THE DEVELOPMENT OF MORALITY IN AUTISM SPECTRUM DISORDER

by

Erin Elizabeth Dempsey

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ABSTRACT

Morality helps guide behaviour and facilitates relationships. Autism spectrum disorder (autism) is a neurodevelopmental condition characterized by differences in social-communication skills and repetitive or inflexible patterns of behaviour or interests. Research in moral psychology in autism has often been interpreted through a psychopathology model wherein differences are viewed as deficits. The aim of this dissertation was to describe the literature investigating autistic moral thinking from a strengths-based perspective, to identify areas requiring further investigation, and to conduct preliminary investigations of these. Manuscript 1 documents a systematic review of 29 studies of morality in autism. An area for further research identified therein is the application of an alternative theoretical framework to studying morality in autism that is amenable to strengths-based interpretations (i.e., moral foundations theory). I conducted a study using critical incident interviews and qualitative analysis among 6 autistic adults as an initial foray into understanding autistic moral thinking using moral foundations theory (Manuscript 2). I found that all five moral foundations were represented in the interviews, yet certain foundations were more prominent than others. This study set the stage for a mixed methods investigation among autistic and neurotypical children to better understand the manifestations of moral foundations in the two groups (Manuscript 3). This study was conducted in collaboration with two autistic community partners. I examined the moral judgements of 25 autistic and 23 neurotypical children using the Moral Foundations Questionnaire for Kids. I used semi-structured interviews and qualitative analysis with a subgroup of participants to describe children's moral reasoning. Quantitative and qualitative analyses suggested that autistic and neurotypical children made similar judgements of transgressions across all five moral foundations and that these judgements were primarily driven by how severe children deemed the transgressions to be across groups. This dissertation contributes to the literature as the first empirical investigation of moral foundations theory in autism. This is important because it suggests minimal differences in moral thinking in autistic children while identifying areas that could be different (e.g., recommendations for punishment) and potentially give rise to interpersonal difficulties. This research may therefore help to reduce stigma surrounding social cognition in autism.

LIST OF ABBREVIATIONS USED

APA	American Psychiatric Association
AQC	Alexithymia Questionnaire for Children
ASD	Autism Spectrum Disorder
ASP	Academic Search Premier
AQ-Child	Autism Spectrum Quotient for Children
CA	chronological age
CAM	Children's Alexithymia Measure
CI	confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
df	degrees of freedom
ERIC	Educational Resources Information Center
exp	experiment
F	female
F	Fisher's exact test
FSIQ	Full Scale Intelligence Quotient
I	interviewer
IQ	Intelligence Quotient
M	male
M	mean
MFQ-K	Moral Foundations Questionnaire for Kids
N	total sample size
N	no
n	subsample size
N/A	not assessed or not applicable
NT	neurotypical
NVIQ	Nonverbal Intelligence Quotient
OR	odds ratio
P	participant
p	probability
PIQ	Performance Intelligence Quotient
PRI	Perceptual Reasoning Index
ProQuest	ProQuest Dissertations and Theses Global
r	correlation coefficient
R	respondent
R^2	coefficient of determination
SD	standard deviation
SES	socioeconomic status
SWA	Social Work Abstracts
TD	typically developing
ToM	theory of mind
VIQ	Verbal Intelligence Quotient
VMA	verbal mental age
WASI-II	Wechsler Abbreviated Scale of Intelligence - Second Edition

WoS	Web of Science
X^2	chi-square test
Y	yes
α	Cronbach's alpha

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CHAPTER 1. INTRODUCTION

Autism spectrum disorder (hereafter autism or ASD) is a neurodevelopmental disorder characterized by differences in social-communication skills and the presence of repetitive or inflexible patterns of behaviour or interests (American Psychiatric Association, APA, 2013). Autism affects up to one in 66 children and youth in Canada (Ofner et al., 2018). Differences in commonsense psychology, i.e., the human tendency to attempt to make sense of relationships and interactions by representing the internal states of others (Moore, 2006), are commonly associated with autism (Baron-Cohen, 2000). One commonsense psychology difference in autism is difficulty taking others' perspectives (Baron-Cohen et al., 1985). Taking another's perspective has been associated with the development of moral psychology (Kohlberg, 1969; 1971). Moral psychology is a form of social cognition that involves reflecting on norms for how to treat other people and non-human animals and coexist with them in society.

Autistic[1] individuals have difficulties interacting with others and with forming and maintaining friendships (Howlin et al., 2013). These challenges could be affected by differences in moral development and subsequent moral reasoning. Typically developing children as young as three years old demonstrate an understanding of fairness by protesting when resources are shared unequally (Rakoczy et al., 2016). Judgements of fairness among neurotypical children may depend on the moral character of those receiving distributed resources. Hamlin et al. (2011) found that 8-month-old infants preferred agents who behaved positively toward prosocial individuals and negatively toward antisocial individuals over agents who displayed the opposite pattern of relating.

[1] We use identity-first language (i.e., "autistic"; "neurotypical") rather than person-centered language (i.e., "person with autism"; "typically developing person"), as preferred by many autistic individuals (Kenny et al., 2016).

Discrimination of appropriate behaviour toward actors who have behaved badly may be different among autistic compared with neurotypical youth. Li et al. (2014) found that autistic children aged 6 to 12 years old did not modulate cooperative behaviour in response to immoral acts of their partners. This stands in contrast to neurotypical children, who cooperated less with perceived moral wrongdoers (Li et al., 2014). Failure to modulate cooperative behaviour in response to moral transgressions may lead to peers liking autistic children less, making it more difficult for the latter group to develop and maintain friendships. Different patterns of behaviour in response to moral transgressions may also contribute to disproportionately high rates of bullying victimization among autistic youth (Maïano et al., 2016).

Rationalist Moral Psychology

The field and study of moral psychology has been dominated by rationalist theories (Kohlberg 1969; 1971; Piaget, 1932). Piaget pioneered moral psychology theory with cognitive-developmental research demonstrating two distinct stages of moral development (Piaget, 1932). He found that children up to six years old tended to use reasoning based on externally dictated rules, i.e., the heteronomous stage. Older children and adults began to rely more on others' intentionality when reasoning about morality, i.e., the autonomous stage.

Kohlberg (1969, 1971) built on Piaget's work by demonstrating further nuance in the stage-theory approach to the development of moral psychology. He used vignettes to elicit moral decision-making, i.e., how one opts to respond to a moral dilemma. He classified the decisions according to the degree to which they promoted justice in the world. This research yielded six progressively sophisticated stages through which

individuals were theorized to advance by taking the perspectives of others (Kohlberg, 1969; 1971), which requires the use of commonsense psychology skills (Moore, 2006). The stages Kohlberg posited are elaborated further in Chapter 2.

Next in the progression of moral psychology experimentation and theory was Turiel's social domain theory (1983). Turiel highlighted the distinction between harmless norms violations and transgressions that are morally wrong as such. The ability to make the distinction between these two forms of transgressions is sometimes referred to as moral understanding (Garon et al., 2018). For an act to be morally wrong under social domain theory, it must be harmful or unfair. Like Kohlberg, Turiel cited commonsense psychology skills as foundational in the development of increasingly nuanced moral thinking.

Moral Psychology in Autism

Given the dominance of rationalist theories in research regarding moral psychology, this form of social cognition has often been assumed to develop via typical commonsense psychology skills (see Garcia-Molina & Clemente-Estevan, 2019, for review). Given the differences in commonsense psychology among autistic individuals, moral psychology has been theorized by some to be underdeveloped in this population (e.g., Shoemaker, 2015).

Despite the assertion that autistic individuals' moral development may be stunted by the differences in their commonsense psychology skills, researchers have shown that moral judgement, i.e., the evaluation of behaviour and character in light of culturally salient virtues (Haidt, 2001), and moral understanding are generally similar between autistic and neurotypical children and adults, though reasoning about moral judgements

has tended to differ (see Chapter 2). It stands to reason that an alternative theory of moral development could be helpful in explaining why theorized differences in moral judgement between these two groups are not prominent in the literature.

Moral Foundations Theory

This brings us to Haidt's (2001) moral foundations theory. This theory is defined by four core features. First, the theory is pluralistic—Haidt argues that morality can develop across at least five foundations, i.e., care/harm, fairness/reciprocity, in-group/loyalty, authority/respect, and purity/sanctity. Second, moral foundations theory is social-intuitionist in nature. That is, Haidt argues that emotions are triggered by morally relevant stimuli, and that these emotions give rise to moral intuitions, or "gut instincts" about whether an act is morally wrong, which subsequently lead to moral judgements (Haidt, 2003). Moral reasoning, one's description of why an act is morally right or wrong, is thought to arise following moral judgements as a means of justifying these judgements to others (Haidt 2001). Third, moral foundations theory argues that cultural learning promotes the development of specific moral foundations during childhood, thereby leading to differences across cultures, political orientations, and socioeconomic strata (e.g., Koleva et al., 2012). As such, the theory is in essence developmental, although few studies have investigated the developmental course of moral foundations intuitions (Peverill, 2020). Fourth, morality is held to be innate in the sense that the human brain is genetically predisposed to develop moral intuitions under the right circumstances (Haidt & Joseph, 2008), and that humans evolved this genetic disposition to promote individual or group survival, respectively, depending on the foundation.

Several of the key features of moral foundations theory conflict with assumptions of rationalist theories. One key difference relevant to this dissertation is that moral foundations theory's pluralism is non-hierarchical, in contrast with rationalist moral development, wherein different weighting of moral values is argued to imply more or less mature moral reasoning skills (Kohlberg, 1969; 1971). Moral pluralism offers a lens for a non-pejorative understanding of differences in moral values, lending itself to strengths-based interpretations. Another important difference is that taking others' perspectives is not assumed to be central to moral development in moral foundations theory (Haidt, 2012), unlike in rationalist theories (Kohlberg, 1969; 1971). This may help account for the fact that past research investigating morality in autism has only evidenced subtle differences when comparing moral judgements made by autistic compared with neurotypical research participants. Finally, social-intuitionism implies that moral reasoning is a post hoc confabulation aimed at communicating one's moral leanings to others (Haidt, 2001), unlike in accounts based on rationalist theories wherein moral reasoning is the precursor to moral judgement (Kohlberg, 1969; 1971). As such, under moral foundations theory, differences in moral reasoning among autistic compared with neurotypical individuals could be understood to reflect differences in verbal reasoning rather than deficits in moral intuitions or judgements.

Though Haidt's research has gained prominence with many published studies using quantitative (e.g., Clifford et al., 2015; Graham et al., 2012; Niazi et al., 2020), and qualitative methods (e.g., McAdams et al., 2008; Pilecki, 2017), the theory is not without criticism (e.g., Suhler & Churchland, 2011); these criticisms are considered in the General Discussion (Chapter 7).

Researchers in the Early Social Development Lab have begun to investigate the developmental pathway of moral foundations among children (Hartlin et al., 2018; Peverill, 2020), given that the theory posits early cultural learning to account for different moral predilections across political orientations, cultures, and socioeconomic strata (Koleva et al., 2012). Inquiry into the development of moral foundations among children opens the question as to whether development of these foundations could differ depending on neurodiversity. At the outset of this dissertation there had been no investigations of moral foundations theory among autistic individuals. Research using qualitative and quantitative methods in this area was therefore called for to fill the gap.

Engaging Autistic Individuals in Research

In the current dissertation, I sought to use mixed methods to better understand how moral foundations theory might be applicable among autistic adults and children. Quantitative research methods have the benefit of being putatively generalizable to broader populations, allowing researchers to make inferences beyond their group of research participants. Qualitative research offers the opportunity to delve deeper into the lived experiences of research participants and opens areas for quantitative hypothesis testing. First-person accounts may be particularly important in autism research, wherein research has demonstrated that autistic individuals' experiences are often not well understood by neurotypical others (e.g., Calder et al., 2013). Related to the current research, investigators have attributed deficits in moral reasoning when autistic and neurotypical participants differ in their responses to moral vignettes (e.g., Senland & Higgins-D'Alessandro, 2016; Takeda et al., 2007). In contrast, autistic individuals may perceive themselves as having greater loyalty, honesty, and empathy than their

neurotypical peers (Jaarsma & Welin, 2012; Russell, et al., 2019). Qualitative methods are therefore important, especially in early studies, and for investigating the nuances of autistic perspectives.

A further means of including autistic perspectives in autism research is using community-based participatory research methods (Jull et al., 2017). This methodology is important while conducting autism research because scientists may perceive themselves to be more engaged with the autistic community than autistic community members perceive themselves to be (Pellicano et al., 2014), potentially leading to research agendas at odds with the priorities of the autism community. Further, autistic researchers point out that autism research has been dominated by neurotypical researchers who have tended to frame autism from a deficits-based perspective, whereas a model emphasizing strengths and differences is arguably a more accurate and beneficial approach (Milton & Bracher, 2013; Robertson, 2010). As such, the autism community has increasingly called for involvement of autistic individuals in the research process using a community-based participatory research framework (Nicolaidis et al., 2011).

Summary and Overview of Dissertation

Moral reasoning is important because it affects how we decide to treat one another, and our responses to moral transgressions may themselves lead to judgements by others. Autistic moral thinking has been cast in a rationalist paradigm that may not accurately convey strengths and differences compared with neurotypical individuals. A deeper understanding of autistic moral thinking from a strengths-based perspective could enhance society's understanding of what autistic moral reasoning can offer while

demystifying notions of a lack of moral agency among this population. Doing so could help reduce potential harms associated with such notions, e.g., stigma.

The overall aim of the current dissertation was to investigate moral psychology among autistic individuals using mixed methods, and through a strengths-based lens that involved autistic adults in the development and interpretation of the research. I addressed this aim through a series of three research studies that comprise the body of this dissertation.

The first step in the process of realizing the overall aim was to summarize the state of the literature of morality in autism using a systematic literature review (Chapter 2). This first manuscript presents a critical review of the extant literature in the field and identifies gaps, strengths and weaknesses, and areas for further study. I found that autistic moral judgement and decision making did not differ greatly from that of neurotypical individuals, which calls into question the developmental pathway to moral development posited by rationalist theories. Autistic participants' moral reasoning differed from that of their neurotypical peers—these differences were often described as deficits without necessarily justifying why these differences ought to be interpreted in this way. Results regarding the role of emotion in moral decision making among autistic individuals were mixed, calling for further investigations. Taken together, the results of the systematic review suggested that the pluralism and intuitionism of moral foundations theory, which had not yet been investigated among autistic individuals, could provide a strengths-based lens to more accurately characterize subtle differences in autistic compared with neurotypical moral thinking.

In Chapter 3, I describe how the findings from the systematic review defined the direction of the overall research project and contributed to the design of the second study, a qualitative investigation of moral foundations theory and associated emotions among autistic adults (Chapter 4). The aim of this investigation was to provide an initial foray into autistic moral psychology from the perspective of moral foundations theory to establish hypotheses for a mixed methods study to follow. Separate from empirical research results, this qualitative study also provided the opportunity to consult with research participants regarding this research platform. Each autistic adult who participated in the study was interviewed regarding their view of the value of the current research agenda. Also separate from the qualitative investigation, each participant completed a novel moral foundations theory questionnaire designed to assess moral leanings among neurotypical children aged 5-12 (the Moral Foundations Questionnaire for Kids; Curtis et al., 2019; Appendix A). Participants were then asked to offer feedback on this measure's appropriateness for use with autistic youth. Further, two research participants were invited to engage as community partners in the development and interpretation of a mixed methods study. Their suggestions, along with feedback from other participants in Study 2, are summarized in Chapter 5. The findings of the qualitative study itself suggested that the five foundations of moral foundations theory were endorsed as morally salient by the six autistic adults I interviewed, though some foundations featured more prominently than others. Although emotions were described in response to moral vignettes, the frequency of allusion to emotion varied greatly among the participants.

The findings of Study 2 spurred questions that motivated the research aims and methodology of the third study (Chapter 6). Given the developmental nature of moral foundations theory, I thought it was relevant to investigate it among younger autistic and neurotypical research participants. The choice to select younger participants was also pragmatic. First, my research colleagues in the Early Social Development Lab at Dalhousie University were developing and testing the Moral Foundations Questionnaire for Kids to evaluate moral foundations predilections among neurotypical youth, and I thought it was important to adapt the measure to be suitable for autistic children. Further, my research colleagues at the Autism Research Centre were involved in multiple longitudinal research projects with children whose families' consent for future research contact provided a pool of potential participants. In the third manuscript, I detail the methods and results of a mixed methods research project assessing autistic and neurotypical children's moral foundations theory predilections and reasoning regarding transgressions of these foundations. The mixed methods approach to this study was important as it allowed me to test hypotheses related to potential differences in moral foundations salience between autistic and neurotypical children while highlighting the first-person perspectives of research participants central to the interpretation of results.

The findings from all chapters are summarized in a general discussion (Chapter 7). This final chapter offers a description of how the body of work constituting my dissertation contributes to the literature. I also describe overall limitations of this research and suggest areas for further inquiry.

CHAPTER 2. MANUSCRIPT 1: MORALITY IN AUTISM SPECTRUM DISORDER: A SYSTEMATIC REVIEW

This chapter is a reproduction of Dempsey, E. E., Moore, C., Johnson, S. A., Stewart, S. H., & Smith, I. M. (2019). Morality in autism spectrum disorder: A systematic review. *Development and Psychopathology*, *2*, 1069-1085. This manuscript is reprinted here, with minor edits to improve readability within the dissertation, and with permission from the copyright holder (See Appendix B for Copyright Release Request Letter and response granting permission). Note that Erin Dempsey, with direction from her co-supervisors Drs. Chris Moore and Isabel Smith, along with her co-authors and dissertation committee members Drs. Shannon Johnson and Sherry Stewart, was responsible for the preparation and execution of this study. Ms. Dempsey wrote the manuscript constituting this chapter and revised it with suggestions from her collaborators.

Abstract

Moral reasoning and decision-making help guide behavior and facilitate interpersonal relationships. Accounts of morality that position commonsense psychology as the foundation of moral development (i.e., rationalist theories) have dominated research in morality in autism spectrum disorder (ASD). Given the well-documented differences in commonsense psychology between autistic and neurotypical individuals, researchers have investigated whether the development and execution of moral judgement and reasoning differs in this population compared with neurotypical individuals. Given the diverse findings of investigations of moral development and reasoning in ASD, a summation and critical evaluation of the literature could help make sense of what is known about this important social cognitive skill in ASD. To that end, we conducted a systematic review of the literature investigating moral decision making among autistic children and adults. Our search identified 29 studies. In this review, we synthesize the research in the area and provide suggestions for future research. Such research could include the application of an alternative theoretical framework to studying morality in autism spectrum disorder that does not assume a deficits-based perspective.

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by differences in social communication and social interaction, and the presence of stereotyped or repetitive interests or behaviour (American Psychiatric Association [APA], 2013). Differences in social cognition between autistic and neurotypical individuals are also common (Gallese, 2006). Moral reasoning, i.e., how people think about moral issues, is a form of social cognition; as such, it may be atypical among autistic individuals. A lay understanding of morality is that it provides a guide or set of norms for how to treat other people and non-human animals and coexist with them in society.

Autistic individuals often show difficulties with interpersonal interactions and friendships (Howlin et al., 2013; Kasari et al., 2011). These challenges could arise in part from differences in moral development and subsequent moral reasoning. For instance, if autistic children do not adhere, adhere too rigidly, or adhere in ways that differ from neurotypical children to moral prescriptions regarding care, harm, and fairness, this may interfere with social interactions and relationships (Hamlin et al., 2011; Rakoczy et al., 2016). Given the potential ramifications of differences in moral thinking in autistic individuals, researchers have investigated whether the development and execution of moral judgement and reasoning differ in this population compared with neurotypical individuals (e.g., Bellesi, et al., 2018; Blair, 1996; Koster-Hale et al., 2012; Shulman et al., 2012).

In the following sections, we will describe theories of morality that have informed investigations of moral reasoning and development in ASD. We will then describe differences in social cognition often observed in autistic individuals that may be relevant

to their moral development and reasoning. We then review research investigating morality in ASD and offer directions for future research.

Rationalist Moral Development

Piaget's empirical investigations of moral judgement differentiated two stages of development: the heteronomous stage, wherein moral judgements are strictly guided by external rules; and the more mature, autonomous stage, wherein moral judgements are based on a consideration of actors' intentions (Piaget, 1932). Piaget found that children up to six years old tend to be in the heteronomous stage; older children progress to the autonomous stage.

Building on Piaget's rationalist approach to moral development (1932), Kohlberg (1969; 1971) posited that moral development takes place through a series of six progressively nuanced stages. The six stages are classed under three higher-order levels with two stages in each level. The first, pre-conventional level is marked by responsivity to external cultural rules based on desire for positive, or fear of negative, physical consequences. The second, conventional level is reached when children learn to value moral rules as a means of maintaining order among one's social group. The final, post-conventional level is achieved when individuals view moral rules as internalized abstract principles used to maintain their own and others' rights and well-being. Children ostensibly develop through the later stages by imagining themselves in the role of others, i.e., role-taking (Kohlberg, 1969; 1971). The post-conventional stages are marked by a departure from reliance on authority for informing moral decision-making in favour of an increased appreciation of individual rights, reciprocity, and justice, which requires role-taking and sophisticated verbal reasoning.

Turiel (1983) expanded on Kohlberg's conceptualization by developing social domain theory, according to which children learn to differentiate conventional transgressions (those that violate institutional norms) from moral transgressions (those with intrinsically harmful or unfair consequences). Turiel (1983) asserted that children learn this distinction using role-taking to imagine themselves in the position of transgressors or victims, and that perception of victims' pain allows children to understand certain transgressions as *immoral*.

Such accounts of morality that position social cognition as the foundation of moral development, i.e., rationalist theories (Kohlberg, 1971; Piaget, 1932; Turiel, 1983), emphasize the role of commonsense psychology. Commonsense psychology refers to the human tendency to attempt to make sense of relationships and interactions by *representing the internal states of others* (Moore, 2006). This requires identifying others as psychologically similar to, yet distinct from, oneself. This understanding must be integrated with the notion that psychological representations denote references to objects that are often invisible. For instance, imagine seeing a downcast mourner in a graveyard. Despite the fact that the object of her psychological distress, a lost friend, is not visible, commonsense psychological skills allow us to infer the source of her sadness. This example demonstrates that commonsense psychology requires complex coordination of social information from a variety of temporally diverse sources, i.e., synthesizing the significance of the mourner's tears with past or imagined experiences with grief. Verbal reasoning and communication skills are also required to integrate increasingly complex social information from others regarding their psychological representations (Moore, 2006). For Piaget, moral development requires consideration and understanding of

others' intentions. For Kohlberg, role-taking and discursive reasoning are required to progress to higher stages of moral development. For Turiel (1983), recognizing and empathizing with victims' pain is crucial for differentiating moral from conventional transgressions. As such, commonsense psychology is implicated in rationalist accounts of moral development.

Representing internal states of others requires an understanding of those states as distinct from one's own, i.e., theory of mind, or mentalizing (Wimmer & Perner, 1983). Despite autistic individuals' ability to attribute mental states to others during theory of mind tasks (Baron-Cohen et al., 1985), mentalizing has been found to be less automatic among this population, suggesting a compensatory cognitive strategy for mentalizing (e.g., verbal reasoning skills: Senju et al., 2009; or non-verbal reasoning skills: Patil et al., 2016). Development and execution of rationalist moral judgement therefore requires psychological processes and cognitive skills that could be atypical among autistic individuals.

Social Cognitive Differences in ASD

Autistic individuals show altered development of commonsense psychology (Baron-Cohen, 2000). Empathy, i.e., a response to another based on her or his psychological or contextual circumstances (Hoffman, 1987), is an aspect of commonsense psychology (Moore, 2006). Empathy can be disassociated into cognitive and affective elements (Blair, 2008). Cognitive empathy involves the ability to consider others' perspectives, thereby inferring their mental states (Baron-Cohen & Wheelwright, 2004). Affective empathy is an emotional response appropriate to another individual's mental state (Dziobek et al., 2008). Cognitive empathy in response to the funeral mourner

would entail the capacity to infer the source of the mourner's distress. An affective empathic response to the mourner would be the ability to share in her pain while recognizing that it is distinct from one's own experience of pain (i.e., self-other distinction). Some studies suggest that affective, but not cognitive, empathy is largely preserved in autistic individuals (Dziobek et al., 2008; Rueda et al., 2015). Another study of empathy in autistic adolescents suggested that affective empathy is only preserved when the emotional valence is positive (Mazza et al., 2013). There is also evidence to suggest that both cognitive and affective elements of empathy are impaired in ASD (Bos & Stokes, 2018). Further evidence for differences in empathy among autistic individuals comes from neuroimaging studies (Kana et al., 2009; Schulte-Rüther et al., 2011). Compared with neurotypical adults, autistic adults have demonstrated hypo-connectivity in brain regions considered to be involved in commonsense psychology (e.g., the right temporo-parietal junction) during cognitive empathy tasks (Schulte-Rüther et al., 2011) and hyper-connectivity in these regions during affective empathy tasks (Kana et al., 2009). Despite differences in right temporo-parietal junction activity in autistic compared to neurotypical participants, the self-other distinction during empathic responding remains intact in autism, suggesting an alternative role for this brain region in commonsense psychology among autistic individuals (Hoffmann et al., 2016). Differences in empathy among autistic individuals would suggest delayed or atypical moral development in ASD according to rationalist theories, which hold that commonsense psychology is crucial for moral maturity.

Rationalist theories assert that moral decision-making relies on an emotional response to others' distress (Turiel, 1983). This ability could be impaired among

individuals with constricted emotional functioning that involves difficulties describing their own emotions, i.e., those with alexithymia (Sifneos, 1973). Estimated prevalence of alexithymia in neurotypical adults is 20% (Loas et al., 1995; McGillivray et al., 2017; Mason et al., 2005). In contrast, 40-50% of autistic adults may have co-occurring alexithymia (Hill et al., 2004). Rates of alexithymia are also elevated among autistic relative to neurotypical children (Griffin et al., 2016). Elevated rates of alexithymia among autistic individuals may lead to differences in emotionally arousing moral judgements.

Given the dominance of rationalist accounts of moral development, empirical investigations of morality in ASD have been primarily guided by the notion that commonsense psychology is required for typical moral development. Indeed, this supposition has led many researchers to hypothesize delayed or atypical moral development in autistic individuals (e.g., Takeda et al., 2007; Zalla et al., 2011). Despite this hypothesis, autistic individuals successfully discriminate between moral and conventional transgressions (Blair, 1996; Buon et al., 2013) that appear unlikely to arise from a knee-jerk emotional response in the absence of moral discrimination (Leslie et al., 2006). Intact moral reasoning in autism suggests a difficulty for the rationalist account of moral development, which would predict an inability to make typical moral judgements among autistic individuals with differences in commonsense psychology development. In contrast, moral foundations theory is an intuitionist account of moral psychology (Haidt, 2001) that offers an alternative framework for understanding autistic moral development and reasoning. We will return to the intuitionist account of moral development in our discussion of the results of this review.

A critical evaluation of the literature is needed to synthesize research on this important social-cognitive skill in ASD and to guide future research. The authors are aware of two systematic reviews investigating morality in ASD, both written in languages other than English with no available translations (Li & Liu, 2017; Margoni et al., 2017). A third review by Margoni and Surian (2016) focuses primarily on intent-based moral judgements among autistic individuals and did not include a systematic search. A fourth review covers morality in ASD but focuses on its relationship with criminal responsibility (Grant et al., 2018). As such, our English-language review, with its systematic search and coverage of various aspects of moral decision making, is much needed. Though investigations of morality in ASD have extended beyond effects of commonsense psychology to include the role of executive functioning skills, the present review focuses on moral judgement and social cognition, due to the latter's salience in the dominant rationalist paradigm. Some research on morality in ASD has focused on developmental differences in this population; other studies have focused on qualitative differences in moral reasoning across the lifespan in ASD. The current systematic literature review was conducted to synthesize the extant literature investigating moral development and reasoning in autistic individuals, thereby clarifying directions for future research. The review's primary aim was to enhance the field's understanding of this aspect of social cognition in ASD.

