelateerd is aan minder symptomen van depressie in beide groepen. Daarnaast bleek in beide groepen een maladaptieve coping stijl (bijv. externaliseren) gerelateerd te zijn aan meer symptomen van depressie. Alleen in kinderen en adolescenten met een ASS bleek een vermijdende coping stijl op het eerste gezicht voordelig te zijn, gezien het een negatieve relatie bleek te hebben met symptomen van depressie. In hoofdstuk 3 wordt besproken wat de mogelijke consequenties zijn van het toepassen van deze vermijdende coping stijl op de lange termijn versus de korte termijn. Ten slotte bleek sociaal functioneren (gepest worden en negatieve vriendschap interacties) alleen in

kinderen en adolescenten met een ASS, een unieke bijdrage te leveren aan symptomen van depressie. Deze bevindingen worden verder besproken in de discussie van hoofdstuk 3.

In **hoofdstuk 4** wordt de associatie tussen affectieve en cognitieve empathie en reactieve en proactieve agressie onderzocht in kinderen en adolescenten met en zonder een ASS. Met deze onderzoeksvraag werd getracht een antwoord te geven op de vraag of agressief gedrag hetzelfde geïnterpreteerd kan worden in kinderen en adolescenten met een ASS als in typisch ontwikkelende kinderen en adolescenten. Ten eerste bevestigden de resultaten van dit hoofdstuk het idee dat kinderen en adolescenten met een ASS vooral beperkt zijn in cognitieve empathie en niet zozeer in affectieve empathie. Een belangrijke bevinding was dat affectieve empathie negatief gerelateerd is aan reactieve agressie in typisch ontwikkelende kinderen en adolescenten, maar positief gerelateerd is aan reactieve agressie in kinderen en adolescenten met een ASS. In de discussie wordt er verder ingegaan op deze bevinding en geconcludeerd dat beperkt empathisch begrip en regulatie van het ervaren van andermans emoties gerelateerd is aan agressie in kinderen en adolescenten met een ASS.

In **hoofdstuk 5** wordt het onderzoek beschreven naar de rol van emotioneel functioneren in pesten en gepest worden in kinderen en adolescenten met een ASS, vergeleken met typisch ontwikkelende kinderen en adolescenten. In het bijzonder werd er gekeken naar hoe twee basisemoties (boosheid en angst) en twee morele emoties (schaamte en schuld) gerelateerd was aan pesten en gepest worden in de twee groepen. In beide groepen, bleek minder schuld en meer boosheid gerelateerd te zijn aan meer pesten. Een opvallende bevinding was dat kinderen en adolescenten met een ASS, die meer moeite hebben met het reguleren van boosheid, vaker slachtoffer van pesten blijken te zijn. In hoofdstuk 5 wordt verder ingegaan op welke rol boosheid speelt in pestgedrag en victimisatie in kinderen en adolescenten met een ASS.

In **hoofdstuk 6** wordt de kwaliteit en stabiliteit van vriendschap onderzocht van jongen en meisjes met en zonder een ASS. De resultaten wezen uit dat de vriendschappen van jongens met een ASS minder stabiel waren dan die van jongens zonder een ASS. Daarnaast bleken vriendschappen van jongens met een ASS gekarakteriseerd te worden door meer negatieve vriendschap interacties en minder positieve vriendschap interacties vergeleken met vriendschappen van jongens zonder een ASS. Er werd geen verschil gevonden tussen de kwaliteit van vriendschappen van meisjes met en zonder een ASS. Emotioneel bewustzijn, empathie en prosociaal gedrag bleken allemaal gerelateerd te zijn aan positieve of negatieve vriendschap interacties in jongens met een ASS en gedeeltelijk in jongens zonder een ASS. Samengevat kwam uit dit hoofdstuk naar voren dat vriendschappen van jongens met een ASS wel degelijk een emotionele waarde hebben.

Hoofdstuk 7 is een samenvatting van alles resultaten en een discussie daarvan. Uit de resultaten kwam naar voren dat kinderen en adolescenten met een ASS lager scoorden op empathisch begrip, theory of mind en prosociaal gedrag, vergeleken met typisch ontwikkelende kinderen en adolescenten. Echter, er was geen verschil gevonden tussen de twee groepen in scores op emotioneel bewustzijn en de mate van gebruik van verschillende coping strategieën. De grootste verschillen waren te vinden in scores op sociaal functioneren, waarin kinderen en adolescenten met een ASS lager scoorden op kwaliteit van vriendschappen en de morele emoties schaamte en schuld en hoger op gepest worden vergeleken met typisch ontwikkelende kinderen

en adolescenten. Wat betreft de scores op psychopathologie, scoorden kinderen en adolescenten met een ASS vooral hoger op internaliserende problemen (zoals depressie en angst) vergeleken met typisch ontwikkelende leeftijdsgenoten. Alle onderzochte aspecten van emotieregulatie bleken gerelateerd te zijn aan sociaal functioneren psychopathologie in beide groepen. In dit hoofdstuk wordt geconcludeerd dat in kinderen en adolescenten met een ASS, de confrontatie met andermans emotie een stressvolle belevenis is. Door gebrek aan cognitieve empathie weten deze kinderen minder goed hoe ze op andermans emoties moeten reageren, dat vervolgens kan leiden tot gevoelens van frustratie. Deze beperking heeft grote gevolgen en is gerelateerd aan bijvoorbeeld agressief gedrag. Dit roept ook de vraag op hoe we bepaald gedrag van kinderen en adolescenten met een ASS moeten interpreteren. Ten slotte worden in dit hoofdstuk implicaties besproken voor de praktijk en verder onderzoek.

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Curriculum Vitae

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