Methods

Search Strategy

A comprehensive search was conducted on February 2, 2018 using 7 electronic databases (PsycInfo; Cumulative Index to Nursing and Allied Health Literature,

CINAHL; Academic Search Premier, ASP; Social Work Abstracts, SWA; Educational Resources Information Center, ERIC; Web of Science, WoS; ProQuest Dissertations and Theses Global, ProQuest). Search terms and databases were selected with the assistance of a librarian with expertise in psychology research. The search was conducted in three phases; all searches included terms related to autism spectrum disorder (i.e. Autis* OR Asperger* OR "Pervasive Developmental Disorder" OR "Pervasive Development Disorder" OR PDD OR "Kanner's Syndrome" OR "Kanner Syndrome" OR "Kanners Syndrome"). The first search included the term (moral*). The second search included the terms (ethic* OR conscience NOT moral*) to identify research more likely to deal with ethical issues in ASD intervention and research. The third and final search included terms related to utilitarian decision-making that may have been missed by the first two rounds (trolley* OR dilemma OR utilitarian* NOT ethic* NOT conscience NOT moral*). An updated search was conducted on October 5, 2018, using the same search terms and databases (except ProQuest Dissertations and Theses Global, as dissertations were omitted from the systematic review to focus on studies of peer-reviewed quality).

Inclusion/Exclusion Criteria

Inclusion Criteria

1. Empirical studies published in peer-reviewed journals
2. Papers written in, or with available translation to, English
3. Papers investigating moral reasoning, moral decision-making, or moral behaviour in autistic individuals
4. Papers documenting studies in which autistic children/adults were participants

5. Papers that differentiate autistic participants from other neurodevelopmental disorders

Exclusion Criteria

1. Papers that are not reports of empirical studies
2. Papers published in magazines, non-peer-reviewed journals, etc.
3. Papers investigating empathy, theory of mind, prosocial behaviour, social cognition, etc., without specifically investigating moral reasoning, judgement, or behaviour
4. Papers that investigate parents' perceptions of moral behaviour in an autistic child
5. Papers that do not differentiate autistic participants from other groups (e.g., papers that combine autistic individuals and those with intellectual disability who are not autistic in data analysis)

Screening Procedure

The identified documents were exported to and screened using Covidence software. The three initial searches together yielded 1943 articles, 631 of which were duplicates identified by Covidence software, leaving 1312 documents. Studies were screened for relevance with 96% agreement at the abstract stage by the first author and a trained volunteer. Conflicts (n = 47) were resolved to consensus by discussing inclusion and exclusion criteria. A further 1241 documents were deemed irrelevant (e.g., related to ethical considerations in ASD research or intervention; reviews; commentaries; 105 additional duplicates that were not automatically detected by Covidence). Full texts of the 71 remaining documents were screened for relevance with 96% agreement by the first author and a second trained research assistant. Conflicts (n = 3) were again resolved to

consensus by discussing inclusion and exclusion criteria. Forty-five documents were omitted based on the following categorizations: 8 duplicates; 4 conference abstracts; 4 combined ASD with other diagnoses; 3 in languages other than English with no available translations; 9 dissertations; 5 commentary / review articles; 12 not related to moral judgement (e.g., prisoner's dilemma; sharing). Reference lists of the two reviews without English translations (Li & Liu, 2017; Margoni et al., 2017) and of all included articles were searched for relevant studies; all had been identified by our search. The October 5, 2018 search yielded 51 new references with no duplicates. These studies were screened by the first author and the second trained research assistant at the abstract stage with 98% agreement. The single conflict was resolved to consensus through discussion of inclusion and exclusion criteria. At the full-text screening stage (percentage agreement = 75%), the only conflict was resolved through discussion of inclusion and exclusion criteria. This study was omitted because it did not examine moral outcome measures. Reference lists of the three added studies were screened for additional articles with no new relevant studies found. See Figures 2.1 and 2.2 for an outline of the study selection process. The 29[2] relevant articles are reviewed below. Studies were grouped and summarized based on the aspect of moral reasoning investigated.

Results

Moral Stages

[2] Two studies that were considered but omitted from inclusion in this review were: Barnes et al., (2009); and Steele et al. (2003). Barnes et al. (2009) used a set of morally laden films to evoke narratives from autistic participants, but moral reasoning was not investigated in their study. Steele et al. (2003) studied moral development but did not analyze moral reasoning in isolation from other measures of social cognitive development.

Three studies offer evidence regarding the development through Kohlberg's moral stages among autistic and neurotypical children and young adults (see Table 2.1). In two of them, autistic children scored significantly lower in moral reasoning than neurotypical children (Senland & Higgins-D'Alessandro, 2016; Takeda et al., 2007). However, in another study, no significant difference was found in moral reasoning development between autistic and neurotypical children (Kretschmer et al., 2014).

Conventional/Moral Distinction

The conventional / moral distinction has traditionally been measured using variations of Smetana's (1981) classic task. Vignettes involve: a) clear-cut moral transgressions wherein an actor unjustifiably causes harm to a victim or to property, e.g., a child hitting another child, and b) an actor who commits a harmless norms violation, e.g., a child wearing pyjamas to school. After hearing or reading these vignettes, participants are asked about a) permissibility: whether the actors' behaviour was okay; b) seriousness: whether it was bad to have committed the act; and, c) authority jurisdiction: whether the act would be okay if deemed so by an authority figure (i.e., an authority-bound transgression).

Three studies have researched the conventional / moral distinction among autistic children (see Table 2.2). Autistic children did not differ from children with moderate learning difficulties or neurotypical children in distinguishing between moral and conventional transgressions (Blair, 1996). Children across groups also maintained that morally wrong (i.e., harmful) acts remained so even if approved of by an authority figure (Blair, 1996). In another pair of studies, researchers found greater similarities than differences between groups of autistic and neurotypical children on the conventional /

moral distinction task, even when victims were shown to be distressed without having been morally wronged (Leslie et al., 2006). These results suggest that autistic children do not base moral judgements on distress of victims alone. Skolnick Weisberg and Leslie (2012) further investigated the effect of victims' distress on autistic children's ability to distinguish between moral and conventional transgressions. In their experimental manipulation, half of the stories from each category (i.e., conventional / moral / neutral) showed the victim crying whereas half did not. Results showed that autistic children were affected by the transgression *and* by crying; judgements of neurotypical children were not affected by crying, presumably due to less reliance on outcome than autistic children. These three studies were limited by their group matching strategies. In Blair's (1996) study, participants were roughly matched according to verbal mental age between groups. Leslie et al. (2006) did not describe matching procedures. Skolnick Weisberg and Leslie (2012) did not directly compare autistic children to a control group but rather compared results of neurotypical and autistic children between two separate experiments. Autistic participants in all three studies were chronologically older than the comparison participants.

Shulman et al. (2011) investigated the conventional / moral distinction in autistic and neurotypical adolescents (see Table 2.2). Rather than asking whether a behaviour would be acceptable if approved of by an authority figure as in Smetana's task, the authors asked for examples of contexts in which the behaviour would be considered appropriate (i.e., universal applicability). The two groups did not differ significantly in judgements of universal applicability for moral transgressions, but the autistic group judged the conventional transgressions as more universally abiding than did the

neurotypical participants, suggesting less cognitive flexibility among the autistic group. When asked to justify conventional / moral judgements, justifications by autistic adolescents tended to be more concrete, more utilitarian, less elaborate, less flexible, and with fewer abstract rules than those offered by neurotypical adolescents (Shulman et al., 2011).

One study investigated the conventional / moral distinction among autistic adults with the addition of a scenario describing a disgusting but harmless act (i.e., disgust transgression; e.g., a person spits in her water glass before drinking from it; Zalla et al., 2011; see Table 2.2). Autistic adults did not differ from neurotypical adults in their judgements of permissibility for each condition. However, whereas neurotypical participants judged disgust transgressions as less seriously wrong than moral transgressions, autistic participants did not significantly differentiate between the two. Autistic adults used more rule-based justifications of moral judgements than neurotypical participants, who appealed more to others' welfare (Zalla et al., 2011).

Intent-based Moral Judgement

Six studies investigated intent-based moral judgements by autistic youth and neurotypical controls (see Table 2.3). Participants across groups based their judgements primarily on intentions (Grant et al., 2005; Rogé & Mullet, 2011; Salvano-Pardieu et al., 2016), judged damage to people as more serious than damage to property (Grant et al., 2005), and judged more serious consequences more harshly than less serious consequences (Rogé & Mullet, 2011; Salvano-Pardieu et al., 2016).

However, subtle differences in the influence of intentions on moral judgements were found between autistic and neurotypical youth. When intentions and outcomes were

at odds, neurotypical children were significantly more likely to base judgements on intention than autistic children of below-average verbal IQ and children without autism whose mean IQ was also below average (Grant et al., 2005). Similarly, when behaviour, outcomes, and personal characteristics (e.g., "Takeru-kun is a nice boy who likes to please his father") were at odds, autistic children did not use information about personal characteristics in making moral judgements, unlike neurotypical children (Komeda et al., 2016). In another study, autistic children judged moral culpability most often based on consequences, followed by rules, with the fewest participants basing judgements on intentions, in contrast to neurotypical children, who judged moral culpability first based on intentions, then consequences, then on rules (Fadda et al., 2016). Further, intention had a weaker effect on judgements of moral culpability among autistic compared with neurotypical adolescents (Rogé & Mullet, 2011). Salvano-Pardieu et al. (2016) showed a similar result when comparing autistic to neurotypical adolescents. Finally, whereas autistic individuals considered outcomes in moral judgements regardless of how serious those outcomes were, neurotypical individuals considered intentions alone if potential outcomes were very serious (Salvano-Pardieu et al., 2016). Akechi et al. (2018) compared autistic children and young adults with neurotypical individuals on judgements of blame. In contrast to the above results, Akechi et al. (2018) found that autistic participants did not differ from neurotypical controls in their assignation of blame to targets with varying degrees of agency (e.g., god, human adult, robot), suggesting sensitivity among autistic individuals to differences in moral culpability based on the capacity to act intentionally.

A limitation of two of the above studies is failure to consider language and intellectual abilities (Fadda et al., 2016; Rogé & Mullet, 2011). This is especially salient given that the ability of autistic children to justify their moral judgements was correlated with verbal IQ and verbal mental age in Grant et al.'s (2005) study.

Nine studies tested moral judgements by autistic and neurotypical adults using vignettes showing either intentional or unintentional harms, with neutral or harmful outcomes (see Table 2.4). Across groups, actions with neutral intentions and outcomes were judged as more permissible than those with negative intentions and outcomes (Baez et al., 2012; Bellesi et al., 2018; Moran et al., 2011), and intentional harms were viewed as less permissible than unintentional harms overall (Baez et al., 2012; Buon et al., 2013; Channon et al., 2011; Moran et al., 2011). Autistic and neurotypical adults considered acts with physical and psychological harms as more wrong than neutral acts (Tsoi et al., 2018).

However, neurotypical participants judged transgressions with neutral intentions and negative outcomes as more permissible than did autistic participants (Moran et al., 2011). Autistic adults were more punitive in their responses to transgressions and were less accepting of transgressions than neurotypical adults regardless of intentionality (Bellesi et al., 2018). When asked to explain their judgements, autistic participants offered significantly fewer sophisticated rationales than neurotypical participants when controlling for IQ (Bellesi et al., 2018). Autistic individuals assigned greater relative blame to intentional than unintentional harms (Channon et al., 2011; Koster-Hale et al., 2012), yet significantly less blame for intentional harms than neurotypical participants (Koster-Hale et al., 2012). In another study, autistic adults supported greater punishment

for, and assigned greater blame to, an accidental agent than did neurotypical adults (Buon et al., 2013). Also, autistic adults were significantly less sympathetic to drivers with poor justifications for negligence than were neurotypical controls (Channon et al., 2010). In contrast, Baez et al. (2012) did not find differences in moral judgements between groups, perhaps owing to their relatively small sample size.

No differences between autistic and neurotypical adults were found in estimates of victims' suffering or degree of causality between accidental, coincidental, or intentional harms (Buon et al., 2013). Differences were also not found between autistic and neurotypical participants' acceptability ratings of self-interested moral violations (e.g., lying on a job application; Bellesi et al., 2018). Further, autistic and neurotypical participants rated intentional acts as more instrumental to outcomes than unintentional acts, and rated acts by protagonists with envy as more instrumental to outcomes than protagonists with revenge motives (Channon et al., 2011). However, autistic adults judged accidental harms as more intentional than did neurotypical individuals, and only the autistic participants judged accidental harms as more intentional than harms that merely coincided with an action (Buon et al., 2013). Groups equally assigned greater intentionality to a protagonist with neutral intentions and poor outcomes than to a protagonist with neutral intentions and good outcomes (i.e., Knobe effect; Knobe, 2003), but autistic participants assigned more praise to actors with neutral intentions and good outcomes than did neurotypical participants (Zalla & Leboyer, 2011).

Two studies investigated neural responses to intent-based moral judgements using functional magnetic resonance imaging (fMRI; see Table 2.4). Neurotypical participants but not autistic participants showed greater activity in the right temporo-parietal junction

when judging accidental versus intentional harms (Koster-Hale et al., 2012). However, as in neurotypical controls, autistic participants did show greater activity in the right and left temporo-parietal junctions and the precuneus when judging harmful compared to neutral actions (Koster-Hale et al., 2012). Tsoi et al. (2018) conducted secondary analyses on data from Koster-Hale et al. (2012) to assess the brain regions involved in judgements of intentional or unintentional transgressions that led to physical harms, psychological harms, or neutral outcomes. Across groups, brain regions related to commonsense psychology (i.e., right temporoparietal junction, precuneus, dorsolateral prefrontal cortex) were more active during judgements of psychological relative to physical harms (Tsoi et al., 2018).

Emotion-backed Moral Judgement

The trolley problem has been used by philosophers and psychologists for decades to demonstrate the influence of intuition and emotion on moral decision-making (Stratton-Lake, 2016). This task is useful for studying moral psychology because it discerns subjective utilitarian versus deontological moral inclinations. Whereas utilitarian ethics advocate maximizing good for the greatest numbers of people (Mill, 1863), deontological ethics advocate strict adherence to ethical rules despite consequences (Kant, 1785/2002).

The trolley problem includes two dilemmas. In the standard trolley dilemma, participants are told to imagine they can see a trolley with broken brakes barreling down tracks in front of them. Strapped to the tracks are five innocent people. A switch that would allow the participant to change the path of the trolley is available, but one person is strapped to the alternate track. As such, pulling the switch would spare five lives at the

cost of one. The footbridge variant of the trolley dilemma similarly pits five lives against one, but in this scenario, preventing the trolley from killing five requires throwing a man off a footbridge in front of the runaway trolley. Whereas most children and adults indicate they would pull the switch in the trolley dilemma (i.e., the utilitarian solution), the majority indicate they would not throw the man onto the tracks in the footbridge scenario, preferring instead a duty-based, deontological solution (e.g., Greene et al., 2001; Moore et al., 2008; Pellizzoni et al., 2010).

Two studies investigated responses to the trolley problem in autistic adults (see Table 2.5). In Gleichgerrcht et al.'s (2013) study, autistic adults were equally as likely as neurotypical adults to endorse the utilitarian solution to the trolley dilemma. However, autistic adults were significantly more likely than neurotypical participants to endorse the utilitarian solution to the footbridge dilemma (i.e., throwing the man onto the tracks to save the five others), despite expressing the belief that this act was inappropriate. In contrast, Patil et al. (2016) did not find between-groups differences in responses to either the trolley *or* footbridge dilemmas in their sample of autistic adults and neurotypical controls. The emotional responses of autistic participants also differed between the two studies. Gleichgerrcht et al. (2013) found that when asked how strongly they felt about their decisions, autistic adults reported greater emotional arousal following trolley decisions and less emotional arousal following footbridge decisions compared with neurotypical participants. Patil et al. (2016) asked participants how emotionally arousing they found the scenarios (not their decisions) and found that autistic adults reported *more* emotional arousal than neurotypical participants regardless of the dilemma type. Patil et al. (2016) added a measure of alexithymia and conducted a path analysis of the autistic

participants' data to further investigate responses to the footbridge dilemma. When controlling for shared variance between autistic and alexithymic traits, alexithymic traits were associated with *increased* endorsement of action in footbridge-style scenarios, whereas autistic traits were associated with *reduced* tendency to endorse action in these scenarios, among autistic adults. Thus, while alexithymic and autistic traits are usually positively correlated, when controlling for their shared variance, the two have different associations with actions in footbridge-style scenarios. Non-verbal IQ was negatively predictive of utilitarian moral judgments when controlling for autistic and alexithymic traits (Patil et al., 2016).

Hirvelä and Helkama (2011) explored the connection between self-reported empathy and moral values in autistic adults and neurotypical controls using online surveys (see Table 2.5). Autistic adults rated benevolence lower and tradition higher than neurotypical adults on a values questionnaire but did not differ significantly in ratings of other moral values such as universalism and conformity. In contrast to Patil et al.'s (2016) findings, moral values were generally similar despite differences in self-reported empathy. Brewer et al. (2015) used questionnaires to investigate the influence of co-occurring alexithymia on moral decision-making among autistic adults and neurotypical controls (see Table 2.5). Participants were asked to rate the moral acceptability and report on their emotional response to saying each of 100 potentially upsetting statements to another individual (Marsh & Cardinale, 2012). No significant differences in moral acceptability judgements were found between groups (Brewer et al., 2015). In contrast to Patil et al.'s (2016) findings, alexithymia was a significant predictor of moral judgements among neurotypical adults but *not* among autistic adults. The contrasting findings of

these two latter studies with Patil et al.'s (2016) study could be due to the difference in emotional salience of the tasks. Perhaps autistic individuals used emotional information in moral decision making when the emotional information was highly salient, as in the trolley problem. In contrast, the task used in the studies by Brewer et al. (2015) and Hirvelä and Helkama (2011) may have been less emotionally arousing, such that alexithymia did not disrupt moral judgements in autistic individuals.

Schneider et al. (2013) used an ethical decision-making task to investigate neural activity underpinning emotional moral judgements in autistic individuals and neurotypical controls (see Table 2.5). When responding to moral dilemmas (i.e., ethical versus neutral; socio-ethical versus individual-group comparisons), the autistic group showed lower activation in the left amygdala, left insula, and left posterior cingulate cortex than the neurotypical controls, despite no differences in judgements of the dilemmas (Schneider et al., 2013). No significant correlations were found among activations of brain areas of interest and either autism symptom severity or alexithymia in either group (Schneider et al., 2013).

Moral Judgement and Behaviour

Only one study investigated the effect of moral thinking on behaviour (see Table 2.6). Li et al. (2014) tested moral judgement and cooperation in autistic and neurotypical children. Participants were asked to rate the relative naughtiness or niceness of protagonists depicted in a series of moral vignettes. Accuracy of moral judgements did not differ significantly between the groups; however, autistic children judged the naughty children as significantly naughtier than did the neurotypical children. Following the moral judgement task, participants were asked to engage in a cooperation game (the

prisoner's dilemma game, wherein participants choose between personal benefit at cost to another or a smaller mutual benefit), ostensibly with the protagonists from the moral vignettes. Cooperation in the prisoner's dilemma game among autistic individuals did not differ significantly depending on the partner (i.e., naughty versus nice), in contrast with the neurotypical children, who cooperated more with the nice than the naughty child. The authors concluded that the perceived moral behaviour of one's partner in a cooperation game does not influence cooperation among autistic children, unlike among neurotypical children.

Commonsense Psychology

Results of studies investigating the role of commonsense psychology in moral reasoning by autistic individuals were mixed. Kretschmer et al. (2014) found no relations among first- and second-order false-belief tasks, i.e., tasks that assess children's understanding that others' knowledge and perspectives differ from their own, and moral stage maturation. Although Senland and Higgins-D'Alessandro (2016) measured empathy and found both it and moral stage levels to be lower among autistic than neurotypical adolescents, the influence of commonsense psychology on moral reasoning was not investigated statistically.

The specific role of false-belief understanding in the conventional / moral distinction among autistic children is also unclear. No relations were found between false-belief task performance and the ability to make the conventional / moral distinction by Blair (1996) or by Leslie et al. (2006). However, Zalla et al. (2011) found a significant negative correlation between faux pas scores (i.e., the ability to identify mild social transgressions) and judgements of seriousness of transgressions among autistic adults,

whereas the two variables were positively correlated among the neurotypical controls. The authors interpreted this finding as indicating that neurotypical adults' use of mentalizing skills lessens their negative judgements of unintentional or inoffensive acts. In contrast, autistic participants were argued to rely more on rule-based heuristics for making moral judgements. As such, mentalizing may interfere with outcome-based judgements for moral transgressions among autistic adults. Further, in another study, autistic children who passed a false-belief task made greater distinctions between moral and neutral transgressions than did autistic children who failed the false-belief task (Skolnick Weisberg & Leslie, 2012).

As for intent-based moral judgement, Fadda et al. (2016) found that autistic children who passed a second-order false-belief task (5%) considered intentions in moral judgements less than did neurotypical children who passed the false-belief task (50%). Akechi et al. (2018) found that autistic children and youth integrated judgements of others' agency with moral judgements. Among autistic adults, false-belief, faux pas, and empathy scores were not related to intent-based moral judgements (Baez et al., 2012; Koster-Hale et al., 2012; Moran et al., 2011; Zalla & Leboyer, 2011). Despite the lack of connection between these forms of commonsense psychology and moral-decision making, autistic adults showed atypical lack of association between activity in the right temporo-parietal junction (an area associated with commonsense psychology; Sellaro et al., 2015; Yamada et al., 2012) and judgement of intentionality for accidental harms among autistic adults (Koster-Hale et al., 2012). These findings suggest that subtle differences in autistic moral reasoning are not related to their performance on commonly used measures of commonsense psychological skills.

The relation among commonsense psychology skills and emotion-backed moral decision making is complicated by the high comorbidity of alexithymia and related differences in empathic responding among autistic individuals. Faux pas understanding among autistic adults was negatively related to willingness to sacrifice one life to save five in the footbridge dilemma (Gleichgerrcht et al., 2013). Increased alexithymia symptoms were associated with reduced empathic concern, which was in turn associated with increased utilitarian action (Patil et al., 2016). Conversely, greater autistic traits were positively associated with self-reported empathic hyper-arousal, which predicted a reduced utilitarian response (Patil et al., 2016). In contrast to Patil et al.'s (2016) findings, Hirvelä and Helkama (2011) found that moral values were generally similar across groups despite differences in self-reported empathy; however, there were subtle differences among relations of self-reported empathy and specific moral values between groups (e.g., universalism and empathic concern were correlated among neurotypical but not autistic participants). Schneider et al.'s (2013) findings of differences in emotion-related brain regions during a moral decision-making task yielded no between-groups differences. Taken together, differences in emotion-backed moral decision making in ASD appear to be related to the presence or absence of comorbid alexithymia and the use of emotional information in decision making more generally.

Discussion

Moral Stages

Two of the three studies investigating development through Kohlberg's (1969; 1971) moral stages among autistic children and youth suggest lower moral development in autistic participants than neurotypical participants (Senland & Higgins-D'Alessandro,

2016; Takeda et al., 2007). Autistic children and youth were concluded to have less mature moral reasoning skills, based more on concrete rules than on abstract principles. These conclusions should be hedged by inconsistent findings—Kretschmer et al. (2014) did not find between-group differences in moral stage development.

A general limitation of research investigating moral development according to Kohlberg's stages derives from Kohlberg's (1969, 1971) assumption of invariant progression through moral stages across cultures. Haidt (2001) challenges this view—his intuitionist account proposes that children have an innate capacity to internalize moral intuitions across five social contexts, or "foundations," that humans have evolved to recognize as morally salient (i.e., harm/care, fairness/reciprocity, in-group/loyalty, authority/respect, and purity/sanctity). The relative importance of these foundations depends on early cultural environments that may reinforce the development of some moral foundations over others. To illustrate, whereas Kohlberg's (1969, 1971) stages describe moral reasoning based on authority as less mature than reasoning based on individual rights, Haidt and colleagues assert that reasoning based on authority represents a different (not lesser) moral foundation, the importance of which is determined by one's culture (Graham et al., 2009). Given the emergent conceptualization of autism as a culture (Davidson, 2008; Jaarsma & Welin, 2012), it may be inappropriate to conclude that autistic youth have less mature moral reasoning than neurotypical participants based on differences in Kohlberg's (1969; 1971) moral stages. Instead, Haidt's framework would suggest that autistic youth value the authority domain more greatly than neurotypical youth.

Conventional/Moral Distinction

Autistic children and adults have consistently demonstrated the ability to discriminate between conventional and moral transgressions, despite their impaired commonsense psychology skills and lower mean level of intellectual abilities. However, subtle differences in cognitive flexibility among autistic individuals with respect to conventional distinctions (Shulman et al., 2011), and greater weight of severity of disgust transgressions have been found (Zalla et al., 2011). Zalla et al. (2011) argued that emotional empathy has greater involvement in moral decision-making among autistic than neurotypical individuals to compensate for relative lack of cognitive empathy, which they argue could be important for differentiating the severity of moral and disgust transgressions. An alternative explanation can again be derived from the work of Haidt (2001). Autistic individuals in Zalla et al.'s (2011) study were more sensitive to Haidt's purity/disgust foundation, perhaps due to greater sensory sensitivity than neurotypical individuals (Crane et al., 2009), leading them to judge these violations more stringently. This interpretation, coupled with findings that authority may be more valued as a moral concept among some autistic individuals (Senland & Higgins-D'Alessandro, 2016; Takeda et al., 2007), suggests that differences in moral reasoning in this population could offer a comparison point to better understand how people think about moral issues and how moral reasoning develops.

Intent-Based Moral Judgement

Given the prominence of Piaget's theory of moral development, investigators of morality in children and adults have often sought to determine the extent to which individuals base moral judgements on intentions (e.g., Cushman et al., 2013). Autistic children show differences in intent-based moral judgements compared with neurotypical

children (Fadda et al., 2016; Grant et al., 2005; Komeda et al., 2016; Rogé & Mullet, 2011; Salvano-Pardieu et al., 2016). These differences are present from as early as nine years old (Grant et al., 2005). This seems particularly true when intentions and outcomes are incongruous (Grant et al., 2005; Komeda et al., 2016), such that intentions are generally weighted less heavily than outcomes among autistic individuals (Fadda et al., 2011; Salvano-Pardieu et al., 2016). In contrast to these results, Akechi et al. (2018) did not find differences in judgements of blame for individuals with varying levels of agency.

Older autistic individuals also seem to rely on outcome more than intention when making moral judgements (Buon et al., 2013; Channon et al., 2010; Channon et al., 2011; Koster-Hale et al., 2012; Moran et al., 2011). The development of intent-based moral judgements in autistic children appears to follow a similar, yet slower developmental trajectory compared with neurotypical children (Cushman et al., 2013; Rogé & Mullet, 2011). However, it is important to note that neurotypical individuals also base some of their moral judgements on outcomes rather than intentions, as demonstrated by the Knobe effect (i.e., assigning greater intentionality to agents whose acts with neutral intentions lead to negative, rather than positive, outcomes). Further, there are situations in which focusing on outcomes rather than intentions is appropriate and valuable. For example, impaired drivers may not intend to cause accidents, but when accidents occur due to such negligence, neutral intentions do not compensate for negative outcomes. As such, it would be inaccurate to cast differences in intent-based moral reasoning in autism as necessarily detrimental or erroneous.

Although much research in intent-based moral judgement in autism has suggested some subtle differences, there are many similarities in intent-based moral judgements

across groups. Moreover, not all studies have found differences (e.g., Baez et al., 2012) despite similar participant characteristics and methodologies. Further, autistic individuals do use intentionality in a typical manner when making moral judgements of intended harms with neutral outcomes (Moran et al., 2011). Finally, in one study, autistic participants judged both unintentional and intentional transgressions more harshly, suggesting that some differences in moral judgements between groups may not depend on considerations of intentionality (Bellesi, 2018).

Margoni and Surian (2016) reviewed intent-based moral judgement in ASD and concluded that autistic people have "less mature" moral reasoning due to deficits in mental state understanding. However, we argue that greater reliance on outcome than intention when making moral judgements need not imply that autistic individuals overlook the importance of intention. Indeed, we see evidence of increased emphasis on intention when judging culpability of outcomes consistent with intentions (Channon et al., 2010; Channon et al., 2011; Koster-Hale et al., 2012; Li et al., 2014). Further, autistic individuals' assignment of intentionality appears itself to be informed by outcome rather than being automatically cued (Koster-Hale et al., 2012; Zalla & Leboyer, 2011). Since both outcomes and intentions matter for autistic moral reasoning, but outcome trumps intention when the two are at odds, we propose that autistic individuals use outcomes as a heuristic to infer intentionality more than do neurotypical adults, who rely instead on their more automatic mentalizing skills to infer intention and subsequent moral judgements. Differences in intent-based moral judgements among autistic individuals despite their ability to identify faux pas and understand false beliefs supports this hypothesis. Our interpretation is also consistent with research demonstrating intact false-

belief understanding in the absence of automatic attributions of intent to others (Senju et al., 2009). Therefore, we argue that the ability to infer and base moral judgements on intentionality is present among autistic individuals, but that the method of inferring intentionality differs between autistic and neurotypical participants. However, it is unclear whether compensation is mediated by verbal or non-verbal cognitive skills (Senju et al., 2009; Patil et al., 2016).

The different cognitive mechanisms involved in intent-based moral judgement in ASD may be underpinned by atypical activity in the right temporo-parietal junction (Koster-Hale et al., 2012). This finding is consistent with research showing that autistic adults demonstrate hypo-connectivity in the right temporo-parietal junction during cognitive empathy tasks (Schulte-Rüther et al., 2011). Differences in activity in this region might account for differences in assignment of intentionality. Specificity of this atypical activity in response to intent-based moral judgements is supported by the finding that right temporo-parietal junction activity was similar between autistic and neurotypical participants when distinguishing physical from psychological moral wrongs (Tsoi et al., 2018), and that different patterns of activation in this brain region do not predict an inability in ASD to make the self-other distinction (Hoffman et al., 2016).

Emotion-backed Moral Judgement

Results of the two studies investigating the trolley problem in autistic adults were mixed. In Gleichgerrcht et al.'s (2013) study, autistic individuals were more likely than neurotypical individuals to endorse the utilitarian solution to the footbridge dilemma. In contrast, Patil et al. (2016) did not find differences in responses to the footbridge dilemma across groups, despite autistic adults reporting more arousal than neurotypical

participants in response to both the trolley and footbridge dilemmas (Patil et al., 2016). Gleichgerrcht et al. (2013) reasoned that less emotional responding to the footbridge dilemma and differences in commonsense psychology led to the between-group differences in moral decision making. However, differing methodologies could account for discrepancies in findings, and it is unclear how emotionally arousing the dilemmas were to participants in Gliechgerrcht et al.'s (2013) study. Alexithymic traits and autism symptoms appeared to have counterbalancing moderating effects on trolley responses, such that alexithymia scores were associated with increased utilitarianism and autism traits were associated with decreased utilitarian decision-making (Patil et al., 2016). However, an fMRI investigation showed no significant correlations between emotion-related brain activity and either autism symptom severity or alexithymia during moral decision making (Schneider et al., 2013). Despite this, limbic system activity differed significantly between autistic and neurotypical participants during moral reasoning (Schneider et al., 2013).

In contrast to the results of Patil et al. (2016), Brewer et al. (2015) found that the presence of alexithymia affected moral judgements and self-reported emotional arousal in otherwise neurotypical individuals but *not* among autistic individuals. Brewer et al. (2015) used a moral acceptability scale that assumes normative moral judgement from acceptability ratings of a series of statements intended to evoke specific emotional responses (i.e., anger, disgust, fear, happiness, and sadness; Marsh & Cardinale, 2012). Although these emotions might be related to moral judgements (Haidt, 2001; Nichols, 2002), the task is based on the premise that eliciting negative emotions in others is morally wrong, a theoretical position that has not been validated as a metric of moral

judgement. Similar limitations were present in a study investigating differences in moral values between autistic and neurotypical individuals (Hirvelä & Helkama, 2011). It is unclear to what extent between-group differences in self-reported values of benevolence and tradition, which were unrelated to empathy, affect moral judgements and decision-making. Further, the extent to which these tasks are emotionally arousing, with subsequent emotional influences on moral decision making, likely varies. In addition, autistic people tend to rate subjective emotional states differently than do objective observers (Johnson et al., 2009; Legiša et al., 2013), making self-reported emotional arousal potentially unreliable for the researchers' purposes. Despite limitations, research investigating emotion-backed decision making in ASD suggests that autistic individuals with and without alexithymia do not use emotionally informed strategies in the same way as neurotypical individuals to arrive at the same moral conclusions.

Moral Judgement and Behaviour

All save one investigation of moral development and decision-making in autistic individuals reviewed here have focused on laboratory-based moral-judgement tasks or self-report questionnaires. Li et al. (2014), in contrast, investigated the effect of moral judgement on subsequent patterns of cooperation using a prisoner's dilemma game. The authors found that, unlike neurotypical children, autistic children did not modulate their cooperative behaviour based on naughtiness ratings (Li et al., 2016). These findings have important implications for autistic children, whose reciprocity is less influenced by others' moral transgressions, which might contribute to difficulty forming and maintaining friendships (Hamlin et al., 2011; Howlin, et al., 2013; Kasari et al., 2011; Rakoczy et al., 2016).

Justifications for Moral Judgements

In one study investigating justifications of moral judgements offered by autistic children, participants tended to reiterate vignettes instead of offering sound rationales (Grant et al., 2005). In another study, these explanations tended to be more concrete and less elaborate than those offered by neurotypical children (Shulman et al., 2012). Justifications for intent-based moral judgements appeared more rule-bound and focused on consequences among autistic children than neurotypical children, whose focus was more on protagonists' intentions (Fadda et al., 2016; Takeda et al., 2007). Autistic adults also reported more concrete, rule-bound rationales for moral judgements than neurotypical adults (Zalla et al., 2011). Rationales were also found to be less sophisticated among autistic than neurotypical adults (Bellesi et al., 2018). Differences between autistic and neurotypical participants in justifications for moral judgements were similar to atypicalities in moral judgements among autistic individuals, which tended to prioritize outcomes over intentionality. At first glance, this convergence might appear to support a Kohlbergian reliance of moral judgement on discursive reasoning. Yet, some studies of human reasoning have suggested that moral and other forms of reasoning may be nothing more than post hoc rationalizations of emotion-based judgements that function to aid communication and argumentation (Haidt, 2001; Mercier & Sperber, 2011). Concrete moral reasoning in autistic adults may therefore suggest post hoc rationalizations for moral judgements that are limited by the relatively concrete thought processes often observed in ASD (Hobson, 2012).

Commonsense Psychology

The majority of studies investigating links between commonsense psychology and moral reasoning in ASD did not find evidence of a connection. Mentalizing skills, as measured by false belief and faux pas tasks, were at best tenuously related to moral stage progression, the ability to discern between conventional and moral transgressions, and intent-based moral judgements. However, a neuroimaging study suggested an atypical pattern of activity in the right temporo-parietal junction (Koster-Hale et al., 2012), suggesting that alternative neural mechanisms underpin mentalizing during intent-based moral judgements for autistic individuals.

When making emotionally demanding moral decisions, autistic individuals appear to be influenced by emotions, but the emotional landscapes and resultant moral decisions of autistic individuals differ from those of neurotypical individuals due to common co-occurrence of alexithymia and differences in empathic responding. Greater faux pas understanding and greater autistic traits *decrease* utilitarian responding to footbridge dilemmas, perhaps due to heightened empathic responding. Alexithymia *increases* such decisions, presumably due to lower empathic responding. In less intense emotion-backed decision-making paradigms, emotion-related brain regions (i.e., left amygdala, left insula, and left posterior cingulate cortex; Schneider et al., 2013) show atypical hypo-arousal despite no concomitant differences in moral decision making, suggesting an alternative heuristic for emotional moral judgement among autistic adults.

Differences in neural activation in mentalizing and emotional regions in autistic compared with neurotypical individuals could help account for the subtle differences found in moral decision making between groups. However, a challenge to the rationalist theory that role-taking is central to moral development arises because autistic individuals

make moral judgements that are similar to those of neurotypical people despite having different mentalizing skills. Haidt's (2001) moral foundations theory proposes that intuition arises in response to moral scenarios leading to moral judgement; reasoning follows judgement as a means of justifying and communicating one's perspective to others. This theory could help account for similarity of moral judgements between these two groups despite differences in empathy, mentalizing skills, and verbal justifications for moral judgements. It could also help account for differences between groups (e.g., moral stage ascension and judgements of disgust transgressions) leading to understanding these as reflecting the differential importance of five moral domains (i.e., authority/respect; purity/sanctity).

Future Directions

Several avenues for future research emerge from the current literature review. First, studies investigating moral development through hierarchical stages could be strengthened by adopting longitudinal designs. Longitudinal research could also help elucidate the role of commonsense psychology in the development of moral maturity. Conclusions drawn regarding the role of commonsense psychology in the conventional / moral distinction in ASD (Skolnick Weisberg & Leslie, 2012) would be strengthened by introducing age-matched neurotypical control participants. Future studies of intent-based moral reasoning in ASD could be designed to elucidate the cognitive and neural mechanisms involved in this form of moral thinking. In particular, researchers could investigate the hypothesis that autistic individuals rely on outcomes to infer intentions to compensate for less developed automatic mentalizing compared with neurotypical individuals. Research on emotion-backed moral decision making in ASD would be

strengthened by including objective measures of emotional arousal (e.g., heart rate, electrodermal response, breathing rate), given deficits in self-reports of emotion (e.g., Johnson et al., 2009) and the common co-occurrence of alexithymia and ASD (Hill et al., 2004), which could prevent accurate self-reports of emotional arousal in ASD. Finally, much of the research investigating moral development and judgement among autistic children and adults has adopted a rationalist perspective. The rationalist account of moral development is challenged by only tenuous links between commonsense psychology and moral development based on the studies reviewed here—future studies should investigate moral development in ASD from an intuitionist perspective (Haidt et al., 2001) to help account for similarities and differences in moral reasoning between autistic and neurotypical individuals. Examining moral reasoning in autism through Haidt's framework could also further our understanding of the cognitive and neural mechanisms at play in moral judgements of autistic and neurotypical individuals. However, we believe that Haidt's framework must be tested in ASD before we can conclude that autistic moral reasoning is consistent with the intuitionist hypothesis.

General Limitations

Limitations of the above studies include *n*s of less than 30 per group in 79% of the studies reviewed, making statistical analyses unlikely to have sufficient power to achieve acceptable type I and type II errors rates (Button et al., 2013). Three studies did not report participants' sex (Blair, 1996; Buon et al., 2013; Grant et al., 2005). Further, only 48% of studies reviewed above reported that autistic participants were diagnosed using standard measures (e.g., Autism Diagnostic Observation Schedule – Second Edition, ADOS-2, Lord et al., 2015; Autism Diagnostic Interview—Revised, ADI-R, Lord et al., 1994). In

the remaining studies, diagnoses were reported based on various criteria, including previous clinical diagnosis (using interviews: Bellesi, et al., 2018; Channon et al., 2010; Channon et al., 2011; or methods not reported: Blair, 1996; Leslie et al., 2006; Li et al., 2014; Patil et al., 2015; Schneider et al., 2013); meeting "the established criteria" (Grant et al., 2005); clinical evaluation and information gathered from parents (Gleichgerrcht et al., 2013); evaluation by a clinical team (Takeda et al., 2007); screening questionnaires and interview by a psychiatrist (Baez et al., 2012); methodology not described (Hirvelä & Helkama, 2011; Skolnick Weisberg & Leslie, 2012); or self-reported clinical diagnosis (Senland & Higgins D'Alessandro, 2016). A further limitation is that most studies included samples with IQs in the average range. In contrast, only highly cognitively able autistic participants (i.e., mean full scale IQ of 120) were included by Koster-Hale et al. (2012), Moran et al. (2011), and Tsoi et al. (2018). Blair (1996) and Grant et al. (2005) included only participants with relatively low IQs. As such, results may not generalize to autistic individuals across the full IQ range.

Conclusions

The results of investigations into moral judgement and reasoning among autistic individuals call into question Piaget's (1932), Kohlberg's (1969; 1971), and Turiel's (1983) theories of moral development, all of which assert the prominence of discursive reasoning and commonsense psychology in moral decision-making. As such, researchers should carefully evaluate conclusions drawn regarding moral development in ASD researched from a rationalist perspective. We propose that Haidt's (2001) intuitionist model of moral judgement may better account for weak moral reasoning with generally intact moral judgements among autistic individuals, as Haidt's model does not rely on

discursive moral reasoning for moral development. Investigations into moral reasoning in ASD using an intuitionist approach may more accurately convey both social-cognitive strengths and weaknesses among autistic people.

Table 2.1

Summary of studies investigating moral stage development among autistic children (n = 3)

		Age (years)					Morality	
Reference	*n* ASD	*Mean*	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Kretschmer, et al., 2014	21 (F = 3)	10.22	6-14	Matrix Reasoning[2]: 10.8 Vocabulary[2]: 9.3	Y	age, gender[3], cognitive abilities	N	N false-belief understanding
Senland & Higgins-D'Alessandro, 2016	22 (F = 3)	19.2	18-27	FSIQ[4]: 104.7	N	FSIQ[4], age, sex, years education, SES,	Y	Y perspective taking
Takeda et al., 2007	23 (F = 3)	9.38	6.33-14.16	FSIQ[5]: 106.1 VIQ[5]: 107.2 PIQ[5]: 103.3	N	FSIQ[5], VIQ[5], PIQ[5], age, sex, SES	Y	N/A

Note. F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; PIQ: performance IQ; VIQ: verbal IQ; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)
[2] Scaled scores of subtests of Weschler Intelligence Scale for Children-IV, German version (Petermann & Petermann, 2008)
[3] Sex and gender are used in accordance with authors' terminology
[4] Wechsler Abbreviated Scales of Intelligence—Second Edition (Wechsler, 2011).
[5] Wechsler Intelligence Scale for Children-III - Japanese Version (Japanese WISC-III Publication Committee, 1998)

Table 2.2

Summary of studies investigating conventional / moral judgements among autistic individuals (n = 5)

		Age (years)					Morality	
Reference	*n* ASD	Mean	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Blair, 1996	20 (sex not reported)	failed ToM: 11:6; passed ToM: 14:6	8.25-17.5	failed ToM: VIQ[2]: 71; passed ToM: 80; learning disability: 68	N	age	N	N false-belief understanding
Leslie et al., 2006	exp 1: 19 (F = 3) exp 2: 17 of same group	12:5	7.58-16.67	VMA[3]: 3:3 - 11:1; mean 5:4	N	—	N	N false-belief understanding
Shulman et al., 2011	18 (F = 2)	12.07	8.08-17.16	FSIQ[4]: 94.31 VIQ[4]: 92.66 PIQ[4]: 97.12)	Y	FSIQ[4], VIQ[4], PIQ[4], age, SES	Y	N/A
Skolnick Weisberg & Leslie, 2012	12 (F = 2)	10.7	—	VMA[3] > 4y	N	—	Y	Y false-belief understanding

		Age (years)					Morality	
Reference	*n* ASD	Mean	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Zalla et al., 2011	20 (F = 3)	28.3	17 - 38	FSIQ[5]: 96	Y	FSIQ[5]; VIQ[5], PIQ[5], age, gender[6], years education	Y	Y faux-pas recognition

Note. F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; PIQ: performance IQ; SES: socioeconomic status; ToM: theory of mind; VIQ: verbal IQ; VMA: verbal mental age; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)

[2] Test not indicated

[4] Peabody Picture Vocabulary Test (Dunn & Dunn, 1997)

[5] Wechsler Intelligence Scale for Children—Third Edition (Wechsler, 1991)

[6] Wechsler Adult Intelligence Scale—French Edition (Wechsler, 1999a).

[6] Sex and gender are used in accordance with authors' terminology

Table 2.3

Summary of studies investigating intent-based judgements among autistic children (n = 5)

		Age (years)					Morality	
Reference	*n* ASD	Mean	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Akechi et al., 2018	33 (F = 9)	15.7	7 - 24	FSIQ[2]: 96.9	Y	Age, sex, FSIQ	N	Y judgements of agency
Fadda et al., 2016	30 (F = 0)	11:8	—	FSIQ[3]: 87.57	Y	Sex[4]	Y	Y false-belief understanding
Grant, 2005	19 (sex not reported)	12.2	—	VMA[5]: 102 months VIQ[3]: 74	N	Clinical group: CA and VMA[5]; TD group: VMA[5]	Y	N/A
Komeda et al., 2016	19 (F = 2)	12.5	—	FSIQ[6]: 100	Y	FSIQ[6], age	Y	N/A
Rogé & Mullet, 2011	25 (F = 5)	—	7-14 (*n* = 10); 15-18 (*n* = 9); 22-36 (*n* = 6)	—	Y	chronological age OR mental age[3]	Y	N/A

Reference	*n* ASD	Age (years)		IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Morality	
		Mean	Range				Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Salvano-Pardieu et al., 2016	14 (F = 2)	12.9	11.5-14.8	FSIQ[7]: 118 NVIQ[8]: 47.2	Y	FSIQ[7], age, sex, SES, academic level[9]	Y	N/A

Note. CA: chronological age; F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; NVIQ: non-verbal IQ; VIQ: verbal IQ; VMA: verbal mental age; SES: socioeconomic status; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)

[2] Wechsler Intelligence Scale for Children-III - Japanese Version (Japanese WISC-III Publication Committee, 1998).

[3] Name of cognitive test not reported

[4] Sex and gender are used in accordance with authors' terminology

[5] British Picture Vocabulary Scale (Dunn et al., 1982)

[6] Wechsler Intelligence Scale for Children—Fourth Edition (Wechsler, 1991)

[7] Wechsler Intelligence Scale for Children—Fourth Edition (French; Wechsler, 2005)

[8] Raven's Progressive Matrices; scale of score not indicated (Raven et al., 1998)

[9] Assessed by teachers based on average grades

Table 2.4

Summary of studies investigating intent-based moral judgements among autistic adults (n = 7)

		Age (years)					Morality	
Reference	*n* ASD	*Mean*	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Baez et al., 2012	15 (F = 4)	35	—	Lowest FSIQ[2] score: 94	N	age, sex[3], years education	N	N social cognition and empathy tasks
Bellesi et al., 2018	20 (F = 8)	22.65	—	FSIQ[4]: 110.75	N	age, sex, FSIQ[4]	Y	—
Buon et al., 2013	16 (F = 3)	26.8	—	FSIQ[5]: 98	Y	FSIQ[5], VIQ[5], PIQ[5], gender, age, years education	Y	N/A
Channon et al., 2010	20 (F = 5)	40.65	—	FSIQ[4]: 106	N	FSIQ[4], age, years of education	Y	N/A
Channon et al., 2011	20 (F = 5)	38.5	—	FSIQ[4]: 109	N	FSIQ[4], age, years of education	Y	N/A

Reference	*n* ASD	Age (years)		IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Morality	
		Mean	Range				Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Koster-Hale et al., 2012	16 (F = 2)	31	20-46	FSIQ[2]: 120	Y	FSIQ[2], age	Y	N right temporo-parietal junction activity
Moran et al., 2011	13 (F = 4)	33.15	—	FSIQ[2]: 120	Y	FSIQ[2], sex, age	Y	N false-belief understanding
Tsoi et al., 2018	16 (F = 2)	31	20-46	FSIQ[2]: 120	Y	FSIQ[2], age	Y	N/A
Zalla & Loboyer, 2011	20 (F = 4)	27:6	—	FSIQ[6]: 93.5 VIQ[6]: 99.4 PIQ[6]: 87.2	Y	FSIQ[6], age, gender, years education	Y	N faux-pas recognition

Note. F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; PIQ: performance IQ; VIQ: verbal IQ; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)

[2] Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999b); (ascertained through personal correspondence with author)

[3] Sex and gender are used in accordance with authors' terminology

[4] Wechsler Test of Adult Reading (Wechsler, 2001)

[5] Wechsler Adult Intelligence Scale—Third Edition (Wechsler, 1997)
[6] Wechsler Adult Intelligence Scale—French Edition (Wechsler, 1999a)

Table 2.5

Summary of studies investigating emotion in moral judgements among autistic adults (n = 5)

Reference	*n* ASD	Age (years)		IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Morality	
		Mean	Range				Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Brewer et al., 2015	25 (F = 6)	34.52	—	—	Y	alexithymia[2], age, gender[3], FSIQ[4]	N	N/A
Gleichgerrcht et al., 2013	36 (F = 12)	32.6	—	VIQ[5]: 114 PIQ[5]: 104	N	VIQ[5], PIQ[5], age, gender, years education	Y	Y faux-pas recognition
Hirvelä & Helkama, 2011	41 (F = 23)	F = 34; M = 31	—	—	N	matching strategy not described	Y	Y empathy
Patil et al., 2016	17 (F = 6)	37.35	—	VIQ[6]: 31 NVIQ[7]: 7.5	N	age, gender, years education	N	Y empathy

Reference	*n* ASD	Age (years)		IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Morality	
		Mean	Range				Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Schneider et al., 2013	30 (F = 13)	31.39	—	FSIQ: 109.1[8]	N	gender, age, years education; digit span[9], lexical fluency[10], semantic fluency[10], flexibility[11], social desirability[12]	N	N/A

Note. F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; M: male; PIQ: performance IQ; VIQ: verbal IQ; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)

[2] Toronto Alexithymia Questionnaire (Bagby et al., 1994)

[3] Sex and gender are used in accordance with authors' terminology

[4] Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999b)

[5] Wechsler Adult Intelligence Scale—Third Edition (Wechsler, 1997)

[6] Mehrfachwahl-Wortschatz-Intelligenztest; scale of score not indicated (Lehrl, 1995)

[7] Raven's Progressive Matrices; scale of score not indicated (Raven et al., 1998)

[8] Wortschatztest (Schmidt, & Metzler, 1992)

[9] Wechsler Intelligenztest für Erwachsene (Von Aster et al., 2006)

[10] Regensburger Wortflüssigkeitstest (Aschenbrenner et al., 2001)

[11] Trail Making (Reitan, 1958)

[12] Deutsche Kurzskala zur Erfassung des Bedürfnisses nach sozialer Anerkennung (Stocké, 2009)

Table 2.6

Summary of study investigating the relation of moral judgements to behaviour among autistic children (n = 1)

		Age (years)					Morality	
Reference	*n* ASD	*Mean*	Range	IQ (*Mean* Standard Score)	Gold Standard Diagnosis[1]	Matching	Between-Groups Differences	Relation to Other Aspects of Commonsense Psychology
Li et al., 2014	38 (F = 8)	9.6	6 – 12	FSIQ[2]: 110	N	age, gender[3]	Y	N/A

Note. F: female; FSIQ: full-scale IQ; IQ: intelligence quotient; Y/N under Morality heading indicates whether relations were found between constructs; N/A indicates that the relation between constructs was not assessed.

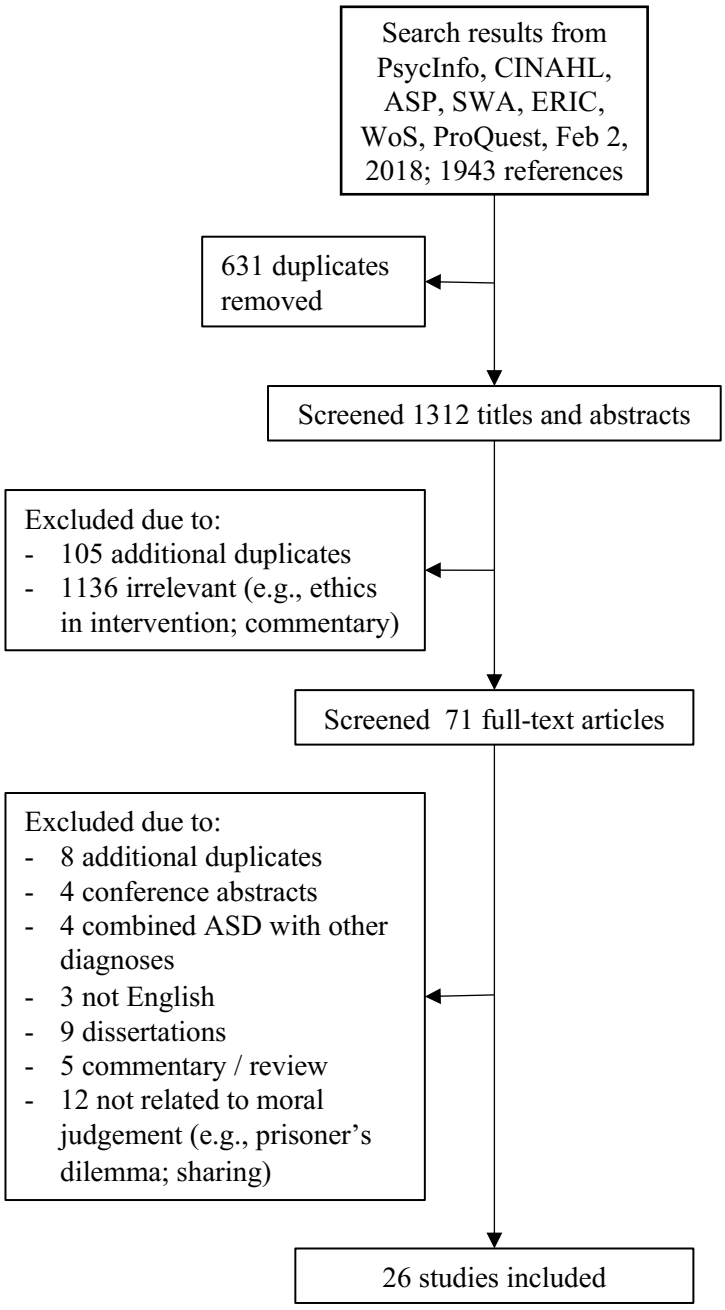
[1] Diagnosis made / confirmed using Autism Diagnostic Observation Schedule – Second Edition (Lord et al., 2015); Autism Diagnostic Interview—Revised (Lord et al., 1994)

[2] Combined Raven's test (second revision in Chinese; Wang, & Qian, 1997)

[3] Sex and gender are used in accordance with authors' terminology

Figure 2.1

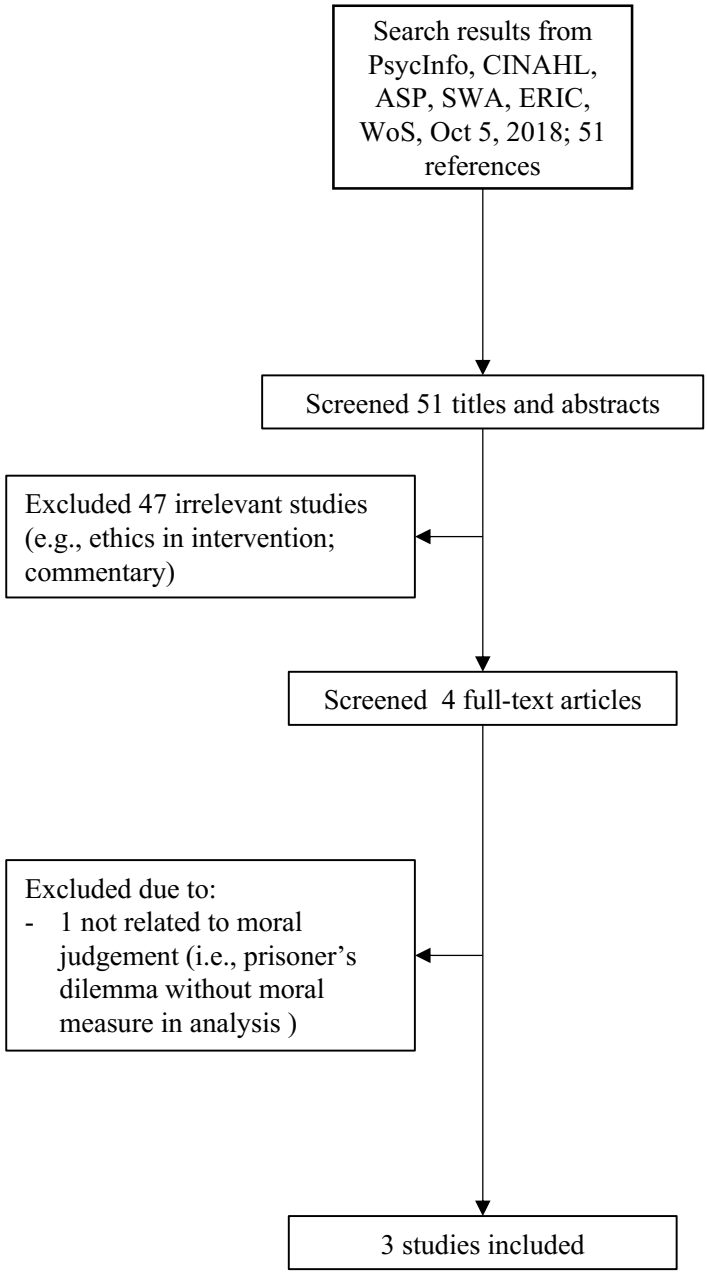
Systematic review of morality in autism spectrum disorder conducted on February 2, 2018.



Note. CINAHL, Cumulative Index to Nursing and Allied Health Literature. ASP, Academic Search Premier. SWA, Social Work Abstracts. ERIC, Educational Resources Information Center. WoS, Web of Science. ProQuest, ProQuest Dissertations and Theses Global.

Figure 2.2

Systematic review of morality in autism spectrum disorder conducted on October 5, 2018.



Note. CINAHL, Cumulative Index to Nursing and Allied Health Literature. ASP, Academic Search Premier. SWA, Social Work Abstracts. ERIC, Educational Resources Information Center. WoS, Web of Science. ProQuest, ProQuest Dissertations and Theses Global.

CHAPTER 3. HOW SYSTEMATIC REVIEW FINDINGS INFORMED THE DESIGN OF THE RESEARCH PROGRAM

This chapter offers a summary of how findings from the systematic review in the previous chapter helped motivate the qualitative investigation of morality in autism that followed. The goal of the systematic review was to summarize the extant literature in the field and identify relevant areas for future research.

Findings from the review suggest that conclusions drawn by researchers of moral development in autism have tended to assume a deficits-based perspective hinging on Kohlberg's (1969, 1971) hierarchical model of moral psychology. An alternative to this approach would be to investigate morality in autism using a strengths-based perspective, which could draw on Haidt's (2001) model of moral development. This model asserts that cultural influences are responsible for shaping moral predilections without assuming a hierarchy of moral values based on foundational commonsense psychology skills.

The review also showed that the role of emotions in autistic moral decision making remains unclear. One study suggested that autistic adults were less likely than neurotypical adults to be influenced by emotions when faced with a moral dilemma (Gleichgerrcht et al., 2013), whereas another study found no differences in moral decision making despite greater self-reported emotional arousal in the autistic group (Patil et al., 2016). Further complicating the picture, an fMRI study showed that between-groups differences in limbic system activity did not correlate with moral decision making for autistic or neurotypical adults (Schneider et al., 2013).

Justifications for moral judgements (i.e., self-reports of moral reasoning) were found to be less sophisticated, and to focus more on rules and outcomes than intentions, among autistic compared with neurotypical individuals (Bellesi et al., 2018; Zalla et al.,

2011). These two studies used ad hoc coding schemes which, in my opinion, limit the possibility for richness and nuance in interpretation of justifications for moral judgements made by autistic individuals.

Before the qualitative study that comprises the next chapter was published, predictions based on moral foundations theory had not yet been investigated among autistic individuals. I saw this as an opportunity to interview autistic adults, offering them the occasion to expound on experiences of moral transgressions or exemplars in their own lives while investigating the degree to which emotions were perceived to play a role in their moral judgements. The goal was to provide an initial investigation into moral foundations theory in autism from a strengths-based perspective, laying the ground for possible future research.

A second motive for this study was to engage autistic community members in the development of future research questions and methodology in a community-based research framework (Fletcher-Watson et al., 2019; Gillespie-Lynch, 2017; Jull et al., 2017). As such, in addition to the study described in Chapter 4, I asked autistic adults to describe the perceived value to themselves and to the autism community of a strengths-based investigation of morality in autism (i.e., one drawing on moral foundations theory). I also asked participants to offer feedback on the Moral Foundations Questionnaire for Kids (Curtis et al., 2019) to adapt it as necessary for use with autistic children in anticipation of a third dissertation study with autistic youth. Feedback from autistic adults is summarized in Chapter 5.

CHAPTER 4. MANUSCRIPT 2: MORAL FOUNDATIONS THEORY IN AUTISM SPECTRUM DISORDER: A QUALITATIVE INVESTIGATION

This chapter is a reproduction of Dempsey, E. E., Moore, C., Richard, A. E., Smith, I. M. (2020). Moral foundations theory in autism spectrum disorder: A qualitative Investigation. *Autism, 24,* 2202-2212. This manuscript is reprinted here with minor edits to improve readability within the dissertation and with permission from the copyright holder (See Appendix C for Copyright Release Request Letter and response granting permission). Note that Erin Dempsey, with direction from her co-supervisors Drs. Chris Moore and Isabel Smith, along with her co-author Dr. Annie Richard, was responsible for the preparation and execution of this study. Ms. Dempsey wrote the manuscript constituting this chapter and revised it with suggestions from her collaborators.

Abstract

Morality is important for how humans treat each other and non-human animals. Differences in moral reasoning have been found between autistic and neurotypical individuals. Research in this area has relied on accounts of moral psychology that suggest increasingly mature moral principles that develop from taking the perspectives of others. Yet, even autistic individuals, who sometimes differ in their ability to take others' perspectives, make moral judgements that are similar to neurotypical individuals. Moral foundations theory suggests that moral psychology is not hierarchical but differs depending on culture. Moral foundations theory has not yet been investigated among autistic individuals. This qualitative study used interviews and qualitative analysis as a first attempt at understanding how moral foundations theory fits with autistic moral thinking. We found that all five moral foundations of moral foundations theory were represented in the interviews, yet certain foundations appeared more prominent than others. The autistic adults interviewed in our study discussed issues of care and fairness more than of loyalty, authority, or purity when prompted to discuss moral transgressions. Future research should use quantitative methods to compare groups of autistic and neurotypical individuals to clarify similarities and differences in moral thinking between the groups.

Introduction

Autism spectrum disorder (hereafter autism) is a neurodevelopmental disorder characterized by differences in social communication and social interaction, and the presence of repetitive or restricted interests or behaviour (American Psychiatric Association, APA, 2013). Differences in social cognition between autistic and neurotypical individuals are also common (Gallese, 2006). Moral reasoning is a form of social cognition that has been posited by some to be atypical among autistic individuals (e.g., Takeda et al., 2007; Zalla et al., 2011). Researchers have investigated whether the development and execution of moral judgement and reasoning differs in this population compared with neurotypical individuals (for review see Dempsey et al., 2019).

Rationalist accounts of morality have dominated research in moral development for several decades. Rationalist theories position social cognition as the foundation of moral development (Kohlberg, 1971; Piaget, 1932; Turiel, 1983), emphasizing the role of various aspects of commonsense psychology, such as perspective-taking and role-taking. Commonsense psychology refers to the human tendency to attempt to make sense of relationships and interactions by representing the internal states of others (Moore, 2006). This requires identifying others as psychologically similar to, yet distinct from, oneself.

Autistic individuals show altered development of aspects of commonsense psychology (Baron-Cohen, 2000), including empathy, i.e., an emotional or cognitive response to another based on her or his psychological or contextual circumstances (Hoffman, 1987). However, the way researchers define and measure empathy rests on the assumption of prescriptive norms for social responses to others (Nicolaidis et al., 2018), which may be inappropriate given that autistic individuals process social information in

atypical ways. Indeed, autistic responses to others could be appropriate given their unique social cognition, yet seem inappropriate to neurotypical individuals (i.e., the double empathy problem; Milton, 2012). Thus, differences in empathy between autistic and neurotypical individuals can be understood as a bidirectional problem.

Relying on traditional definitions of empathy and rationalist theories of morality would suggest delayed or atypical moral development among autistic individuals. However, a recent systematic review of moral psychology in autism (Dempsey et al., 2019) suggested that only minor differences in moral psychology exist between autistic and neurotypical individuals. In particular, moral judgement, i.e., determining whether transgressors were morally right or wrong in their actions, was shown to be generally similar between autistic and neurotypical individuals (e.g., Akechi et al., 2018; Blair, 1996; Margoni et al., 2019), whereas the nature of justifications for those decisions, i.e., moral reasoning, differed (e.g., Grant et al., 2005; Shulman et al., 2012), as did the degree of blame or culpability assigned to moral transgressors (e.g., Bellesi et al., 2018; Channon et al., 2011; Koster-Hale et al., 2012).

Relatively intact moral judgement among autistic individuals with atypical commonsense psychology calls into question rationalist accounts of morality that assert the primacy of commonsense psychology. Furthermore, the subtle differences that have been found have often been interpreted as deficits, as is common when autistic individuals are compared to neurotypical individuals (Akhtar & Jaswal, 2013). Researchers have failed to justify their interpretations of neurotypical superiority beyond citing the hierarchy of moral reasoning associated with rationalist theories of moral development (e.g., Moran et al., 2011; Salvano-Pardieu et al., 2015).

Haidt (2012) developed moral foundations theory, which relies less heavily on commonsense psychology than rationalist accounts. Haidt's (2012) intuitionist account proposes that children have an innate capacity to internalize moral intuitions across five social contexts, or foundations, that humans have evolved to recognize as morally salient. The innateness and modularity of the five foundations has been debated (Haidt & Joseph, 2011; Suhler & Churchland, 2011); however, a full discussion of the controversy surrounding Haidt's theory is beyond the scope of this paper (see Chapter 7 of this dissertation for a fuller discussion of this controversy). The five foundations are care/harm, fairness/reciprocity, in-group/loyalty, authority/respect, and purity/sanctity. The relative importance of these foundations depends on early cultural environments that may reinforce the development of some moral foundations over others. To illustrate, Kohlberg's (1969, 1971) stages describe moral reasoning based on authority as less mature than reasoning based on individual rights. In contrast, moral foundations theorists assert that reasoning based on authority represents a different (not lesser) moral foundation, the importance of which is determined by one's culture (Graham et al., 2009). Given the emergent conceptualization of autism as a culture (Davidson, 2008; Jaarsma & Welin, 2012), differences in moral reasoning from that of neurotypical people could result from differing salience of moral foundations in autistic culture.

Haidt's moral intuitionism implies that moral judgements follow from emotional, pre-rational intuitions or emotions (Haidt, 2003). For Haidt, emotions are classed as moral if they are connected with others' welfare. This position is also not without controversy—Jones (2006), for example, argues that moral judgements are only meaningful if they are at least responsive to reasoning. Others argue that a broader scope

of emotions can be moral by relating to cosmic order and meaning (McGeer, 2008), or that describing emotions as "appropriate" or "inappropriate" conflates notions of whether emotions are fitting versus morally acceptable (d'Arms & Jacobson, 2000). Despite controversy regarding the theory, we adopt Haidt's position for the purpose of investigating the applicability of his theory among autistic adults. Moral emotions, then, are divided into four broad categories: 1) those that arise in judgement of wrongdoers, e.g., anger and disgust; 2) those that arise in response to judging oneself as a moral agent, e.g., shame and guilt; 3) those that arise in response to victims of moral transgressions, e.g., empathy and compassion; and, 4) those that arise in response to moral exemplars, e.g., elevation and gratitude (Haidt, 2003). As such, moral intuitionism relies more heavily on emotional responding than discursive reasoning and perspective taking than do rationalist accounts of moral psychology. The role of emotion in autistic moral judgement is not clear (Dempsey et al., 2019), especially given high rates of co-occurring alexithymia, i.e., reduced ability to identify and describe one's own emotions, among autistic individuals (Hill et al., 2004).

Using an intuitionist approach in investigating moral reasoning may more accurately convey social-cognitive strengths and weaknesses among autistic people than those employing rationalist accounts. To our knowledge, moral foundations theory has not yet been investigated among autistic individuals. We therefore conducted interviews with autistic adults as a preliminary study of moral foundations theory in autism. Our aim was to investigate whether the theory's five foundations were considered morally salient among autistic adults. We also aimed to assess the degree to which moral emotions motivated judgements in autistic moral thought, as theorized in moral foundations theory.

To further these aims, autistic adults were asked to explain their moral reasoning and emotions related to past situations in which they felt they had been wronged or had witnessed another person experiencing a moral wrong.

Methods

Research Team and Reflexivity

The first author conducted and analyzed all interviews. She is a clinical psychology Ph.D. student with undergraduate degrees in psychology and philosophy. She has experience with diagnostic assessment and mental health intervention with autistic youth and adults, in addition to training and experience interviewing people in both clinical and research settings. She contacted each participant prior to study participation to discuss the study. At the time of the interview, the participants were aware of the interviewer's goal of exploring moral thinking in autism from a strengths-based perspective as part of her dissertation research. However, participants had not yet been introduced to moral foundations theory.

Bias. Moral foundations theorists have shown that political orientation, culture, and socioeconomic status may influence the relevance of each moral foundation to an individual's moral thinking (Koleva et al., 2012). The first author identifies as a white, middle-class woman who is politically left-wing. These characteristics may make her more likely to prioritize care/harm and fairness/reciprocity foundations over in-group/loyalty, authority/respect, and purity/sanctity foundations. Her interest in the topic stems from a desire to better understand the plurality of moral convictions through a non-hierarchical lens to lessen tension between groups and improve societal functioning. She

was motivated to conduct this research among autistic participants to help describe and understand morality in autism from a strengths- rather than deficits-based perspective.

Participants

Participants were recruited using advertisements through Autism Nova Scotia; communication with autistic participants in previous research; word of mouth; and community clinicians. Participants were contacted by e-mail or phone to assess interest in participation, and follow-up telephone calls were made to describe the study in more detail and schedule a research visit. All contacted individuals (n = 6) agreed to participate in the study and provided written informed consent. This study was approved by the IWK Health Centre's Research Ethics Board.

Setting

Interviews were conducted by the first author at Dalhousie University in the Early Social Development Lab conference room. A volunteer research trainee was present during two of the interviews as an educational experience.

Materials

Semi-Structured Morality Interview. The interview was semi-structured and used the critical incidents technique (Flanagan, 1954). Participants were asked to reflect on and describe morally laden situations that affected them. They were asked to indicate why they thought each situation was morally wrong or right, and how they felt about it. First, participants were invited to describe any morally laden situation that came to mind (i.e., unprompted). After three incidents were shared, the interviewer probed for situations representing moral foundations that had not yet been discussed (i.e., prompted; See Appendix D for the interview template). As part of a larger study, participants were

also asked to share their opinions about a measure of moral foundations designed for neurotypical youth, and to comment on the potential of the proposed research program to contribute to the autism community. The results of those portions of the interviews are not reported here (See Chapter 5 for summary of participants' responses to this aspect of the interview).

Demographics Questionnaire. Participants were asked to provide demographic information regarding age, postal code, sex, gender, race/ethnicity, level of education, occupation, and household income using pen and paper. See Appendix E.

Audio Recording Equipment. An Olympus digital voice recorder (Model WS-802) was used to audio record interviews.

NVivo Software. QSR International's NVivo 11 software for Windows (2015) was used to facilitate coding of data for qualitative data analysis.

Procedures

Each interview was audio-recorded using a digital recording device. Following the interview, participants were asked to complete the demographics questionnaire. A professional transcriptionist who was blind to the study's research questions, coding scheme, and participant diagnoses transcribed all interviews.

Data Analysis

Data were analyzed using thematic analysis, a method of identifying themes in qualitative data commonly used by psychology researchers (Braun & Clarke, 2006). Inductive, semantic coding from a realist perspective was used.

The first author and one trained research assistant read the entire corpus of transcribed data to familiarize themselves with the contents and generate reflections on

the data prior to coding. Next, the first author coded statements from each transcribed interview. Statements were defined as "phrases, assertions, comments, and attributions which retained a sense of completeness and had an [*sic*] homogeneous object" (Sani & Reicher, 1998). Codes were then collated and organized into initial themes. The first author reviewed these themes to confirm that coded statements reflected the pattern of the category into which they were sorted. Additional statements were coded, and themes were renamed as appropriate. Next, the trained research assistant performed analytic auditing on the coded data to ensure that all extracts were coded appropriately according to the semantic, realist approach. She also assessed internal homogeneity and external heterogeneity (Patton, 1990) to check whether data within each theme were meaningfully connected, and that themes were distinct.

The first author evaluated the extent to which final themes captured patterns of moral sentiments and reasoning represented within the data. Upon concluding that individual codes were supportive of identified themes, and that these themes were adequate to describe the data, codes were renamed as appropriate and a final thematic map was created (Figure 4.1). A narrative account of the themes, with support from tables of coded data extracts, is presented in the Results.

After all interviews were coded and extracts isolated as evidence of themes, participants were invited to participate in member reflections (Tracy, 2010). All participants were presented with the findings via email and asked to comment on whether they saw their contributions reflected in the findings. The researcher collaborated with participants to enrich the interpretation of the interviews and refine themes as appropriate (Tracy, 2010).

Community Involvement

Autistic community partners were not involved in the development of the research question or outcome measures, the design of the study, or its implementation. However, the autistic adults who participated in this study contributed to the interpretation of the results through member reflections.

Results

Participants

See Table 4.1 for participant characteristics[3]. Participants were aged 18 or older, fluent in English, and had sufficient receptive and productive verbal skills to participate in the interview. If participants were not known to the research team, language skills were assessed by the first author during the initial telephone interview.

Morality Interview Themes

Findings addressed a) situations that triggered the five moral foundations theorized by Haidt (2012) and, b) emotions elicited by these situations. Themes and subthemes are elaborated below. Care/harm and fairness/reciprocity foundations were referenced more frequently during the unprompted versus prompted portion of the interviews; in-group/loyalty, authority/respect, and purity/sanctity were more often referenced in the prompted versus unprompted section of the interview (see Table 4.2).

Theme: Care/Harm

Emotional harm to a human (Clifford et al., 2015), physical harm to a human (Clifford et al., 2015; Graham et al., 2011), and physical harm to a non-human animal (Clifford et al., 2015; Graham et al. 2011) were important elicitors of the care/harm

[3] They/them pronouns were adopted rather than she/her; he/him as several participants identified as gender non-binary.

foundation for participants in this study. Additionally, respondents endorsed care for the environment (n = 4) and emotional care for animals as morally relevant. See Table 4.3 for examples and quotes in support of care/harm themes and subthemes.

Subtheme: Physical Care/Harm towards Humans. All participants indicated that physical care for humans is morally correct. Value in helping others was expressed by three participants. It was deemed particularly important to help the disadvantaged. P6 shared that it is morally right to protect the vulnerable. Many participants indicated that killing is morally wrong, along with mistreatment of marginalized groups, separating immigrant families, pedophilia, abuse, assault, and violence.

Subtheme: Emotional Care/Harm towards Humans. Three participants shared that it is morally right to care for the emotional wellbeing of humans. When describing the circumstances under which a beloved family pet was euthanized, P1 shared that the veterinarian did the morally right thing by performing a home visit. P5 shared that it would be morally correct to comfort a woman when someone they knew accidentally struck the woman's cat in an automobile accident. All participants indicated that it is morally wrong to harm humans emotionally.

Subtheme: Emotional Care/Harm towards the Disabled[4]. Two participants indicated that it is important to care for individuals who live with disabilities. For example, P4 shared that getting the disability support and accommodation they needed at work was morally right. This was in part because it empowered them in the workplace. Three participants indicated that it is morally wrong to harm disabled people.

[4] Note that sub-subthemes appear in italics.

Subtheme: Emotional Care/Harm towards Animals. P1 described that during the euthanization of their family pet, part of the reason that the veterinarian's home visit was morally correct is that it would have been "traumatic to take [the pet] out of her home".

Subtheme: Physical Care/Harm towards Animals. Two participants endorsed the importance of physical care for animals. For example, P5 noted that reckless driving leading to the death of a pet was morally wrong.

Theme: Fairness/Reciprocity

All participants expressed the salience of the fairness/reciprocity foundation. Unfairness was explicitly deemed morally wrong by three participants. Many subthemes emphasizing fairness/reciprocity were elicited and are described below (see also Table 4.4).

Subtheme: Inequality. P4 and P6 described situations that were morally wrong based on inequality in relation to characteristics such as gender, sexual orientation, and ethnicity.

Subtheme: Inequality based on Disability. Three participants stressed the immorality of unequal treatment of the disabled. P1, P2, and P4 stressed that including disabled people in broader society would be morally correct.

Subtheme: Honesty. P4 and P5 indicated that they value being honest and truthful. P1 indicated that trustworthiness is morally correct. Dishonesty was seen as morally wrong by four participants.

Subtheme: Aggregation of Resources or Power. P3 and P6 emphasized that it is morally wrong to abuse power. Five participants stressed the unfairness of accruing

resources by stealing. P2 asserted that capitalism is morally wrong because it benefits only a few people.

Subtheme: Cheating/Free-riding. P1 and P5 shared that cheating is morally wrong.

Subtheme: Denial of Rights. P6 was strongly opposed to denying individuals their basic human rights. P4 shared this emphasis on the right to self-determination.

Theme: In-group/Loyalty

Although all participants endorsed the importance of this foundation to some degree, almost all coded references were from the prompted portion of the interview. P1 shared that they felt betrayed when everyone in school except them seemed to be aware that no buses would be available to drive them home one day. P4 shared, unprompted, that they value loyalty in interpersonal relationships and that infidelity is morally wrong. They also indicated that keeping one's word is morally correct. P5 shared P4's view that infidelity is morally wrong. P6 indicated it was morally wrong when a friend betrayed them by passively allowing others to adopt and hold an untrue, negative view of them.

Subtheme: Political Loyalty. P3 described that betrayal of international alliances such as the North Atlantic Treaty Organization is morally wrong. They also indicated that when governments foster international alliances with erstwhile enemies this is morally wrong if the new alliance is a betrayal to previous allies. P2 indicated that it is morally wrong when governments betray their own people. See Table 4.5 for a quote in support of this subtheme.

Theme: Authority/Respect

Important signifiers of the salience of the authority foundation such as respect for others and their property were deemed to be morally relevant by all participants, particularly in the prompted portions of their interviews. P3 described that destroying someone's property would be morally wrong. P6 asserted that an employee stealing from or sabotaging an employer who had treated the employee well would be immoral. See Table 4.6 for examples and quotes in support of authority/respect themes and subthemes.

Subtheme: Laws, Rules, and Convention. The importance of laws and rules was asserted by three participants. P3 shared that we need laws that prevent large numbers of people from behaving in ways that would be harmful to society.

Subtheme: Authority Figures have Special Responsibilities. Four participants reported that some authority figures have special responsibilities that they are morally bound to fulfil. For instance, P1 described that a teacher was morally wrong to not help a student in need of special assistance to write an exam.

Subtheme: Authority not Morally Salient. Though many participants identified authority transgressions as morally wrong in certain instances, a majority of participants (n = 5) demonstrated flexibility in the applicability of this foundation to different circumstances.

Subtheme: Rejection of Traditional Gender Roles. P2 returned many times to the notion that traditional gender roles may be harmful.

Subtheme: Respect Must be Earned. P2 and P5 stressed that respect is not based on being in a position of authority, but that respect must be earned. P1 shared that they also hold this view when asked to review the results of this study.

Theme: Purity/Sanctity

As with in-group/loyalty and authority/respect, this theme was derived almost entirely from the prompted portion of the interview. P1 spurned acts that were degrading such as spitting on the sidewalk or swearing in public. P2 indicated it is wrong to insinuate that women are unchaste in an insulting manner. P4 shared that graveyards are sacred and that it is immoral to destroy a person's grave, even if that person had not lived a good life and no living relatives were harmed by the disrespect shown. All participants emphasized the importance of human dignity. See Table 4.7 for examples and quotes in support of the purity/sanctity theme.

Theme: Moral Emotions

All participants indicated having experienced anger, annoyance, or frustration in response to moral situations. P5 and P1 indicated feeling disgusted. Guilt was mentioned by four participants. Shame was not explicitly indicated but two people expressed embarrassment. The positive moral emotion of elevation was not explicitly described, but four participants cited happiness, connection, excitement, joy, or hopefulness in response to positive moral acts. See Table 4.8 for examples and quotes in support of moral emotions themes and subthemes.

Subtheme: Reasons as Emotion. When prompted to share their emotional responses to morally salient incidents, five participants sometimes adduced reasons instead.

Theme: Morality as Care/Harm or Fairness/Reciprocity

Authority/respect was sometimes viewed as morally salient by four participants only if it was related to care/harm or fairness/reciprocity. In-group/loyalty was cast as trumped by care/harm or fairness/reciprocity by two participants. Five participants

described purity/sanctity as morally salient only when it was harmful or unfair. See Table 4.9 for examples and quotes in support of relevant themes and subthemes.

Discussion

This study was conducted as an initial investigation into the salience of aspects of moral foundations theory in autistic moral thinking. We also sought to elucidate the degree to which emotions contributed to moral judgements in this population. We interviewed six autistic adults using the critical incidents technique (Flanagan, 1954) and analyzed the interviews using thematic analysis (Braun & Clarke, 2006).

The autistic adults in our study endorsed all five moral foundations (Haidt, 2012) as morally relevant. Our sample consisted primarily of adults who identified as politically left wing. It is therefore not surprising that many participants described that some transgressions against the authority/respect, in-group/loyalty, and purity/sanctity foundations were only morally wrong if they caused harm or were unfair (Koleva et al., 2012). However, it is also possible that the reduction of these three foundations to care/harm or fairness/reciprocity by some participants could be related to autistic moral psychology. Almost all incidents that were offered without probing for specific foundations yielded examples of transgressions against the care/harm and fairness/reciprocity domains. These findings suggest that the two domains are particularly salient among the politically left-leaning autistic adults we interviewed (Graham et al., 2009).

Emotions from each category of Haidt's (2003) theorized moral emotions were represented in our analysis, i.e., emotions related to: 1) judgement of wrongdoers; 2) judging oneself; 3) responses to victims; and, 4) responses to moral exemplars (Haidt,

2003). Despite this, explanations were sometimes offered in lieu of emotional responses. This style of responding might be attributable to alexithymia in our sample, a trait common among autistic individuals (40-50%; Hill et al., 2012). It could be that the autistic adults in this study experienced more moral emotions during the interviews than were reported, but that they were either unaware of, or unable to report on, their emotions; we could not test this possibility with the available data, however. It is also possible that a comparable study among neurotypical adults would similarly demonstrate that reasons are sometimes cited rather than emotions when people are asked how moral transgressions make them feel. Further complicating the relation of emotional reactions to moral situations in our study is the finding that autistic individuals may rate their own emotional states differently from ratings given by third-party observers (Johnson et al., 2009). Future research should assess autistic emotional responding to moral stimuli using objective measures of emotional arousal such as heart and respiratory rates, galvanic skin conductance, and facial expressions in larger groups of individuals.

In summary, we used qualitative methods to offer a preliminary view of the representation of moral foundations theory in autistic moral reasoning. Our findings suggest that the five moral foundations proposed by Haidt (2012) are considered morally relevant by the autistic adults we interviewed. The care/harm and fairness/reciprocity foundations were most salient among this sample, evidenced by the relatively high rates of unprompted examples reflecting these foundations and by the fact that transgressions in other foundations were sometimes considered morally wrong only if they caused harm or were unfair. Future studies should use quantitative methods to study the relative salience of the five foundations among autistic and neurotypical individuals to investigate

more deeply the differences and similarities between the groups. Understanding such differences could contribute alternative perspectives on moral thinking that could be of value to society, for instance, consideration of the moral salience of caring for the climate and the emotional wellbeing of animals. Such studies could also apply objective measures of emotional arousal to assess the degree to which pathways to moral judgement might differ between autistic and neurotypical individuals. Understanding autistic moral thinking from the strengths-based perspective afforded by the pluralism of moral foundations theory could afford researchers and the broader population with a deeper understanding of the social cognitive profile of autistic thinking.

Table 4.1

Demographics information for autistic adults

Participant	Age	Gender	Social Issues	Economic Issues	Ethnicity	Level of Education	Employment Status	Work	Household Income
P1	23	Non-binary	Slightly Liberal	Slightly Liberal	White	Bachelor's Degree	Student	Library Circulation Assistant	Preferred not to answer
P2	38	Non-binary	Very Liberal	Slightly Liberal	White	Trade School	Part time and social assistance	Clerical	< $20,000
P3	37	Man	Liberal	Liberal	White	Master's Degree	Full time	Public service	Preferred not to answer
P4	50	Non-binary	Liberal	Conservative	White/ Indigenous	High School	Part time	Magazine Editor	$60,000 - $99,000
P5	22	Woman	Very Liberal	Slightly Liberal	White	Bachelor's Degree	Student	Student	< $20,000
P6	41	Man	Very Liberal	Very Liberal	White	Master's Degree	Self-employed Full time	Translator	$100,000 - $139,000

Table 4.2

Frequency of references to each foundation in the prompted versus unprompted portions of interviews with autistic adults

	Foundation									
	Care/Harm		Fairness/Reciprocity		In-group/Loyalty		Authority/Respect		Purity/Sanctity	
Parti-cipant	Un-prompted	Prompted	Un-prompted	Prompted	Un-prompted	Prompted	Un-prompted	Prompted	Un-prompted	Prompted
P1	18	22	23	4	1	6	3	12	1	6
P2	23	17	7	9	1	5	3	14	1	12
P3	14	0	12	2	1	8	9	6	1	0
P4	22	6	36	4	12	1	1	14	5	7
P5	17	9	21	6	1	11	0	16	0	1
P6	11	0	14	5	0	4	0	2	0	1
Total	105	54	113	30	16	35	16	64	8	27

Table 4.3

Care/harm theme and subtheme examples from interviews with autistic adults

Theme / *Subtheme*	Participant	Example
Care / Harm towards the Environment	P2	"I feel strongly about the environment"
	P4	"I care about the earth over everything else" (prompted)
	P5	"Saving the environment [is morally right]"
Physical Care / Harm towards Humans	P6	"Society definitely has the capacity to provide everyone with their basic needs but we're not doing that. So, there's not really a good argument for not doing that in my mind."
	P2	Viz. politics, it is important to "do right by the little guy;" and, "say no to big money once in a while."
Emotional Care / Harm towards Humans	P3	It is morally wrong to separate migrant families in part "because it would make them feel bad."
	P6	"Language extermination" is morally incorrect because of the value of language to peoples' sense of culture and identity.
Emotional Care / Harm towards the Disabled	P1	"People can be very judgmental … we need to get past our own bias, and we need to stop comparing other people to a sort of standard that we have."
	P2	Some people "think autistics are freaks."
	P4	Sometimes disabled people are commoditized to bolster others' fame or prestige through "inspiration porn": "the person's in a wheelchair, they're marrying someone who's not in a wheelchair. The family organizes that the person stands up to have the dance with the wife."
Emotional Care / Harm towards Animals	P1	A veterinarian's home visit to euthanize a family pet was morally correct because it would have been "traumatic to take [the pet] out of her home."
Physical Care / Harm towards Animals	P2	Notepads can be made out of elephant excrement which "is a big step because … if this takes off then the elephant is worth more to them alive than dead. In which case … it's not harming [elephants via poaching]"

Note. Italics signify sub-subtheme.

Table 4.4

Fairness/reciprocity theme and subtheme examples from interviews with autistic adults

Theme / *Subtheme*	Participant	Example
Fairness/ Reciprocity	P3	"As far as the ruling party is concerned, law is what keeps people in line. And the law actually doesn't affect [the ruling party] at all."
	P5	It would be wrong to steal a lost item because "[the owner has] done nothing to me."
Inequality	P6	Human equality is important regardless of "gender, sexual orientation, ethnicities, [or] nationality."
Inequality based on Disability	P1	It is unfair that "verbal communication is valued in our society, and it's considered the standard norm. People who deviate any way from what we consider normal are seen as inferior."
	P4	"The notion that being disabled means that you cannot contribute into society, I find that not a very moral statement."
Honesty	P3	"One of things I hate most is insincerity. Like when people pretend they're doing something for one reason … but really that's not the reason at all. It's just because it was an unfavourable result for them."
Aggregation of Resources or Power	P6	"A very small group of people [make] these decisions that are going to make things really awful for people in the future. And to my mind they don't have any right to choose those consequences for other people."
Cheating/ Freeriding	P1	"When people study for a test and they don't cheat, that's fair."
Denial of Rights	P4	"I don't think anyone should deprive anyone else of their basic rights to have their needs met and pursue their own happiness."

Note. Italics signify sub-subtheme.

Table 4.5

In-group/loyalty subtheme example from interviews with autistic adults

Theme	Participant	Example
Political Loyalty	P2	Viz. German media coverage of the Hindenburg disaster: "the Nazi forces of the day then tried to churn up the people, saying that it was an allied plot against the … fatherland. When it was an accident as far as they could tell … They stirred up their own people."

Table 4.6

Authority/respect theme and subtheme examples from interviews with autistic adults

Theme / *Subtheme*	Participant	Example
Authority/Respect	P4	"I really value respect above love. I can't have love without respect. So, I find that to be a morally right thing."
Laws, Rules, and Convention	P3	"Following proper procedures just in general" is morally right.
Authority Figures have Special Responsibilities	P3	"[the United States (US) president] represents the US on the international stage [and] there are certain duties that come along with that … there are certain actions then that wouldn't be morally wrong on a personal level that are [morally wrong in that role]."
Authority *not* Morally Salient	P5	"My whole family has had issues with authority figures."
	P6	Sometimes defying authority is the moral thing to do: "[being a Nazi defector] would be a moral thing to do if you found yourself in that situation."
Rejection of Traditional Gender Roles	P2	"Which society actually created male domination or masculinity anyway? … Which society actually decided that men can have all this power?"
Respect Must be Earned	P5	"I don't hold respect for people just because they're an authority figure. They have to show me respect too."

Note. Italics signify sub-subtheme.

Table 4.7

Purity/sanctity theme examples from interviews with autistic adults

Participant	Example
P2	When discussing how people overemphasize the importance of sexual activity, P2 said, "you don't have to have that primal … on your mind all the time … in essence it degrades you too because there are a million more intelligent things you can be thinking about."
P1	Unprompted, P1 condemned the fact that "people with severe or complex needs and disabilities, they're not seen as human sometimes."
P2	When describing vitriol espoused against the Rohingya people, P2 stated unprompted, "has he ever stopped to think that maybe they're human beings?"

Table 4.8

Examples of moral emotions from interviews with autistic adults

Theme	Participant	Example
Anger	P6	"[Politicians are] putting their time and energy into preventing people from getting access to healthcare … rather than … dozens of things they could be putting their time and energy into. Yeah, that's very frustrating to me."
Disgust	P1	"If I'm walking down a street and somebody spits within my path or just off from my path, I just think, 'Ew. Like really?'"
Guilt	P5	"I just get like a guilt … a little bit of embarrassment too [when reflecting on a moral transgression]."
Elevation	P3	"Joy that someone's actually benefitting from [donations to charity]."
Reasons as Emotion	P4	When asked how they felt about an illegal moral transgression: "I feel like that if I know that that's happening again, I'll call the police on them."

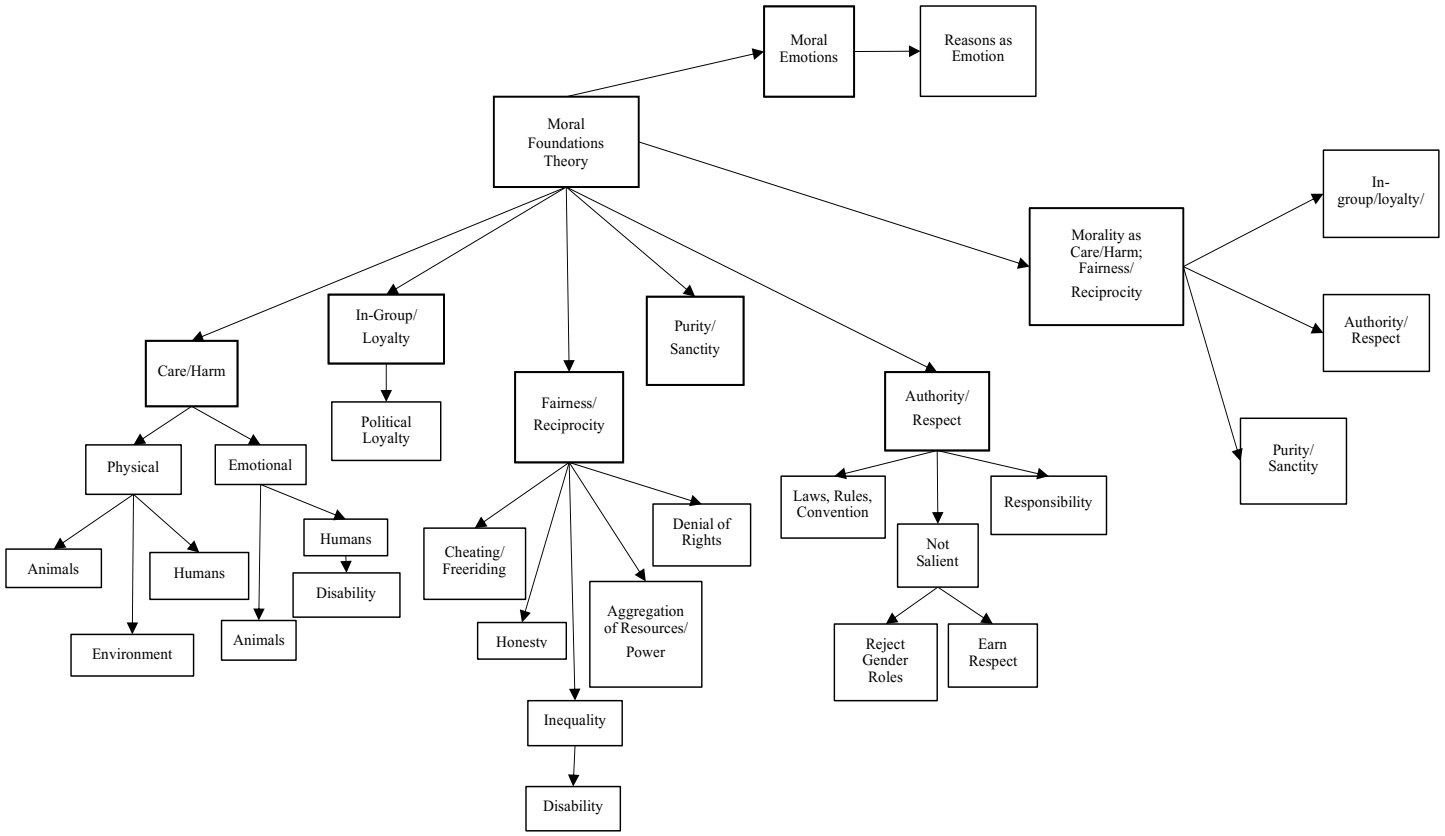
Table 4.9

Examples of morality resolving to concerns regarding care/harm or fairness/reciprocity from interviews with autistic adults

Theme	Participant	Example
Authority/respect	P6	"That employee … steals from the employer, sabotages something … They're not being fair to the employer then."
	P4	"Those laws are in place to protect the animals."
In-group/loyalty	P6	"There were also Nazi defectors. They were being disloyal. But they were being moral, I would say."
Purity/sanctity	P6	"There's been lots of instances recently of people being put in cages … You know, that's a violation of their basic human dignity. But to me that falls under fairness."
	P3	"I don't think I'd consider it morally wrong [to urinate in a public swimming pool] in and of itself," but by "just making people uncomfortable."

Figure 4.1

Coding tree for qualitative analysis of moral thinking among autistic adults



CHAPTER 5. HOW RESULTS FROM STUDY 2 AND COMMUNITY-BASED PARTICIPATORY RESEARCH INFLUENCED THE DESIGN OF THE THIRD STUDY

This chapter summarizes the perceived value of the current research agenda as reported by the autistic adults who participated in Study 2. It also describes suggestions made by these individuals regarding how to adapt the Moral Foundations Questionnaire for Kids (Curtis et al., 2019) for use with autistic youth. I also describe suggestions made by two research participants who volunteered to act as community research partners in the design and interpretation of the third study. Finally, in this chapter I review how results from Study 2 informed the research questions and design of Study 3.

The participants in Study 2 suggested that this research program offers a way of studying autism that emphasizes first-person perspectives of social cognition that steer away from a medical model of disability. Participants indicated that autistic people may think about morality differently than neurotypical people, e.g., they may use more black-and-white thinking or develop morality through different pathways. The autistic perspective on morality was viewed as important. By understanding autistic moral thinking in terms of differences rather than deficits, it was suggested that this research could offer important information about alternative approaches to morality that could benefit society. This strengths-based research was also suggested to have the potential to alter negative stereotypes regarding autistic individuals to improve neurotypical individuals' understanding of autism, thereby facilitating interpersonal relationships.

The six autistic adults who completed Study 2 were asked to provide feedback regarding the Moral Foundations Questionnaire for Kids (Curtis et al., 2019; see Appendix A) so that it could be modified for future research use with autistic children.

Results from piloting this measure suggest that children as young as 5 years old were able to comprehend and complete the measure, that items in different foundations tended to engender different emotional responses, and that sensitivity to the different foundations develops as children age (Hartlin et al., 2018). General feedback on the content of the Moral Foundations Questionnaire for Kids for use with autistic youth focused on rendering vignettes less ambiguous. However, because moral foundations theory is an intuitionist account of moral judgement, it is desirable that participants are forced to respond based on intuition as much as possible, without providing details that would direct them to reason through a moral dilemma in a particular way. Further, research colleagues in the Early Social Development Lab indicated that many neurotypical children and adults made similar requests for elaboration, suggesting that the desire for less ambiguity would not constitute an autism-specific barrier to responding to the vignettes. It was also suggested that more emotions be added to the response options. However, the extant emotion options represent the other-regarding moral emotions identified by Haidt (2003). As such, though the list of emotions is by no means exhaustive, it is representative of the emotions theoretically linked with the vignettes. As such, we retained the existing emotion response options.

Autism-specific changes to the Moral Foundations Questionnaire for Kids based on participant feedback focused on rendering details of the vignettes more concrete, as challenges with imagination may be present among autistic children (Minshew et al., 2002). In the vignette depicting an actor telling secrets about her sister to people her sister does not like, I altered the image by adding similar hairstyles to the sisters to illustrate kinship more concretely. In the vignette that shows an actor telling a password to children

not in her club, it was recommended that I indicate that the password belonged to the club. Next, rather than, "you see a girl *using a* dirty diaper as a pillow," I altered the vignette to read: "you see a girl *sleeping with* a dirty diaper as a pillow," to make the action more concrete. Finally, in the vignette showing an actor reading a sibling's diary, I added the word "secret" to emphasize the nature and severity of the transgression. Given the potential for lower verbal reasoning and/or auditory comprehension skills among autistic children compared to age-matched peers (Coolican et al., 2008), we printed the narrated vignettes onto each screenshot to supplement the oral information.

A further recommendation regarding study methodology came from my autistic community partners, who warned that psychophysiological equipment that requires attaching electrodes to research participants might disturb some autistic individuals with sensory sensitivities. After discussing this challenge further with thesis committee members, I decided to use only remote measures of physiological responses to vignettes to avoid confounding results based on potential sensory sensitivities among autistic children. Note that results of the physiological measures are not included in this dissertation.

In terms of research findings from the manuscript presented in Chapter 4, that qualitative study was the first to investigate moral foundations theory among autistic individuals. The aim was to study whether the theory's five foundations were considered morally salient among autistic adults and the degree to which moral emotions were cited as motivation for judgements. I found that each of the five moral foundations was endorsed as morally relevant by participants, though some were endorsed as more relevant than others. However, emotions were seldom adduced as justifications for moral

judgements. These findings could be explained by the high levels of alexithymia among autistic individuals (Hill et al., 2004). Alternatively, verbal reasoning could compensate for less automatic empathic responding, which has been reported for autistic individuals (Senju et al., 2009). This study set the stage for future research to compare salience of moral foundations between autistic and neurotypical participants, and to investigate the potential that alexithymia or autism symptoms may affect moral foundations judgements in autism. It also led to a qualitative inquiry into moral reasoning among younger autistic children to continue representing first-person accounts of moral thinking in autism. The research motivated by this study is presented in the following manuscript in Chapter 6.

CHAPTER 6. MANUSCRIPT 3: MORAL FOUNDATIONS THEORY AMONG AUTISTIC AND NEUROTYPICAL CHILDREN

Erin Dempsey, with direction from her co-supervisors Drs. Chris Moore and Isabel Smith, along with her co-authors and dissertation committee members Drs. Shannon Johnson and Sherry Stewart, was responsible for the preparation and execution of this study. Two autistic research collaborators assisted Ms. Dempsey with the design of the study and interpretation of the resulting data. Ms. Dempsey wrote the manuscript constituting this chapter and revised it with suggestions from her dissertation committee members.

Abstract

Morality can help guide behaviour and facilitate relationships. Although moral judgements by autistic people are similar to neurotypical individuals, many researchers argue that subtle differences signify deficits in autistic individuals. Haidt's moral foundation theory (2001) describes moral judgements in terms of differences rather than deficits. The current research, aimed at assessing autistic individuals' moral inclinations using Haidt's framework, was co-designed with autistic community members. Our aim was to describe autistic moral thinking from a strengths-based perspective while acknowledging differences that may pose interpersonal challenges among autistic youth. We assessed 25 autistic and 23 neurotypical children's moral judgements using the Moral Foundations Questionnaire for Kids. We used semi-structured interviews and qualitative analysis with a subset of participants to describe children's moral reasoning. Analyses suggested that autistic and neurotypical children make similar judgements about moral transgressions across all five moral foundations. General linear mixed modeling showed that the greatest predictor of recommending punishment was how bad children deemed moral transgressions to be. We also found a trend that autistic children were more likely to recommend punishment for harmless norms violations than were neurotypical children. Future research could use longitudinal methods to understand the development of moral judgements among autistic and neurotypical children.

Introduction

Autism spectrum disorder (hereafter autism) is a neurodevelopmental disorder characterized by differences in social-communication skills and the presence of repetitive or inflexible patterns of behaviour or interests (American Psychiatric Association, APA, 2013). Commonsense psychology is the general human tendency to make sense of other people's actions by attributing psychological states to them (Moore, 2006). One aspect of commonsense psychology is theory of mind, or the representation of internal psychological states, such as beliefs and desires (Wimmer & Perner, 1983). Differences in commonsense psychology, including theory of mind, are commonly associated with autism (see Baron-Cohen, 2000, for review). Moral psychology is a form of social cognition that involves reflecting on norms for how to treat other people and non-human animals and coexist with them in society[5]. Moral psychology is often assumed to require typical commonsense psychology skills for its development. Thus, moral psychology has been theorized by some to be underdeveloped among autistic individuals (e.g., Shoemaker, 2015).

Autistic individuals often have difficulties interacting with others and with forming and maintaining friendships (Howlin et al., 2013). These difficulties are bidirectional (Milton, 2012) and relational (Morrison et al., 2020). To illustrate, just as autistic individuals may struggle to understand social nuances, neurotypical individuals may misinterpret the intentions of autistic individuals (Sheppard et al., 2016). In addition to communication challenges present in interactions between autistic and neurotypical individuals, difficult interpersonal situations faced by autistic individuals could arise in

[5] Note, however, that some behaviour that is driven by moral convictions may lead to social conflict (e.g., Hauser, 2012, Mcloughlin, 2018).

part from differences in moral development and subsequent moral reasoning. Hamlin et al. (2011) found that 8-month-old infants preferred agents who behaved positively toward prosocial individuals and negatively toward antisocial individuals to agents who displayed the opposite pattern of relating. Li et al. (2014) found that autistic children aged 6 to 12 years did not modulate cooperative behaviour in response to immoral acts of their partners whereas neurotypical children cooperated less with perceived moral wrongdoers. Autistic children's failure to modulate behaviour in response to others' moral transgressions may lead neurotypical peers to like autistic children less, making it more difficult for the latter group to develop and maintain friendships or possibly contributing to disproportionate rates of bullying victimization among autistic youth (Maïano et al., 2016).

Morality and Commonsense Psychology in Autism

Rationalist accounts of moral development (e.g., Kohlberg, 1969/1971; Piaget, 1932) suggest that commonsense psychology skills, such as perspective-taking, are required for typical moral development. Piaget (1932) found that young neurotypical children use reasoning based on rules, whereas older children and adults rely more on others' intentionality when reasoning about morality. The ability to consider intentions when judging moral culpability has been a key focus in research that has examined morality in autism, wherein subtle differences have often been construed as deficits (see Garcia-Molina & Clemente-Estevan, 2019, for review). However, such research has not shown robust connections between commonsense psychology and moral judgements among autistic individuals (see Dempsey et al., 2019, for review). As such, autistic individuals appear to use heuristics for making moral judgements that rely less heavily on

commonsense psychology than seen in neurotypical individuals, presenting a challenge to the developmental pathway to moral maturity posited by rationalist accounts.

In contrast to rationalist theories of morality, Haidt (2001) proposes an "intuitionist" model of moral reasoning wherein humans have evolved the capacity to develop moral intuitions in at least five domains or foundations (i.e., authority/respect, care/harm, fairness/reciprocity, in-group/loyalty, and purity/sanctity; Haidt & Joseph, 2008). The authority/respect foundation concerns virtues of obedience and deference; care/harm is related to kindness and care; fairness/reciprocity is linked to justice and trustworthiness, in-group/loyalty is defined by loyalty, patriotism, and self-sacrifice; and purity/sanctity concerns virtues of temperance, piety, and cleanliness (Haidt & Joseph, 2008).

Crucially, Haidt's theory does not rely on commonsense psychology for the development of moral judgement. This theory could help make sense of moral psychology among autistic individuals. For instance, autistic adults have described their diagnosis as resulting in greater loyalty, honesty, and empathy for other autistic adults and non-human animals than for their neurotypical peers, which could affect their moral foundations profile (Russell et al., 2019). Zalla et al. (2011) found that autistic participants judged disgusting acts as equally morally wrong compared with harmful acts, in contrast with neurotypical participants who judged disgusting acts as less morally wrong than harmful ones. This difference could suggest greater prioritization of the purity/sanctity foundation among autistic compared with neurotypical participants. Additionally, some studies have shown that autistic youth, compared with neurotypical youth, place a greater emphasis on authority and rules than on abstract principles such as

justice (Garon et al., 2018; Senland & Higgins-D'Alessandro, 2016; Takeda et al., 2007). This difference could signify greater emphasis on the authority/respect moral foundation among autistic compared with neurotypical individuals.

Moral Reasoning in Autism

Moral reasoning, i.e., justification for one's moral judgements, is different among autistic compared with neurotypical children despite similar moral judgements. When asked to justify moral judgements, autistic youth have been found to reiterate moral vignettes (Grant et al., 2005) or provide concrete, less elaborate justifications more often than their neurotypical peers (Garcia-Molina et al., 2019; Shulman et al., 2012). Autistic children's justifications tend to be more rule-bound and focused on consequences rather than intentions, compared with those provided by neurotypical children (Fadda et al., 2016; Garcia-Molina et al., 2019; Garon et al., 2018; Takeda et al., 2007).

Differences in moral reasoning between autistic and neurotypical individuals despite relatively similar moral judgements could be explained in part by studies that suggest that moral and other forms of reasoning are post hoc rationalizations of intuitive judgements (Haidt, 2001; Mercier & Sperber, 2011). Rule- and consequence-oriented moral reasoning in autistic children may therefore indicate post hoc rationalizations for moral judgements that may be explained by the relatively concrete thought processes often observed in autism (Hobson, 2012), as opposed to underdeveloped moral intuitions.

Punishment for Moral Transgressions in Autism

Some differences have been found in assigning blame and punishment to moral transgressors by autistic compared with neurotypical children. To illustrate, Li et al. (2018) found that autistic children aged 6 to 12 years were more likely to recommend a

child be punished for hitting another child than were neurotypical children. Some researchers have found that blame was less tempered by intent among autistic compared with neurotypical children. For example, Salvano-Pardieu et al. (2016) found that autistic adolescents did not differ in their judgements of the level of seriousness of stabbing compared with punching, whereas neurotypical adolescents deemed stabbing as worse than punching. In contrast, Akechi et al. (2018) found that assigning blame did not differ between autistic and neurotypical youth. Rogé and Mullet (2011) found that use of intent in tempering blame judgements increased with age for autistic and neurotypical participants; it could be that Akechi et al. (2018) did not find group differences due to their large age span (7 to 24 years).

Current Study

To the authors' knowledge, moral foundations theory has only been investigated in one study of autistic individuals—a qualitative investigation of moral foundations theory among autistic adults (Dempsey et al., 2020). The aim of the current study was to investigate moral decision making and reasoning among autistic youth from the perspective of moral foundations theory. Our first hypothesis was that authority/respect and purity/sanctity moral foundations would be endorsed more strongly by autistic than by neurotypical children. Our second hypothesis was that autistic children would be more likely to indicate that children depicted in morality vignettes should be punished, particularly for social norms violations, compared with neurotypical children. We conducted this analysis while controlling for alexithymia traits, i.e., difficulty identifying and describing emotional states (Griffin et al., 2016), as these have been shown to influence moral decision making in autism (Patil et al. 2016). Our third hypothesis was

that moral reasoning by autistic children would more often rely on rules and outcomes than among neurotypical children, as assessed in a subset of our participants using qualitative analysis.

Methods

Participants

Ethical approval for this study was granted by the research ethics board of the IWK Health Centre. Parents and children consented and assented to study participation, respectively. Autistic children aged 8 to 12 years (n = 26) were recruited through the IWK Health Centre and community sources. We selected children in this age range because we anticipated they would be cognitively able to complete our moral judgement task while yet pre-adolescent. Autistic children were diagnosed according to DSM-5 diagnostic criteria by specialist teams, most based at a tertiary children's hospital (81%), following guidelines that recommend the use of the Autism Diagnostic Observation Schedule (Lord et al., 2015) and the Autism Diagnostic Interview—Revised (Lord et al., 1994). Age-comparable neurotypical participants (n = 24) were recruited through community sources. One autistic child was not included in the analysis due to low intellectual abilities. One child from the control group was omitted from analysis due to having a diagnosed learning disability. The final numbers for analysis were n = 25 autistic and n = 23 neurotypical children. A subsample of autistic and neurotypical children (n = 6 each) were invited to participate in semi-structured interviews regarding their responses to the morality vignettes.

Most children in each group were male (80% of autistic children; 78% of neurotypical children). The remaining participants were female (autistic: 16%;

neurotypical: 22%) or transgender (autistic: 4%). The groups were similar in age (autistic M_{age} = 9 years 1 month; SD_{age} = 11.5 months; neurotypical M_{age} = 9 years 4 months; SD_{age} = 14.6 months), $t(6.58) = 1.76$, $p = 0.46$. This was true for the qualitative sample as well: autistic M_{age} = 9 years 9 months; SD_{age} = 17 months; neurotypical M_{age} = 8 years 8 months; SD_{age} = 6.8 months), $t(41.74) = 0.74$, $p = 0.12$. Children in both groups were predominantly white (72% of autistic children; 83% of neurotypical children). In the autistic group, 4% of children were Hispanic, 8% African Canadian, 8% were African Canadian/Aboriginal Canadian, and 8% were Aboriginal Canadian. In the neurotypical group, 9% of children were South Asian Canadian, 4% were Asian Canadian, and 4% were Aboriginal Canadian. In terms of parent-reported comorbidities, 32% of autistic participants had comorbid Attention Deficit/Hyperactivity Disorder (ADHD); 28% had a Learning Disability; 20% had an Anxiety Disorder, 4% had Tourette syndrome, and 4% had been diagnosed with Global Developmental Delay (presumably in the preschool years; current intellectual ability assessed by the Wechsler Abbreviated Scale of Intelligence - Second Edition, WASI-II, Wechsler, 2011, was in the average range). No psychiatric or neurodevelopmental diagnoses were reported among the final neurotypical group. Twenty-eight percent of autistic children had pharmaceutical prescriptions; 86% of this subset of children were prescribed psychiatric medications (e.g., stimulants to treat comorbid ADHD), in contrast to no children in the neurotypical group. There were no significant differences between groups in parent-reported economic or social political orientations, in household income, marriage status, employment status, or in parental education (see Table 6.1).

Materials

Questionnaire Software. The Moral Foundations Questionnaire for Kids (Curtis et al., 2019) was administered using Cedrus® Superlab software (Cedrus Corporation, 2016). All other questionnaires were administered using LimeSurvey© software (Schmitz, 2012).

Computers. A MacBook Pro (Retina, 15-inch, Mid 2015) computer was used for all child-completed measures. Parents completed questionnaires on a MacBook Air (13-inch Mid 2013) computer.

Measures

The internal consistency of questionnaires among our sample was assessed using Cronbach's alphas. We adopted acceptability cut-off scores of $\alpha = .6$ for scales with 10 or fewer items and $\alpha = .7$ for lengthier scales (Loewenthal, 1996). These and all statistics were calculated using R (R Core Team, 2020) and R Studio (RStudio Team, 2020).

Moral Foundations Questionnaire for Kids (Curtis et al., 2019, see also Peverill, 2020). On this measure of moral foundations theory, children hear 4 representative vignettes of each of Haidt's five moral foundations (2001) through a computer speaker while the text and illustrations are presented on a computer screen. Four vignettes are control items depicting harmless violations of social norms that are typically not considered moral as such (e.g., wearing pajamas to school), for a total of 24 vignettes. Actors in each vignette match the gender of the child completing the measure. After each vignette, children are asked to indicate whether the act was bad. If they answer "yes", they are asked to rate how bad the act was (i.e., "how bad is it?") on a 5-point graphical scale of increasingly large and dark red circles. The measure includes a training block to introduce children to the response options and to ensure that they understand the

scale. If children indicated the vignette was not bad, their "how bad is it" response was scored as 0. Summary scores for each moral foundation were calculated for each participant as a metric of how bad children considered each transgression to be across each foundation. Next, if children indicated a vignette was bad, they were asked whether the child in the vignette should be punished ("yes" / "no") for a score of 1 or 0, respectively. If children indicated the action was not bad, their data for this latter response were treated as missing. See Table 6.2 for a sample vignette from each moral foundation and the control condition. For the full measure, see Peverill (2020). The Moral Foundations Questionnaire for Kids was piloted among children aged 5 to 12 years with no known developmental disabilities by researchers in the Early Social Development Lab at Dalhousie University (Hartlin et al., 2018). It was adapted for use with autistic children as part of this research program based on feedback from autistic adults. Cronbach's α for the "how bad is it" scale = .90 in the present sample[6].

Moral Reasoning. A subsample of autistic and neurotypical participants (n = 6 each) was asked to describe their moral reasoning in the vignettes using a semi-structured interview (see Appendix F). Children who were determined by the first author, an advanced clinical psychology doctoral student with expertise in autism, to have sufficient verbal ability were selected to participate in the interview[7].

The Wechsler Abbreviated Scale of Intelligence - Second Edition (Wechsler, 2011). The WASI-II is a standardized test of cognitive abilities. The internal consistency

[6] Note that, due to the high proportion of missing data for the punishment question (19%), we were unable to calculate alpha for this scale. The option of scoring punishment as 0 for vignettes which children deemed "not bad" was considered. However, given that doing so would zero-inflate the data, thereby overestimating the alpha and potentially confounding results, we opted not to take this option.
[7] Note that all participants (and their parents) who were invited to participate in the interview agreed and consented to participation.

of the measure is strong and demonstrates good convergent and discriminant validity (Wechsler, 2011). The first version of this abbreviated test has demonstrated good predictive validity of full Wechsler Intelligence Quotient (IQ) scores among autistic youth (Minshew et al., 2005).

Autism Spectrum Quotient: Child Version (Auyeung et al., 2008). The child version of the Autism Spectrum Quotient is a 50-question parent-report measure of autistic traits among children. Each item is scored on a scale from 0 to 3, with greater scores representing higher autistic traits. This measure differentiates groups of autistic from neurotypical children based on autism symptom severity (Auyeung et al., 2008). Internal consistency of the measure is high: $\alpha = 0.97$ (Auyeung et al., 2008). An example of an item is: "Enjoys meeting new people" (reverse scored). Internal consistency of the total score on this measure in our sample was $\alpha = .79$.

Children's Alexithymia Measure (Way et al., 2010). The Children's Alexithymia Measure is a 14-item parent-report instrument designed to assess emergent alexithymic traits among youth. Parents endorse traits observed in their children on a scale from 0 to 3, with higher scores indicating greater alexithymic tendencies. The measure was developed with parents of 220 youth, aged 5 to 17 years, who had experienced trauma. The measure's internal consistency is strong ($\alpha = .92$). An example of an item is: "Has difficulty naming his/her positive feelings (such as joy, happiness, excitement)." Several studies have used this measure with parents of autistic youth (e.g., Griffin et al., 2016; Trevisan et al., 2016). Internal consistency of this measure in our sample was $\alpha = .93$.

The Social Desirability Scale-17 (adapted; Stöber, 2001). The Social Desirability Scale-17 is a set of true-false questions designed to assess the degree to which adult participants present themselves in a socially approved manner. It shows convergent validity (r = .60) with the Lie Scale of the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1991; Stöber, 2001), and has high internal consistency (Cronbach's α = .80; Stöber, 2001). This measure has been used in morality research with autistic young adults (Garon et al., 2018). We adapted the measure for autistic and neurotypical children by simplifying language and reducing the number of items to 10. An example of an adapted item is: "I always admit when I make mistakes" (original version: "I always admit my mistakes openly and face the potential negative consequences"). Internal consistency of this measure in our sample was α = .60.

Demographics Questionnaire. Participants' parents were asked to provide demographic information regarding their children's age, sex, gender, race/ethnicity, comorbidities, and medications. Parents were also asked to provide information about their own education, occupation, and family income. Information on parents' political orientations toward social and economic issues were also collected because political thinking has been linked with differing salience of moral foundations in adults (Koleva et al., 2012).

Procedures

Children were assessed in a research laboratory (autistic n = 12; neurotypical n = 11) or in families' homes (autistic n = 12; neurotypical n = 12). One autistic child was assessed in a quiet room in a public library because the family was not able to travel to the laboratory and did not have a quiet place at home from which to participate in the

research. Children completed the Moral Foundations Questionnaire for Kids while being video recorded for purposes not reported here. The WASI-II was administered next, followed by the Social Desirability Scale. Children either read these questions to themselves or had the questions read to them, depending on each child's stated preference. Parents completed the Autism Spectrum Quotient: Child Version, the Children's Alexithymia Measure, and the Demographics Questionnaire while their children participated. Six children from each group were then interviewed regarding the reasons behind their responses to the Moral Foundations Questionnaire for Kids. The first author conducted all assessments with the help of two trained research assistants.

Community Involvement

This study was designed and executed with the direct assistance of autistic adults in a community-based participatory research framework (Jull et al., 2017). Six participants from a previous research project were invited to offer feedback on the Moral Foundations Questionnaire for Kids (Curtis, et al., 2019) to make this measure more suitable for autistic youth. Two autistic adults were consulted as community team members during the design and recruitment phases of this study; these two adults were again consulted after data analysis to assist with interpretation.

Results

Preliminary Analyses

Descriptive Statistics. Averaged results and *t*-tests comparing groups on the Social Desirability Scale, the Children's Alexithymia Measure, the Autism Spectrum Quotient: Child Version, and the WASI-II intelligence scales are reported in Table 6.3 for the entire sample as well as for the subset of children included in the qualitative analysis.

Note that for these and all family-wise comparisons in the analyses that follow we employed Benjamini and Hochberg corrections (Benjamini & Hochberg, 1995) to correct for multiple testing. This method rank orders *p* values from the analyses, then assigns a new cut-off point based on the formula: (*i*/*m*) * α with *i* corresponding to the *p*-value's rank, *m* corresponding to the number of comparisons, and α corresponding to the predetermined alpha rate, in this case 5% based on convention. Among the full sample, Autistic children had on average higher alexithymia scores, higher autistic traits, and lower Full-Scale IQ and Verbal Comprehension scores than neurotypical children. The two groups did not differ in social desirability or in Perceptual Reasoning scores. Autistic children in the qualitative analysis subsample showed a trend of higher autism traits, but did not differ significantly on any independent variables after correcting for multiple comparisons.

Primary Analyses

Hypothesis One. See Table 6.4 for descriptive statistics for judgements of transgressions in each group for each of the foundations in the Moral Foundations Questionnaire. To test the first hypothesis that authority/respect and purity/sanctity moral foundations would be endorsed more strongly by autistic than by neurotypical children, we calculated two Wilcoxon signed-rank tests and their effect sizes due to skewness. Contrary to hypothesis one, we found no significant difference between how bad authority/respect transgressions were judged by autistic (M = 15.92; SD = 4.16) and neurotypical (M = 15.43; SD = 3.16) children, r from Wilcoxon signed-rank test = .12, p = 0.42. Similarly, contrary to our hypothesis, the assessment of purity/sanctity

transgressions did not differ between the autistic (M = 13.52; SD = 5.94) and neurotypical (M = 12.91; SD = 6.04) groups, r from Wilcoxon signed-rank test = .07, p = 0.60[8].

Hypothesis Two. See Table 6.4 for the proportion of vignettes across foundations for which children in each group endorsed punishment. Our second hypothesis was evaluated using a general linear mixed model. The dependent variable was the dichotomous endorsement of whether punishment was required. Level one of each model was the repeated measures within-subjects factor. Level two predictors were between-subjects autism diagnosis, children's "how bad is it" ratings, and the interaction between these two terms, while controlling for alexithymia and Full-Scale IQ. The only effect that remained significant after performing Benjamini and Hochberg corrections was the main effect of "how bad is it" responses: OR = 2.58; 95% CI = [2.00, 3.32], $p < 0.001$, suggesting that, across groups, more severe judgements of the vignettes were associated with greater probability of endorsing punishment for transgressions. We describe other effects that would have been significant without corrections in terms of trends. There was a trending effect of diagnostic group: OR = 0.17; 95% CI = [0.03, 0.83], p = 0.029. Given that this odds ratio is less than 1, we have taken its reciprocal for ease of interpretation: 1/0.17 = 5.88. An a priori comparison suggested that, consistent with the hypothesis, the trending effect of group was driven by significantly more endorsement of punishment in the control condition by autistic than neurotypical children, r from Wilcoxon signed-rank test = 0.48, $p < 0.001$. There were no between-group differences in allocation of

[8] Note that we were unable to control for the potential effect of Full Scale IQ on these analyses because of the use of Wilcoxon signed-rank tests. As a sensitivity check, we subsequently completed two analyses of covariance (ANCOVAs) with Full Scale IQ as a covariate. Consistent with the Wilcoxon signed-rank test results, the ANCOVAs yielded non-significant results: effect of diagnosis on assessment of authority/respect $F(1, 45) = 0.03$, $p = 0.87$; and purity/sanctity transgressions: $F(1, 45) = 0.008$, $p = 0.93$.

punishment across the five foundations. The intercept for the general linear mixed model was: $OR = 0.01$, 95% CI = [0.00 – 0.95], $p = 0.047$ suggesting a trend that, in the overall sample, the probability of endorsing punishment was greater than by chance. The interaction term between diagnostic group and "how bad is it" responses was not significant. Neither IQ nor alexithymia were significant predictors of endorsements of punishment. Marginal R^2 and Conditional R^2 were 0.31 and 0.55, respectively.

Hypothesis Three. Qualitative data relating to the third hypothesis were analyzed using thematic analysis (Braun & Clarke, 2006). Given similarity of the data and research question, we used the same coding procedure as in Dempsey et al. (2020). The first author initially coded the data; an experienced Master's-trained research staff member familiar with the underlying theory performed analytic auditing on the coded data, ensuring that data fit into the identified themes without redundancy (Elliott & Timulak, 2005). Themes were divided by whether children judged actions depicted in the vignettes as bad versus okay. To remain consistent with qualitative methodology, comparisons of the frequency of coded extracts in support of themes for the two groups were not evaluated statistically.

Bad. All five foundations of moral foundations theory were represented among autistic and neurotypical children's justifications for their judgements of actions as morally bad (see Figure 6.1 for coding tree and Table 6.5 for quotes supporting themes). Some rationales were unclear (subthemes: Just Bad, Post Hoc Rationalization, Reiteration, Uncertain).

"Bad" themes were quite equally represented between the two groups including those relating to rules and outcomes (contrary to hypothesis three). One exception was

Moral Emotions: autistic children reported feeling sad more often than did neurotypical children. Further, autistic children indicated uncertainty regarding emotions more often than did neurotypical children.

Okay. See Figure 6.2 for coding tree and Table 6.6 for quotes in support of themes. The Not Harmful subtheme was more represented among autistic than among neurotypical participants. Contrary to our third hypothesis, Consequences were alluded to more often among neurotypical than among autistic children. As with the bad vignettes, an Unclear Rationale theme emerged. The subtheme Just Okay was cited more often by autistic than neurotypical children, whereas more neurotypical children offered Post Hoc Rationalizations to justify their "okay" judgements. A theme of Positive Emotions wherein children deemed acts to be okay was evident more often among autistic than neurotypical children.

Discussion

The current study was the first to investigate moral reasoning and judgement among autistic children from the perspective of moral foundations theory (Haidt, 2001). Our aim was to begin to develop an understanding of differences in moral foundation priorities between autistic and neurotypical children, to investigate recommendations for punishments for moral transgressions between the two groups, and to describe moral reasoning in the two groups.

Our first hypothesis, that autistic children would be more disapproving of authority/respect and purity/sanctity foundations violations than neurotypical children, was not supported. Other studies have shown that older autistic individuals may be more sensitive to violations of these foundations than neurotypical adults (Senland & Higgins-

D'Alessandro; Zalla et al., 2011). It could be that differences in judgements regarding purity/sanctity among autistic individuals do not emerge until adolescence or adulthood. An alternative explanation for our divergent results is that our study employed more scenarios for each form of transgression (four versus two each in the Zalla et al. [2011] study). Perhaps this generated more representative responses leading to similar judgements of the foundations for both groups.

In terms of lack of differences in the authority/respect foundation judgements, past research has assessed moral values based on Kohlberg's stage-based developmental moral hierarchy (Garon et al., 2018; Senland & Higgins D'Allesandro, 2016; Takeda et al., 2007). This theoretical framework leads to interpretations based on the stage of moral maturity at which the child's moral reasoning is deemed to lie. In contrast, we asked children to rank how bad each transgression was across all five moral foundations and without setting up a hierarchy. The variance in the method could have led to our different results. Alternatively, our scale may have contributed to a ceiling effect. Indeed, 104 authority question responses reached the highest possible "how bad is it" score. Autistic children may have indicated significantly more disapproval of authority transgressions if our scale had permitted a broader range of responses.

Our second hypothesis, that autistic children would be more likely than neurotypical children to recommend punishment for harmless social norms violations was supported, consistent with past findings (Li et al., 2018; Rogé & Mullet, 2011; Salvano-Pardieu et al., 2016). This could be due in part to the social communications differences observed among autistic children (APA, 2013). It is possible that they are more prone to making harmless social norms violations than their neurotypical peers, which may lead to

being corrected or even punished for these differences. Autistic children may in turn assume that other children who behave similarly will or should be punished for such behaviour. It is important to note that the judgement of how bad the transgression was deemed by participants was a greater predictor of endorsing punishment than was being autistic. Indeed, the effect of diagnostic group was only trending as significant in the general linear mixed model.

Our third hypothesis, that autistic children's moral reasoning would defer to rules and consequences more often than that of neurotypical children, was not supported—autistic children actually adduced these reasons *less* frequently than neurotypical children. This result, which is inconsistent with past research (Fadda et al., 2016; Garon et al., 2018; Garcia-Molina et al., 2019), could be due to differences in coding methodology. Most studies assessing autistic children's moral reasoning have used pre-specified coding schemes designed to contrast consideration of intentionality with more concrete reasoning. Our inductive thematic analysis may have led to more diverse themes without forcing children's responses into pre-existing categories.

Consistent with past research (Grant et al., 2005; Shulman et al., 2012), autistic children sometimes offered responses that were less elaborate than those of neurotypical children; that is, they more often said that acts were "just okay" without elaboration. However, this difference was not apparent when children were asked to justify their judgement that actions in the vignettes were bad. Interestingly, neurotypical children's responses to the vignettes were sometimes more elaborate, but more often did not seem to make sense. For instance, when asked why it would be bad to wear pajamas to school, one neurotypical child reasoned that one might need to swim in them, which would be

uncomfortable. Coders judged these explanations to be post hoc rationalizations. Given the theorized social element of post hoc rationalizations (Haidt, 2001; Mercier & Sperber, 2011), perhaps the autistic children's lesser use of such justifications reflects their social communication differences (APA, 2013). Alternatively, Grant et al. (2005) found that appropriate justifications for moral judgements were positively correlated with age among autistic and neurotypical children. The neurotypical children were younger than the autistic children in our subsample, though note that this difference did not reach statistical significance. Still, the difference in age could have contributed to neurotypical children's greater propensity to offer these types of justifications.

A further finding of the qualitative analysis is that autistic children reported uncertainty regarding their emotional responses to vignettes more often than did their neurotypical peers. This could be due in part to higher rates of alexithymia among the autistic children in our sample, a finding that is consistent with past research (Hill et al., 2004).

In general, our results suggest that judgements regarding transgressions against moral foundations made by neurotypical and autistic children were more similar than different, despite differences found in previous related research (e.g., Garon et al., 2018). An explanation for this is that differences in social cognition in autism could present as differences in moral values when assessed based on rationalist theories, but that differences in valuing of the five moral foundations are not apparent when studied explicitly, as we did. To illustrate, autistic children have been found to focus more on rules and consequences than neurotypical children when judging the severity of moral transgressions (e.g., Fadda et al., 2016). In our Introduction, we interpreted such

differences as possibly reflecting variations in valuing of the authority/respect foundation among autistic compared with neurotypical children. We argue that such differences may instead reflect relatively concrete (Minshew et al., 2002) or rigid thinking (Poljak & Bekkering, 2012) in autism without denoting higher prioritization of authority/respect over other moral foundations.

This interpretation is consistent with our suggestion that moral psychology may develop through a pathway other than the commonsense psychology route suggested by rationalist theories. The interpretation also fits with results from Dempsey et al. (2020) who found that the autistic adults in their study, who were generally politically left-wing, emphasized the importance of care/harm and fairness/reciprocity above the other moral foundations posited by Haidt (2001). This profile of moral foundations has been observed to differentiate politically left- from right-wing ideologies (Graham et al., 2009). Given the homogeneity of political attitudes espoused by the parents of children in the current study, it is possible that broader cultural influences may be more responsible for the development of sensitivity to moral transgressions across foundations than are differences in social cognition in autism. However, given the novelty of this study, and the fact that little research exists on the development of moral foundations theory among even neurotypical children (see Peverill, 2020), this interpretation is speculative. Resolving this issue would require testing with more politically heterogeneous groups of families of autistic and neurotypical children.

An interesting avenue for further exploration of moral foundations theory in autistic and neurotypical youth would be to investigate whether differing profiles of moral foundations predilections are present between the two groups. This type of profile

analysis has been conducted in studies with larger, more politically and culturally heterogeneous samples (e.g., Graham et al., 2009; Vecina & Chacón, 2019).

Limitations

As with all studies, ours is not without limitations. First, there were differences in IQ between the two groups, with neurotypical children showing higher average Full-Scale IQ and Verbal Comprehension scores than the autistic children. These differences did not reach significance among the subsample of children who participated in our qualitative analysis, perhaps due to small number of participants rendering the significance tests insufficiently powered to detect between-groups differences. Though we controlled for differences in Full-Scale IQ in our quantitative analyses, we were unable to do so for our qualitative analysis. Matching groups of neurotypical and autistic children on IQ is challenging due to the uneven profiles of cognitive strengths and weaknesses documented among autistic individuals (Coolican et al., 2008). The attempt to match groups on age and IQ has led many studies to include only autistic individuals with at least average IQ (Mottron, 2004). Therefore, though IQ differs between the two groups, a strength of our study is that it includes perspectives of autistic children with a range of intellectual abilities. Another limitation is that, for the qualitative component of the study, the autistic children were older than the neurotypical children, which could have confounded our results, though note that this difference did not reach statistical significance. A further limitation is that the first author selected the participants for the interview based on a clinical judgement of each child's verbal ability. As such, the selection could have been biased and may not accurately represent the population from which our sample was drawn. Despite these limitations, our results contribute

substantially to the literature by offering an initial analysis of moral foundations theory (Haidt, 2001) among autistic and neurotypical children.

Conclusions

Overall, our quantitative and qualitative findings suggest that autistic and neurotypical children evaluate moral transgressions across Haidt's (2001) five moral foundations similarly, despite previous research suggesting possible group differences in the relative salience of the authority/respect and purity/sanctity foundations. This was the case despite some differences in their moral reasoning and in the emotions elicited in response to the scenarios we presented. The most prominent difference that emerged from our study was autistic children's greater likelihood for recommending punishment for relatively minor transgressions.

Insufficient understanding of autistic individuals has been cited by members of the autism community as a barrier to fitting into society (Pellicano et al., 2014). As such, there have been calls from autistic individuals and stakeholders (e.g., families of autistic people) for researchers to focus on subjects that affect autistic individuals' day-to-day lives (Pellicano et al., 2014). Researchers have found that 8-month-olds prefer those who modulate their behaviour in response to others' moral wrongdoing over those who do not modulate their behaviour in this way (Hamlin et al., 2011). As such, if autistic children recommend punishment for minor transgressions more often than do neurotypical children, this could negatively affect their appraisals by neurotypical children, adding to their existing difficulty forming friendships (Howlin et al., 2013). Further, our study was the first to investigate moral foundations theory in autistic and neurotypical children—our findings that autistic children's moral reasoning differs only subtly from that of

neurotypical children contributes to our understanding of moral agency in autism. Future studies could use longitudinal methods to track the development of moral foundation predilections and recommendations for punishment to further refine our understanding of moral development in autism.

Table 6.1

Demographic variables reported by parents of autistic and neurotypical children

Demographic Variable		Diagnosis % ASD	Diagnosis % NT	X^2 (6)	*p*
Income				8.55	0.2
	<$20,000	4	0		
	$20,000 - $39,000	12	0		
	$40,000 - $59,000	12	4		
	$60,000 - $99,000	40	35		
	$100,000 - $139,000	12	9		
	>$140,000	12	39		
	Prefer not to answer	8	13		
Education				8.65	0.19
	Some High School	4	0		
	Completed High School	4	9		
	Some Trade/Vocational School	17	4		
	Completed Trade/Vocational School	28	22		
	Undergraduate Degree	36	26		
	Master's Degree	8	35		
	Doctoral Degree	0	4		
	Other/N/A	4	0		
Spouse's Education				12.58	0.05
	Completed High School	5	17		
	Some Trade/Vocational School	16	4		
	Completed Trade/Vocational School	24	22		
Spouse's Education					
	Undergraduate Degree	24	17		
	Master's Degree	12	22		
	Doctoral Degree	0	17		
	N/A	20	0		
Social Issues				3.92	0.69
	Very Liberal	24	30		
	Slightly Liberal	8	13		
	Liberal	12	26		
	Moderate	40	22		

Demographic Variable	Diagnosis			
	% ASD	% NT	X^2 (6)	*p*
Social Issues				
Conservative	4	4		
Very Conservative	4	0		
Don't Know / NA	8	4		
Economic Issues			6.87	0.33
Very Liberal	17	4		
Slightly Liberal	4	4		
Liberal	20	35		
Moderate	36	35		
Conservative	4	13		
Very Conservative	12	0		
Don't Know / NA	8	9		
			X^2 (1)	
At least one parent with full-time employment	80	96	1.44	0.23
Parents married or common-law	80	100	3.22	0.07

Note. ASD = Autism Spectrum Disorder; NT = Neurotypical; X^2 = Chi-squared test statistic.

Table 6.2

Example vignettes from the Moral Foundations Questionnaire for Kids

Moral Foundation	Example Vignette Text
Authority/Respect	You see a boy/girl calling his parents bad words. Is this bad?
Care/Harm	You see a boy/girl punch another boy/girl in the stomach. Is this bad?
Fairness/Reciprocity	You see a boy/girl taking all of the cookies, and leaving none for others. Is this bad?
In-Group/Loyalty	You see a boy/girl teach a secret password to people who are not in his club. Is this bad?
Purity/Sanctity	You see a boy/girl loudly burping and farting while eating. Is this bad?
Control Condition	You see a boy/girl eating his soup with a fork. Is this bad?

Note. Each vignette is gendered according to the reported gender identity of the child to whom the task is administered.

Table 6.3

Descriptive and inferential statistics for questionnaire and cognitive measures among autistic and neurotypical children

	ASD	NT		
	M (SD)	*M (SD)*	*t*-score	*p*
CAM	**15.40 (8.06)**	**7.26 (5.06)**	**0.539[1]**	**0.0002**
AQ-Child	**85.52 (18.21)**	**48.57 (12.38)**	**8.275**	**<0.0001**
Social Desirability	6.20 (2.33)	5.82 (1.67)	0.643	0.52
FSIQ	**90.04 (13.43)**	**103.91 (7.78)**	**4.42**	**<0.0001**
VCI	**85.08 (12.98)**	**103.22 (10.22)**	**5.402**	**<0.0001**
PRI	97.64 (18.21)	103.48 (9.88)	1.396	0.17

Qualitative Sample Characteristics

	ASD	NT		
	M (SD)	*M (SD)*	*t*-score	*p*
CAM	18.33 (11.45)	10.67 (5.68)	0.394[1]	0.17
AQ-Child	79.33 (24.64)	51.00 (11.28)	2.561	0.04
Social Desirability	6.33 (2.58)	6.00 (1.67)	0.265	0.80
FSIQ	97.17 (17.39)	103.33 (5.50)	0.828	0.44
VCI	88.50 (15.06)	104.83 (12.67)	2.033	0.07
PRI	107.67 (26.24)	101.33 (8.21)	0.564	0.59

Note. ASD = Autism Spectrum Disorder; NT = Neurotypical; CAM = Children's Alexithymia Measure (parent report; Way et al., 2010); AQ-Child = Autism Spectrum Quotient for Children (parent report; Auyeung et al., 2008); FSIQ = Full-Scale Intelligence Quotient; VCI = Verbal Comprehension Index; PRI = Perceptual Reasoning Index. The latter three scales are from the Wechsler Abbreviated Scale of Intelligence - Second Edition (Wechsler, 2011) administered to the child. [1]Denotes that Wilcoxon signed rank test was used rather than the *t*-test due to skewed data; the *r* effect size from this analysis is reported. Bolded values represent statistically significant differences after correcting for multiple comparisons.

Table 6.4

Average "how bad is it" responses and proportion of vignettes for which children recommended punishment, measured using the Moral Foundations Questionnaire for Kids among autistic and neurotypical children

	How bad is it?				Should they be punished?			
	ASD	NT			ASD	NT		
Foundation	*M (SD)*	*M (SD)*	*r*	*p*	Percentage (%)		*r*	*p*
Authority/Respect	3.98 (1.54)	3.90 (1.39)	.12	0.42	88.17	89.77	.03	0.84
Care/Harm	4.22 (1.44)	4.27 (1.06)	.06	-0.68	89.25	88.89	.14	0.35
Control	**2.12 (2.19)**	**1.07 (1.53)**	**.42**	**<0.01**	**76.79**	**31.58**	**.48**	**<0.001**
Fairness/Reciprocity	3.30 (1.86)	2.67 (1.57)	.26	0.07	72.73	56.25	.21	0.14
In-Group/Loyalty	3.02 (2.04)	2.60 (1.72)	.20	0.16	80.26	72.22	.06	0.65
Purity/Sanctity	3.38 (2.04)	3.23 (1.78)	.07	0.60	75.64	62.96	.04	0.76

Note. ASD: Autism Spectrum Disorder; NT: Neurotypical. $r = r$ effect size from Wilcoxon signed-rank tests. Bolded values represent statistically significant differences after correcting for multiple comparisons. Though punishment scores are represented using the proportion of times children from each group recommended punishment across foundations and the control condition, we calculated Wilcoxon signed-rank tests for the summed punishment score for each foundation between groups to avoid violating the assumption of independence of observations.

Table 6.3

Quotes and frequency of quotes in support of themes when autistic and neurotypical participants deemed moral transgressions and norms violations to be "bad"

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Authority/Respect						
	Against the Rules		I: Why is it bad if it's not pajama day? R: Well, you're not following the rules—the rules are don't wear pajamas to school if it's not pajama day.	ASD	18	18
	Disobedient		I: You see a boy ignore his parents when they tell him to stop watching TV. Why is that wrong? R: Number one, he's not being obedient.	ASD	3	11
	Impolite		I: You see a boy loudly burping and farting while eating. Why is that bad? R: It's not polite.	ASD	6	10
Care/Harm						
	Harm to Animals		I: You see a girl stomp on the tail of her pet cat. Why is that wrong? R: Oh, I love cats and dogs. It's bad cause it's trying to hurt animals and trying to kill them.	ASD	5	10

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Care/Harm						
	Harm to Humans					
		Emotional	I: You see a boy calling his parents bad words. Why is that bad? R: It would hurt your parents' feelings.	ASD	24	25
		Physical	I: You see a boy punch another boy in the stomach. Why is that wrong? R: Because, it could stop their breathing or something like that.	NT	6	8
	Unvirtuous					
		Greedy	I: You see a boy cut to the front of the line. Why is that bad? R: Sometimes people wait there for like days, and then he just cuts in and takes, like, five minutes to get something that he wants and that's just being greedy.	NT	1	4
		Selfish	I: You see a girl cheating in a board game. Why is that bad? R: Because it's rude and selfish for her to win.	NT	0	3

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Care/Harm						
	Unvirtuous					
		Unkind	I: You see a boy calling a boy stupid. Why is that bad? R: Because it's a bad word and it's being mean to someone.	NT	24	20
Fairness/ Reciprocity						
	Cheating		I: You see a boy score a goal against his own team to help the other team win. Why was that bad? R: Because … he would probably be cheating if he did that.	NT	6	7
	Sharing		I: You see a boy taking all of the cookies, and leaving none for others. Why is that wrong? R: Because, you're supposed to share.	NT	1	5
	Stealing		I: You see a boy taking all of the cookies, and leaving none for others. You said that's bad, why is that bad? R: Because, someone else might have made it and might paid for it and it might be a special day but he stoled [sic] all the cookies.	ASD	3	1

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Fairness/ Reciprocity						
	Unearned		I: Why is cheating bad, I wonder, what do you think? R: Because you shouldn't have won, but you did. I: And why is that bad? R: Because he didn't deserve to.	ASD	10	12
	Unwarranted		I: You see a boy punch another boy in the stomach. Why is that bad? R: Cause … what if the other guy didn't do anything and he was just trying to be nice and what if the other boy just punched him in the stomach and then the other guy gets hurt.	NT	1	3
In-Group/ Loyalty						
	To Club		I: You see a boy teach a secret password to people who are not in his club. Why is that bad? R: Because they've got to be in the club.	NT	1	2

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
In-Group/ Loyalty						
	To Family		I: You see a boy reading his brother's secret diary. Why is that bad? R: Because it was his brothers' secret I: And why is it bad to read someone's secrets like that, I wonder? R: Because, it's being mean to your siblings.	NT	0	6
	To Team		I: You see a boy score a goal against his own team to help the other team win. Why is that wrong? R: That's betraying your team basically.	ASD	3	2
Purity/ Sanctity						
	Contamination		I: You see a girl rubbing poop on herself in the shower. Why is that bad? R: Well, same for the diaper one, it's bad for your personal hygiene.	ASD	12	9
	Germs/Parasites		I: Why is it bad to get dirty? R: Because it's germy.	ASD	5	1
	Disgusting		I: You see a boy loudly burping and farting while eating. Why is that bad? R: Because, it would be really gross and stinky.	NT	5	5

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Purity/ Sanctity						
	Unhealthy		I: You see a boy drinking pee with his dinner. Why is that bad? R: Because you could get sick and die.	NT	5	6
Negative Consequences						
	Create Conflict		I: You see a boy taking all of the cookies, and leaving none for others. Why is that bad? R: Because, it's not healthy…	NT	1	2
	No Friends		I: You see a boy punch another boy in the stomach. Why is that bad? R: Because it would hurt the other boy, and, uhm, it could start a fight with him and them punching him back. And they'll not be friends anymore.	NT	3	6
	Others might do it too		I: What's wrong with not waiting your turn? R: Because people might start to do it more.	NT	1	3
	Punishment		I: You see a girl calling her teacher bad words. Why is that bad? R: Well, that could have hurt the teacher's feelings. And, she could have to go to the office and be in trouble. And go home, and get punished.	ASD	11	14

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Unclear Rationale						
	Just Bad		I: You see a boy punch another boy in the stomach. Why is that bad? R: Because, it's bad.	ASD	3	1
	Post hoc		I: You see a girl wearing her pajamas to school instead of wearing normal clothes. Why is that bad? R: Because, fleas might get on her and attach to her, and come home and then she'll have fleas in her hair, and then it will get on her parents, her cat, and then they'll all have to get scrubbed.	ASD	6	8
	Reiteration		I: You see a boy ignore his parents when they tell him to stop watching TV. Why is that bad? R: Because he is ignoring his parents.	ASD	3	0
	Uncertain		I: Why is it bad not to listen to your parents? R: I don't know.	NT	12	9
Moral Emotions						
	Angry		I: How does that make you feel? R: Mad.	NT	53	49

Theme	Sub-theme	Sub-sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Moral Emotions						
	Bad (non-specific)		I: How do you feel towards the girl who told the secrets? R: Negative.	NT	3	7
	Disgusted		I: How does that make you feel? R: Disgusted.	ASD	12	12
	Sad		I: How did it make you feel? R: Sad.	ASD	29	7
Reasons as Emotions			I: How does that make you feel? R: I feel like why am I even friends with a person that just lies, that like, doesn't even talk to me that much.	NT	3	1
Uncertain Re: Emotion			I: How does that make you feel? R: I don't know.	ASD	20	5

Note. ASD: autism spectrum disorder; NT: neurotypical; I: interviewer; R: respondent

Table 6.6

Quotes in support of themes when autistic and neurotypical participants deemed moral transgressions and norms violations to be "not bad"

Theme	Sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Authority/Respect					
	Not Against the Rules	I: You see a girl wearing her pajamas to school instead of wearing normal clothes. Why is that bad? R: It actually could be good too, because if it is pajama day then it would be good.	ASD	2	3
	Use Manners	I: You see a boy loudly burping and farting while eating. Why isn't that bad? R: Cause he might say "excuse me," and he can't help burping and farting while he's eating.	NT	10	1
Care/Harm					
	Kindness	I: You see a boy score a goal against his own team to help the other team win. You said that's not bad. R: Because, you're being nice to the other person.	ASD	3	5
	Not Harmful	I: You see a boy drinking pee with his dinner. Why is that not wrong? R: It's not wrong because it wasn't harming anyone.	ASD	1	1
Consequences					
	Natural Consequences	I: You see a boy cheating in a race by taking a shortcut. Why is that okay? R: Cause, you just get eliminated.	NT	1	3

Theme	Sub-theme	Quote	Diagnosis	Frequency ASD	Frequency NT
Consequences					
	No Negative Consequences	I: When you saw a girl eating her soup with a fork you said that's not bad. R: It's not like you need to get punished for doing something you like.	ASD	1	5
Unclear Rationale					
	Just Okay	I: You see a boy eating his soup with a fork. Why is that okay? R: Because, it's okay.	ASD	15	7
	Post Hoc	I: You see a girl using a dirty diaper as a pillow. Why is that okay? R: Well, because it's her choice, and probably she had no pillow and she just had to do it on her little sister's or her little brother's diaper.	NT	1	10
	Uncertain	I: You see a boy eating his soup with a fork. Why is that okay? R: It's his idea. I: and why does that make it okay? R: because… I don't really know.	NT	1	3
Accidental		I: You see a boy score a goal against his own team to help the other team win. Why is that okay? R: Cause, maybe, he did it by accident.	NT	2	6

Theme	Sub-theme	Quote	Diagnosis	Frequency	
				ASD	NT
Lack of Resources		I: You see a girl eating her soup with a fork. Why is that okay? R: Because sometimes my mom and dad don't give me a spoon.	NT	0	4
Positive Emotions					
	Happy	I: You see a boy score a goal against his own team to help the other team win. Why is that okay? R: Because, it helped them win the game and sometimes you can be nice to help other people. I: How does that make you feel? R: Kind of makes me feel happy to help other people.	NT	5	1

Note. ASD: autism spectrum disorder; NT: neurotypical; I: interviewer; R: respondent

Figure 6.1

Coding tree for qualitative analysis when autistic and neurotypical children judged moral vignettes to be "bad"

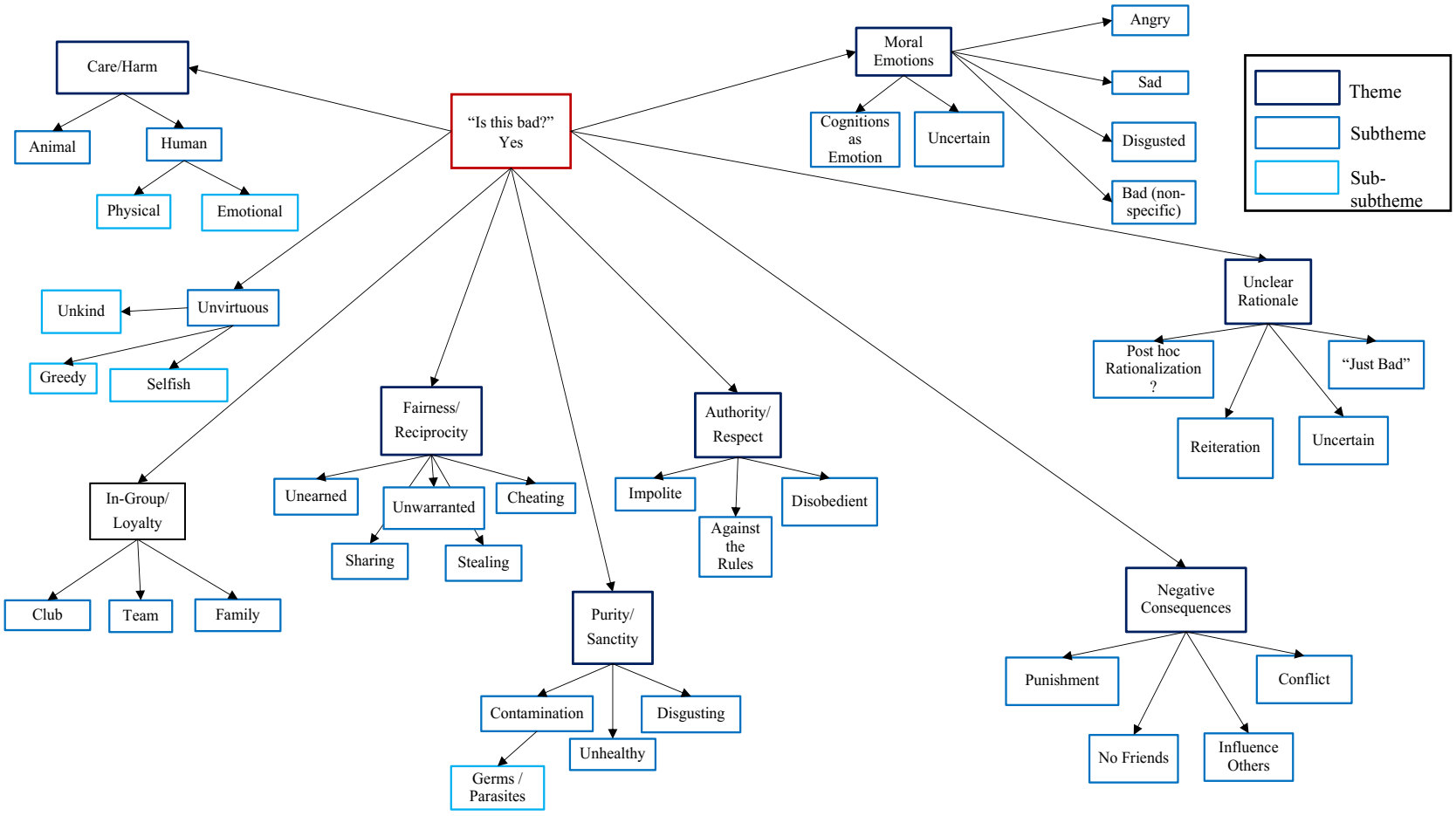
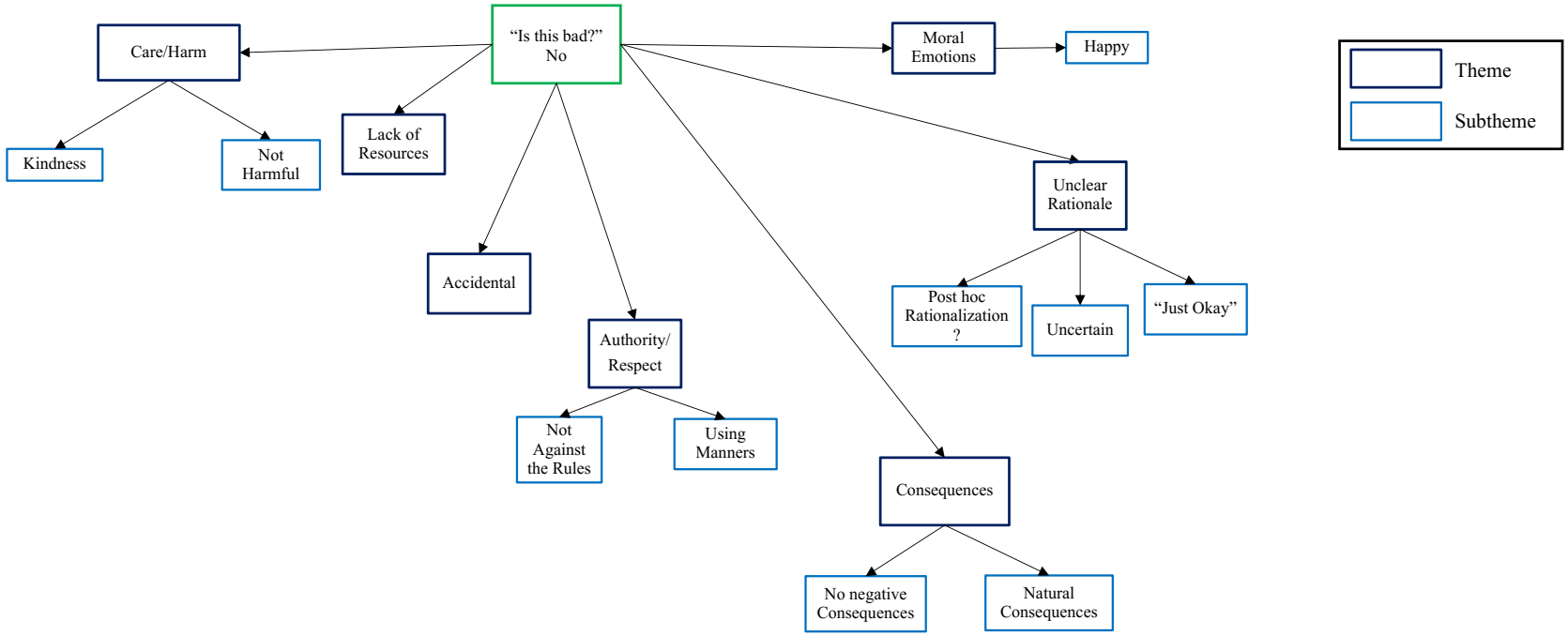


Figure 6.2

Coding tree for qualitative analysis when autistic and neurotypical children judged moral vignettes to be "okay"



CHAPTER 7: GENERAL DISCUSSION

This dissertation documents a mixed methods program of research aimed at investigating moral psychology among autistic individuals. I collaborated with autistic adults in the second and third studies in a community-based participatory research framework to develop autism-centric study methodology and strengths-based interpretations of results. This dissertation offers the first documented application of moral foundations theory in the study of moral psychology among autistic individuals. In this closing chapter, I summarize the three studies constituting this dissertation, their methodologies, and key results. I also describe the factors that influenced the direction and design of the research. Finally, I comment on how the current research fits within the broader literature, describe the general strengths and limitations of the studies I completed, and suggest future research directions.

The first step in this dissertation was a systematic review of the literature investigating moral psychology among autistic individuals (Chapter 2). This study provided a critical review and synthesis of the research findings and identified gaps and limitations therein. The review showed that almost all studies of morality in autism have relied on rationalist accounts of moral psychology development that set up hierarchies of moral values emphasizing the importance of justice over the importance of law and order (Kohlberg, 1969; 1971). Researchers often posited that subtle differences in moral thinking were indicative of deficits in autistic social cognition. Rationalist accounts have been criticized as being Eurocentric, having been based on research with participants from white, educated, industrialized, rich, democratic (WEIRD; Henrich et al., 2010) backgrounds. Jonathan Haidt proposed moral foundations theory based on research with

participants drawn from more varied backgrounds (Haidt, 2001), and his pluralist account of five foundations appears to represent moral values of individuals from across the world (see, for example, Doğruyol et al., 2019). Research in moral foundations theory has shown that different moral values need not be construed as hierarchical but could be understood as variants depending on culture and class (Koleva et al., 2012). Given the conceptualization of autism as having a unique culture (Davidson, 2008; Jaarsma & Welin, 2012), I argued that it was possible that subtle differences in morality suggested by this review could be interpreted as differences rather than deficits if seen through the lens of moral foundations theory. However, moral foundations theory had not yet been studied in autism. I therefore conducted a qualitative study with autistic adults as an initial investigation into moral judgements, reasoning, and emotions based on moral foundations theory.

The qualitative study that I designed was described in Chapter 4. This study was the first to investigate an application of moral foundations theory with autistic research participants. The findings suggested that the five moral foundations posited by the theory (i.e., care/harm, fairness/reciprocity, authority/respect, in-group/loyalty, purity/sanctity) were all endorsed as morally salient by the adults I interviewed to varying degrees. Further, moral emotions were reported by the participants, though the degree to which they were referenced varied by participant. Given the importance of the five foundations avowed by the autistic adults interviewed in Study 2, I was motivated to use quantitative methods to test hypotheses among younger autistic individuals.

The autistic adults in the qualitative study also offered general support for the research program as potentially beneficial to the autism community. They described that

the current research could help demystify inaccurate assumptions by neurotypical individuals regarding autistic people, for example that autistic people lack empathy and are therefore unable to make mature, responsible moral judgements. They offered feedback on our measure of morality, which allowed us to adapt it to be more accessible to autistic youth whose verbal and abstract reasoning skills may have differed from those of their age-matched neurotypical peers (Coolican et al., 2008; Minshew et al., 2002). The community partners who participated in this study suggested further that we avoid using measures of physiological arousal that required attaching equipment to participants' hands/fingers. This feedback led us to rely solely on measures and technology that did not require physical contact.

With these suggestions in mind, along with the findings from Study 1 and Study 2, I designed the third and final study presented in this dissertation in Chapter 6. This study used mixed methods to investigate predictions arising from moral foundations theory among autistic and neurotypical children aged 8 to 12 years. In this study, I assessed moral foundations predilections of autistic and neurotypical children using a novel measure of moral foundations theory, which I adapted for use with autistic youth. I assessed objective indicators of emotional states using FaceReader software (Noldus Information Technology Inc., 2020), however these results are beyond the scope of this dissertation. I also assessed alexithymia and autism symptoms to attempt to clarify whether each of these sets of traits influenced moral judgements. I conducted semi-structured interviews to assess the nature and quality of justifications for moral judgements made by neurotypical and autistic children.

Results from the quantitative and qualitative analyses in the third study combined to suggest that moral foundations predilections were relatively similar between the groups, despite subtle differences in self-reported emotional responses to the vignettes and in justifications for the judgements. In Chapter 6, I argued that differences in justifications for moral judgements could be related to the fact that moral foundations theory understands such justifications as post hoc rationalizations for judgements. Reasons for moral judgements are therefore an aspect of social communication, which we know to develop differently among autistic children. A further possible explanation for differences in moral reasoning could relate to lower verbal reasoning skills among the autistic children in the study.

A further finding from the study presented in Chapter 6 was that the greatest predictor for recommending punishment for moral transgressions was how bad the children deemed the act to be. We also found a trend suggesting that autistic children were more likely than their neurotypical peers to recommend punishment for harmless norms violations. There is little research on the effects or rates of punishment experienced by autistic youth. One study found that parents of youth who have both autism and Attention-Deficit/Hyperactivity Disorder (ADHD) rated their children higher on a scale measuring sensitivity to punishment compared with parents of neurotypical youth and those of children with primary ADHD or with ADHD and other neurodevelopmental differences (Luman et al., 2012). This sensitivity may be exacerbated by reportedly harsher punishment by some parents of autistic than parents of neurotypical children when experiencing parenting stress (van Esch et al., 2018). Parental stress is more marked among families of autistic children compared with children from

other clinical groups (Barroso et al., 2018; Estes et al., 2009). Zaidman-Zait et al. (2014) found a reciprocal relation between parenting distress and child internalizing and externalizing behaviours among families with autistic children. Given the social and behavioural differences inherent in autism, it stands to reason that they more often commit harmless norms violations than their neurotypical peers. Higher sensitivity to punishment, the possibility of harsher punishment, and greater opportunities for punishment, could have coalesced to create the differences in response to norms violations observed in our study. This possibility should be examined in a future study investigating how autistic children's experiences of negative consequences influence their recommendations for punishment.

Our findings are important for several reasons. First, our research shows that autistic children, like their neurotypical peers, demonstrate a clear sense of right and wrong, suggesting an internal ethical framework that is sometimes assumed to be lacking in autistic individuals, including during legal proceedings (Casey, 2020; Coletta, 2020). Second, differences in recommendations for punishment by the autistic children in our sample may have implications for their peer relationships. As young as 8 months, children begin to prefer people who behave kindly towards kind people, and unkindly towards moral transgressors (Hamlin et al., 2011). In another study, neurotypical children were less likely to cooperate with people who were perceived to engage in "naughty" behaviour, whereas autistic children did not modulate their behaviour in this way (Li et al., 2014). It is possible that differences in responses to perceived wrongdoing may set autistic children up to be misunderstood and therefore alienated by their peers.

A troubling element of autistic peer relations is their disproportionate bullying victimization compared with neurotypical children (Maïano et al., 2016). The reciprocal effects peer interaction model offers a framework for understanding the unique context of bullying victimization among autistic youth (Humphrey & Symes, 2011). This theory suggests that core social communication differences in autism coupled with lack of understanding by neurotypical children coalesce to produce greater rates of bullying victimization in autism (Humphrey & Symes 2011). In general, victims of bullying tend to differentiate less between accidental and intentional harms than do individuals who are not victimized by bullying (Gini et al., 2011). Note that Gini et al. sampled entire classrooms of 9- to 13-year-olds without indicating whether children had psychological and/or neurodevelopmental diagnoses. The role of morality in bullying victimization invites the question as to whether different beliefs about allocation of punishment may influence rates of bullying victimization in autism, and/or whether perhaps greater rates of bullying victimization may increase the tendency to indicate punishment is necessary for others.

This dissertation presents the first systematic review of moral psychology in autism that extends beyond a focus on intent-based moral reasoning. Second, it represents the first studies of autistic moral reasoning from the perspective of moral foundations theory—a pluralistic lens that allows for differences to be explored without pejorative interpretations. Additionally, the mixed methods approach employed in this dissertation allowed me to represent data using the strengths of both qualitative and quantitative data analytic methods. Further, this dissertation offers a developmental perspective of moral psychology among autistic individuals by investigating moral foundations theory among

adults and children. Perhaps most importantly, its qualitative analyses and community-based participatory approach emphasize the importance of first-person accounts of autistic participants in formulating research questions and interpreting results. This perspective adds to a growing body of literature adopting person-centered autism research methods.

Limitations

Critiques against Moral Foundations Theory. Moral foundations theory is not without criticism. Suhler and Churchland (2011) have argued that Haidt's theory overlooks candidates for moral foundations beyond the five focused on in this dissertation. Yet, Haidt and his colleagues acknowledge the possibility of further foundations (Haidt & Joseph, 2004) and suggest candidate foundations that could spur further research (e.g., liberty/oppression; Haidt, 2012). Suhler and Churchland (2011) argue further that moral foundations theory, which posits that the moral foundations have evolutionary roots, lacks connection to the genetic bases of innateness and modularity. Haidt and Joseph (2011) convincingly parry this critique by pointing out that genes do not map onto even relatively simple specific traits (e.g., height), so it would be unrealistic to identify genetic underpinnings of complex moral psychology. Given that ought implies can, they argue further that identifying specific genetic substrates of moral thinking is an unnecessary aspect of an evolutionary theory. Finally, Suhler and Churchland (2011) argue that the concepts of innateness and modularity posited by moral foundations theorists are insufficiently sound to support the theory. Again, Haidt and Joseph (2011) refute this critique by explaining that they are not arguing for genetic determinism and that the bar for evidencing innateness is set too high by their critics.

Other critics have argued against social-intuitionism. For instance, Jones (2006) argued that moral judgements must be responsive to reasoning rather than being the product of emotion alone. However, as another critic of moral foundations theory argues, emotional responses that are conditioned by experience may themselves be considered reasons and be responsive to discursive thinking Sauer (2012). Sauer (2012) argued that even if moral judgements are automatic, as Haidt and his colleagues maintain, moral judgements could yet be rationalist given that the intuitions on which they are based may develop through cultural conditioning, which could involve discursive reasoning. Sauer (2012) is therefore countering the strong claim that moral reasoning is mere confabulation (Haidt, 2001). Even if Sauer is right that moral reasoning is more than post hoc rationalization, there is yet considerable evidence undermining other elements of rationalist accounts of moral psychology. First, the model of hierarchical stage-based moral development is inconsistent with cross-cultural research (e.g., Doğruyol et al., 2019). Further, the notion that advanced commonsense psychology skills are necessary for moral development is belied by research with autistic individuals (Chapter 2).

Despite debate regarding moral foundations theory, I adopted it as the theoretical framework for this research for two reasons. First, although moral foundations theory makes claims about the developmental pathway of moral psychology (Haidt, 2001), there has been little research investigating developmental predictions arising from the theory. Colleagues in the Early Social Development Lab have begun to amass empirical evidence regarding the debate surrounding the innateness of moral foundations predilections by investigating predictions arising from the theory using developmental psychology (Hartlin et al., 2018). Moving the research into the developmental area invites exploration

of atypical development of morality—autistic children are an appropriate group in which to investigate this theory, given that research related to moral development in autism has relied on rationalist accounts of moral development (Chapter 2). Second, a guiding principle of this research was to investigate autism through a strengths-based perspective—moral foundations theory offered a ready means of interpreting findings without describing observed differences by suggesting that autistic moral psychology is potentially "less mature" than that of neurotypical individuals.

Limits of Involvement of Community Partners. The ideal format for community-based participatory research is for community members and stakeholders to be part of a research team from its inception and to be involved in each step of the research project (Jull et al., 2017). My initial study (i.e., the systematic literature review) was a product of my interest in autism and moral psychology. Given the gaps in the literature revealed, I was keen to investigate moral foundations theory in autism spectrum disorder. I initiated the second study without community engagement for pragmatic purposes and in hopes of enlisting community research partners. It was fortuitous that my intuition that this area of research would be meaningful to autistic individuals appeared accurate on consultation with autistic adults. However, it is important to note that my enthusiasm could have influenced my choice of community partners, as well as the study methodology. I endeavored to include my community partners in as many further research steps as possible, but they were not involved in recruitment efforts nor the data analyses presented in Study 3. These decisions were pragmatic and informed by constraints of time and resources, both my own and that of my community partners. Despite the lack of holistic involvement in the research project, I am confident that the

value of this research to members of the autism community was enhanced by community involvement. However, I acknowledge that the study design, results, and interpretation may have been different and perhaps more meaningful to members of the autism community if my research had been more explicitly driven by autistic viewpoints.

Influence of COVID-19 Pandemic. In March 2020, I was in the midst of recruitment and data collection for Study 3 of this dissertation. My target *n* of 30 was based on the greatest numbers of participants in the studies identified by the systematic review constituting Study 1. I conducted sensitivity analyses and determined that this sample size would be sufficiently powered to detect medium to large effects. Unfortunately, the pandemic restricted research activities such that I was unable to continue assessing participants. My dissertation committee members and I made the decision to analyze the data available to me at the time ($N = 48$). On recalculating the sensitivity analyses, the sample size remained theoretically suitable for detecting medium to large effect sizes. However, the study could have been underpowered to detect smaller between-groups differences in moral judgement. In order to hedge the ramifications of a smaller sample, I reported confidence intervals and effect sizes in Study 3.

Future Research

The current dissertation gives rise to a host of questions that could fuel future research.

Punishment. First, this finding should be replicated among larger samples to confirm its validity given that the effect was not significant after controlling for multiple comparisons in Study 3. A potential fruitful area for further inquiry would be to examine the relation between punishment sensitivity and peer interactions among autistic and

neurotypical children. For example, learning more about how expectations about punishment and punishment sensitivity could be related to bullying victimization among autistic children could provide important information to educators to foster greater understanding of differences in developing moral psychology between autistic and neurotypical children. Greater education could serve to reduce stigma, perhaps resulting in lowered rates of bullying victimization, and improved mental health among autistic children.

Relationships. As described above, there are reasons to suspect that well documented differences in autistic individuals' ability to initiate and maintain friendships could be influenced by differences in moral reasoning. As an initial study, researchers could begin to clarify this putative connection by interviewing autistic individuals regarding the potential influence of their moral thinking on their social relations. Future research should also investigate this connection with respect to bullying in an effort to curb its negative effects on the lives of autistic individuals.

Mental Health. Autistic youth are frequently diagnosed with oppositional defiant disorder (~30%; Simonoff et al., 2008). Witwer and Lecavalier (2010) found that autistic children with minimal verbal abilities were more likely to be diagnosed with subsyndromal oppositional defiant disorder than were those with greater verbal abilities when using the Diagnostic and Statistical Manual of Mental Disorders-IV-Text Revisions criteria (APA, 2000). This discrepancy calls into question the validity of DSM diagnostic criteria for oppositional defiant disorder when applied to autistic youth. Further, social anxiety, which commonly cooccurs among autistic individuals (Ben-Itzchak et al., 2020) is a better predictor of aggression among autistic adolescents than among those diagnosed

with oppositional defiant disorder (Pugliese et al., 2013), suggesting that the etiology of oppositionality may differ between the two groups. One possible variable contributing to aggressive behaviour among autistic youth is a greater emphasis on punishment for harmless norms violations. Aggression and recommendations for punishment could respectively be driven by relatively rigid or perseverative thinking commonly observed among autistic individuals (Poljak & Bekkering, 2012). These factors may increase the likelihood that autistic youth will become argumentative over seemingly minor conflicts, which could in turn lead to greater attributions of oppositional defiant disorder in autistic children. Studies investigating aggression in autism and oppositional defiant disorder should consider the possible mediating roles of moral predilections and punishment attribution.

The Role of Emotions in Autistic Morality. A gap in the literature identified by the systematic review presented in Chapter 2 is that the role of emotion in autistic versus neurotypical moral judgement is unclear. Understanding how emotions contribute to moral decision making is important, in part to disentangle the relative effects of alexithymia and autism on moral decision making. I made the decision to omit measures of physiological arousal and alexithymia from the study documented in Chapter 6. I did this because including these variables distracted from the primary aim of that study, namely, to provide an initial investigation into morality using the framework of moral foundations theory among autistic youth. Future studies should measure emotional arousal using distal measures (e.g., facial expressions, pupillometry) during moral foundations theory tasks to further investigate the role of emotions in autistic moral thinking.

Developmental Course. Moral foundations theory lends itself to predictions regarding the differential development of moral intuitions depending on early environments and experiences. As such, an investigation of how moral psychology develops in autistic and neurotypical children, using cross-sectional and longitudinal methods, could help track the developmental pathways thereof. Understanding the developmental course of moral foundations predilections, severity of judgement, and recommendations for punishment, could offer guidance for interventions for autistic and neurotypical children to promote clarity and improve communication between the two groups. Such an intervention could take the form of a social narrative (Gray & Garand, 1993) for autistic and neurotypical children that illustrates the unique developmental challenges faced by autistic children viz. punishment and morality. Another possibility would be a psychoeducation intervention for parents and educators illustrating the potential costs of applying negative consequences for harmless norms violations among autistic children, though additional research would be required first to validate this connection, then to test the intervention.

Moral Reasoning. This dissertation used qualitative methods to investigate moral reasoning in autism. This methodology precluded statistical hypothesis testing regarding how verbal skills affect moral reasoning. Future studies could use quantitative methods and analyses to investigate the potential association between verbal comprehension and moral reasoning regarding moral foundations theory transgressions among autistic and neurotypical individuals.

Conclusion

Taken together, findings from the three studies presented in this dissertation suggest that autistic moral reasoning, from the perspective of moral foundations theory, is generally similar to that of neurotypical individuals. All five moral foundations appear to be salient among autistic children and adults. Reasoning about transgressions against these foundations was shown to be subtly different between the two groups, perhaps due to lower verbal reasoning skills among autistic participants compared with their neurotypical peers. The degree to which moral emotions and intuitions are responsible for moral judgements remains a question for future research. Another question for future research is whether and how moral reasoning influences the ways in which neurotypical individuals and their autistic peers interact, and whether this affects the quality of these relationships. This dissertation describes the first studies to investigate autistic moral thinking from the perspective of moral foundations theory. The research was informed by community-based participatory research methods to attempt to benefit members of the autism community. In this vein, I used strengths-based interpretations of study findings to enhance our understanding of social cognition in autism and thereby challenge existing assumptions and potentially reduce stigma.

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Zalla, T., & Leboyer, M. (2011). Judgment of intentionality and moral evaluation in individuals with high functioning autism. *Review of Philosophy and Psychology*, *2*, 681-698.

APPENDIX A

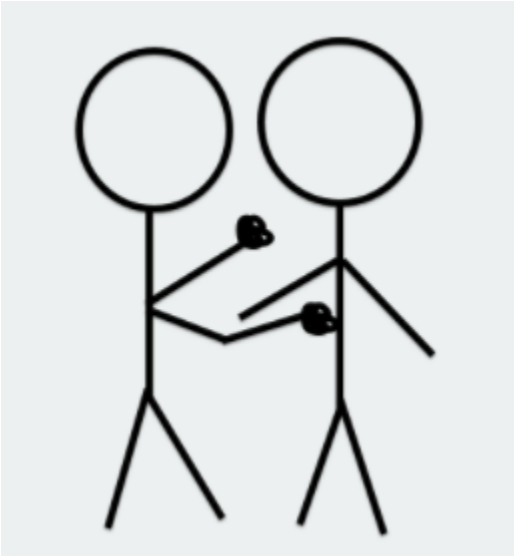
MFQ-K Full Item List

Male Items

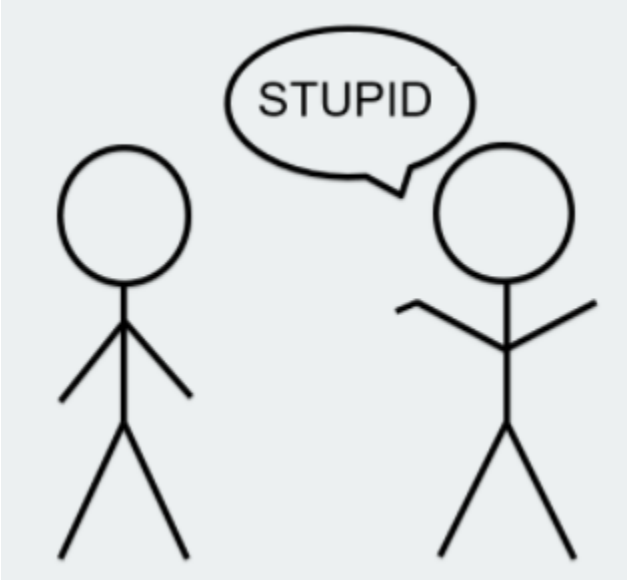
I. CARE/HARM

A. Harm to Human

1. You see a boy punch another boy in the stomach.

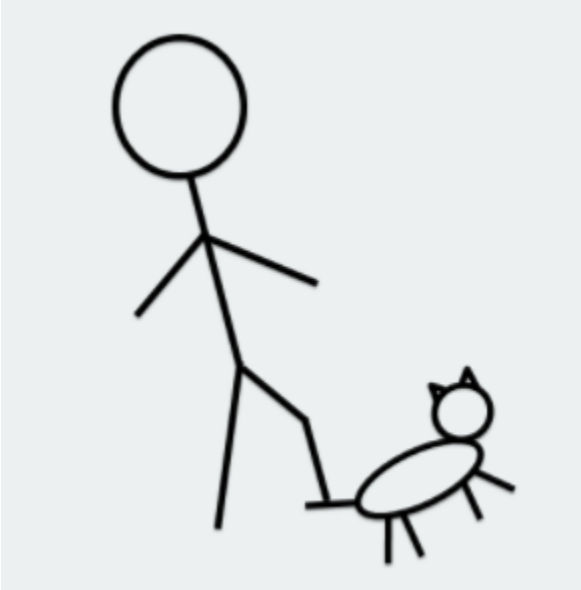


2. You see a boy calling a boy stupid.

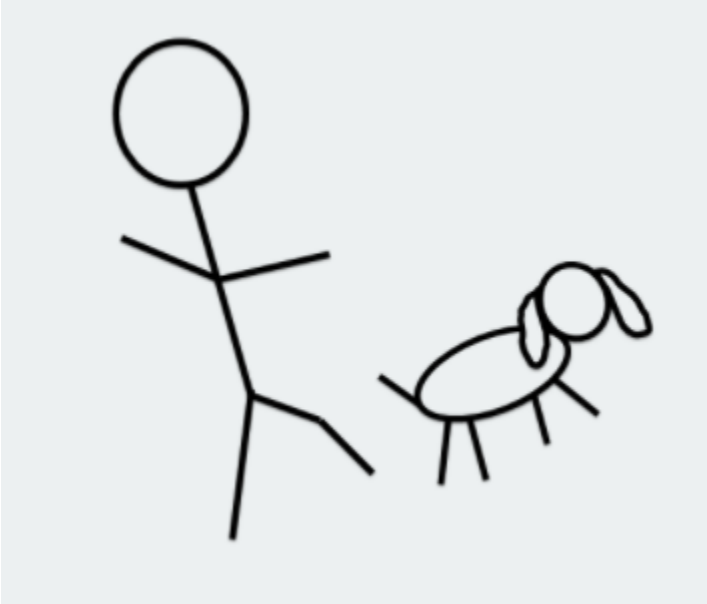


B. Harm to Animal

3. You see a boy stomp on the tail of his pet cat.



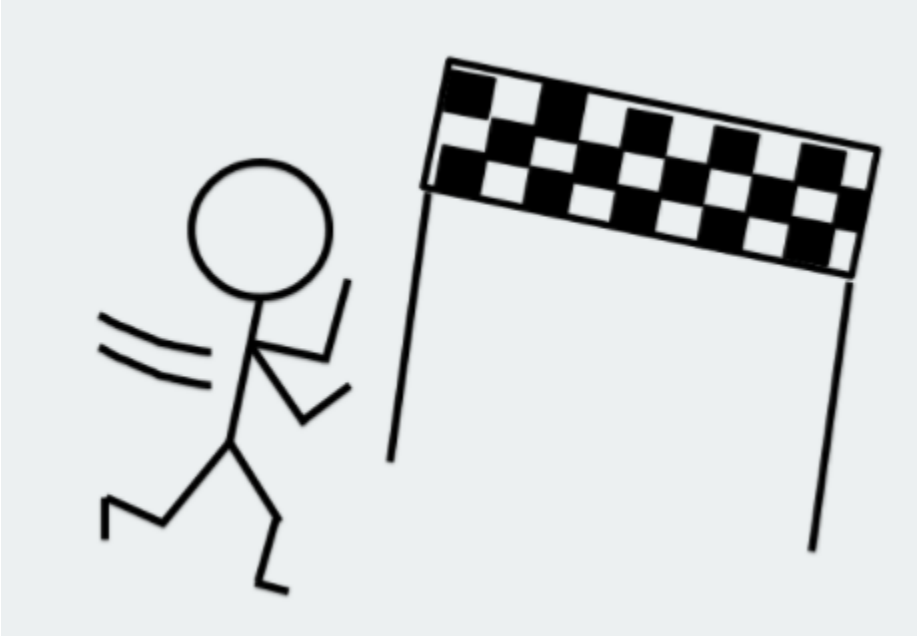
4. You see a boy kick a stray dog



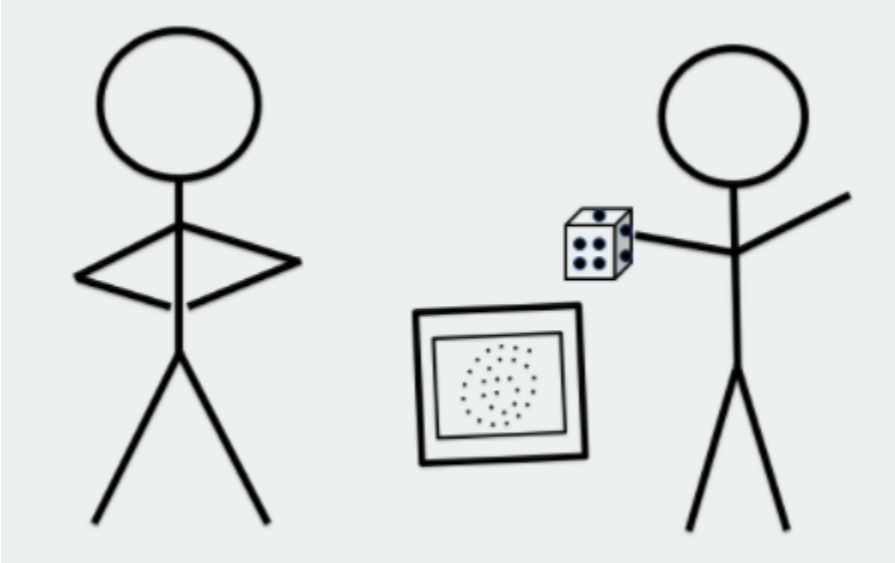
II. FAIRNESS

A. Cheating

5. You see a boy cheating in a race by taking a shortcut.

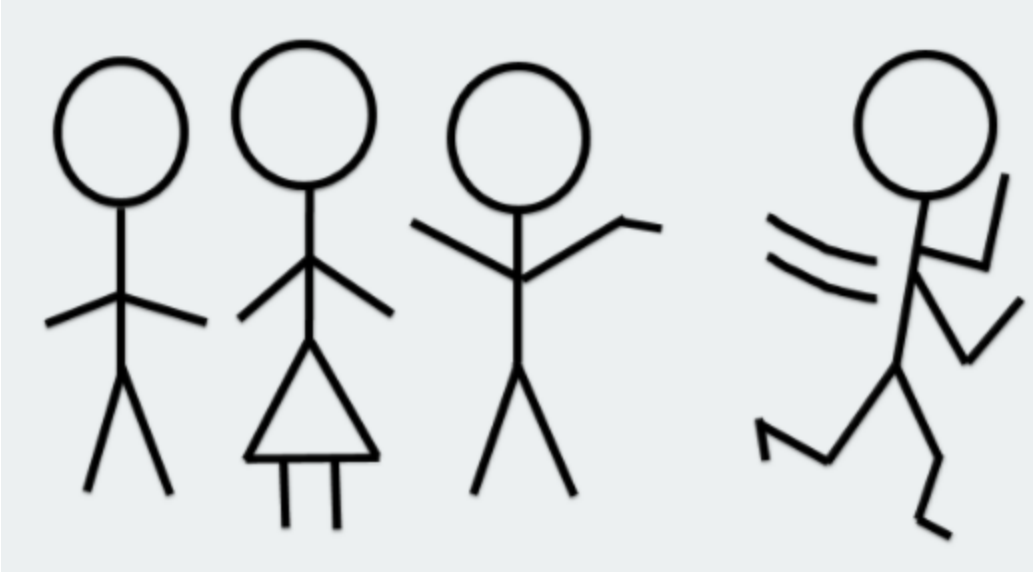


6. You see a boy cheating in a board game.

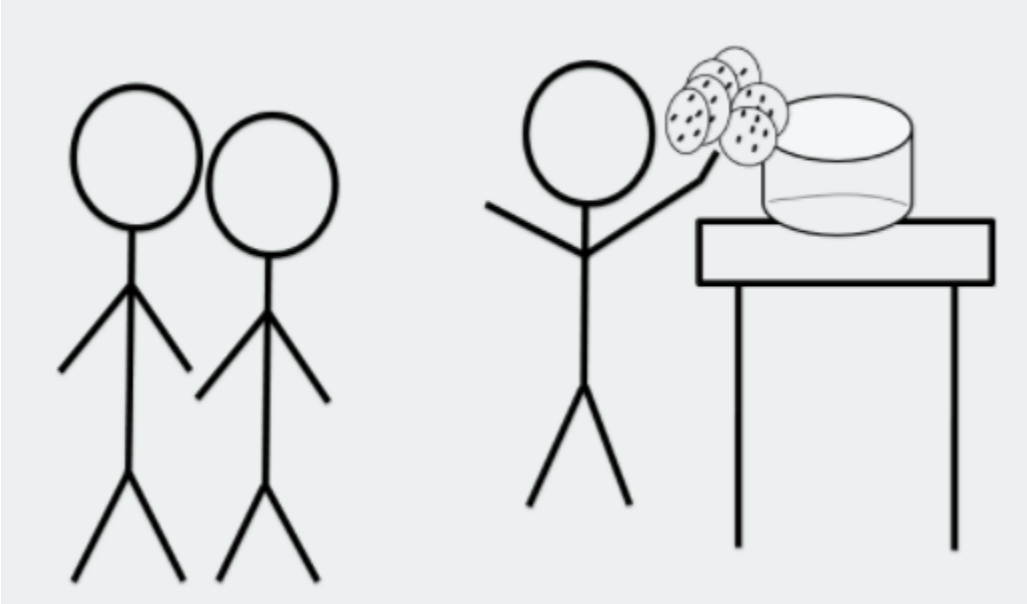


B. Inequality

7. You see a boy cut to the front of the line.



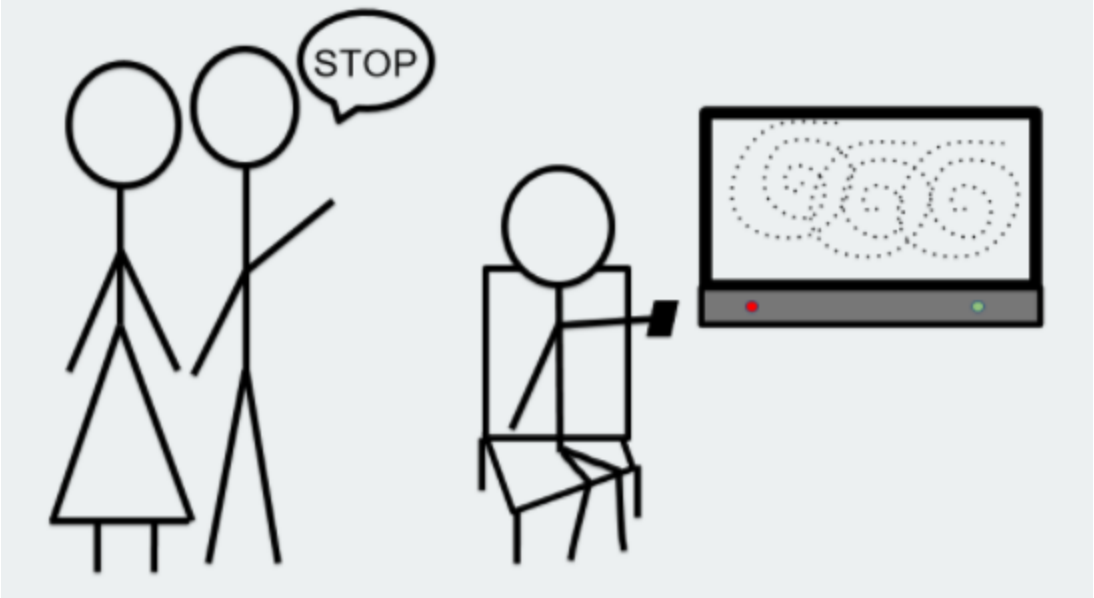
8. You see a boy taking all of the cookies, and leaving none for others.



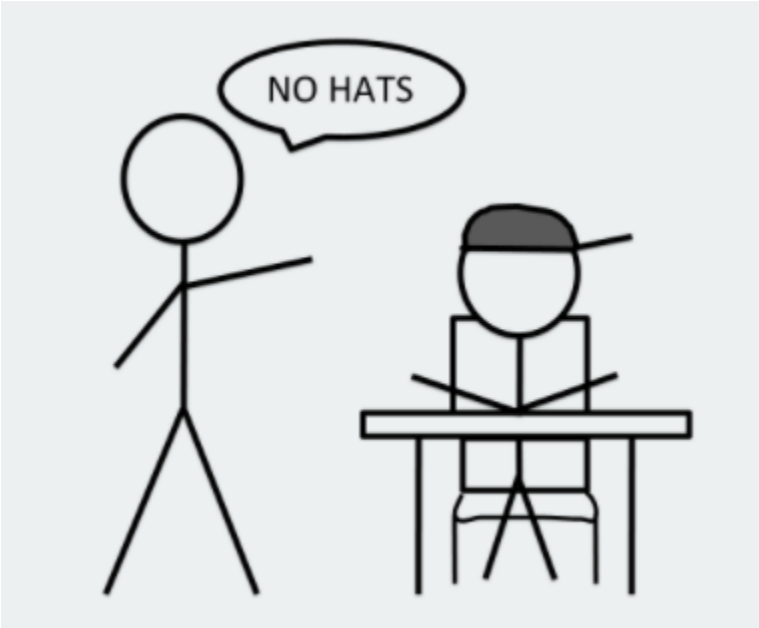
III. AUTHORITY

A. Disobedience

9. You see a boy ignore his parents when they tell him to stop watching TV.

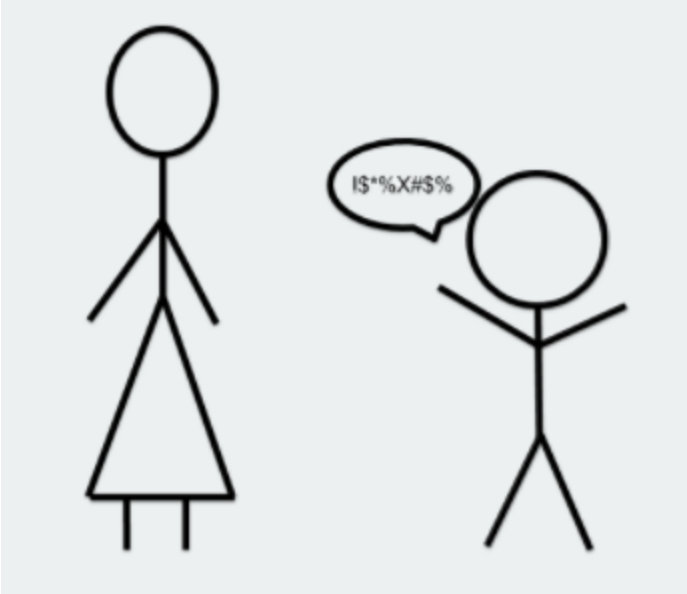


10. You see a boy wearing a hat at school, even after the teacher asks him not to.

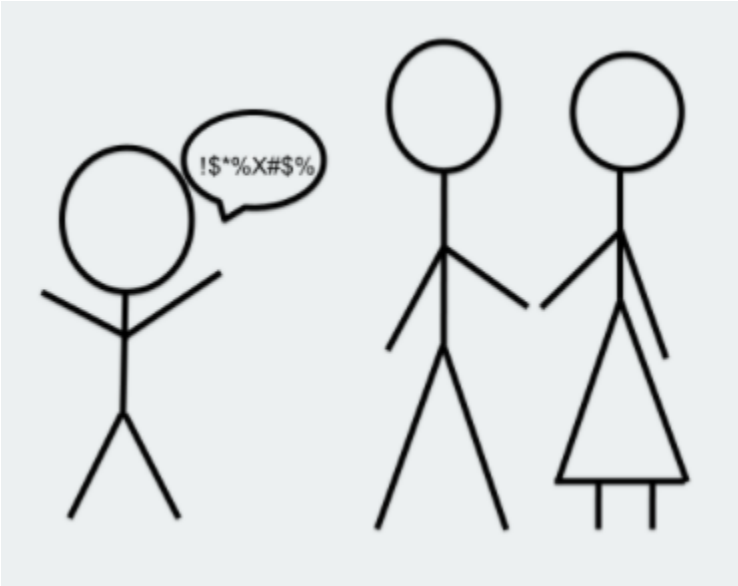


B. Disrespect

11. You see a boy calling his teacher bad words.



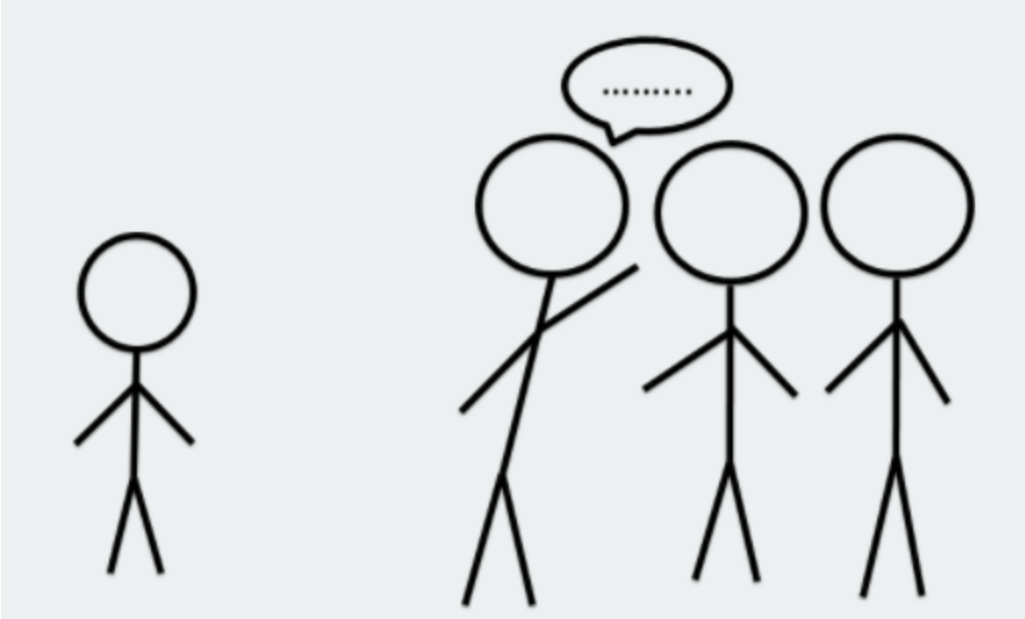
12. You see a boy calling his parents bad words.



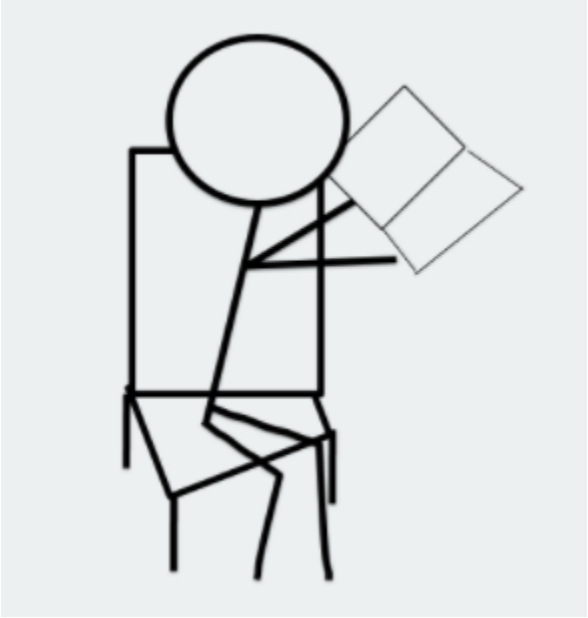
IV. LOYALTY

A. Disloyalty to Sibling

13. You see a boy telling secrets about his brother to people his brother doesn't like.

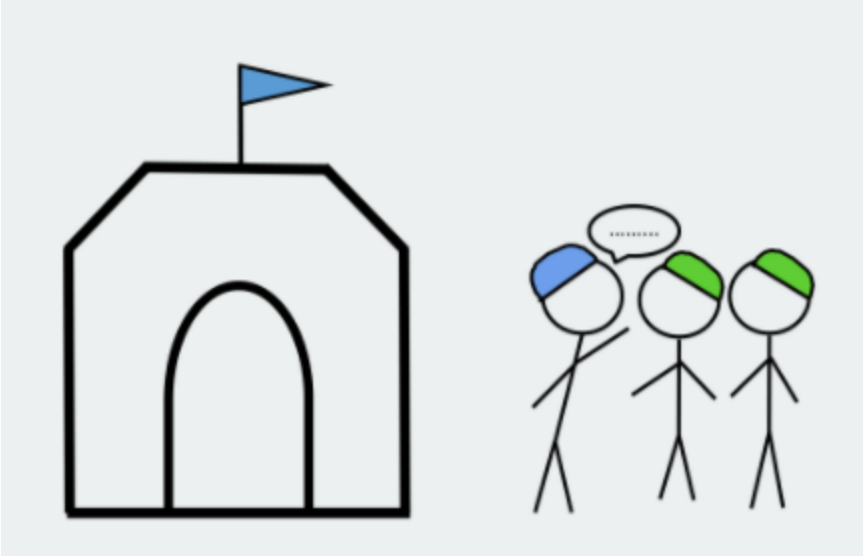


14. You see a boy reading his brother's diary.

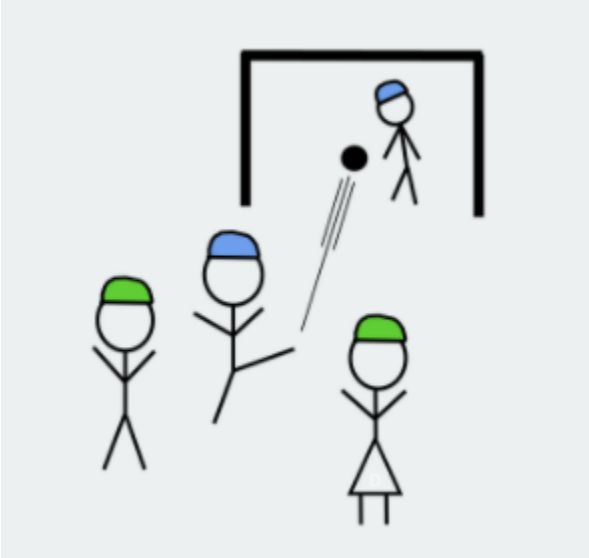


B. Disloyalty to Group

15. You see a boy teach a secret password to people who are not in his club.



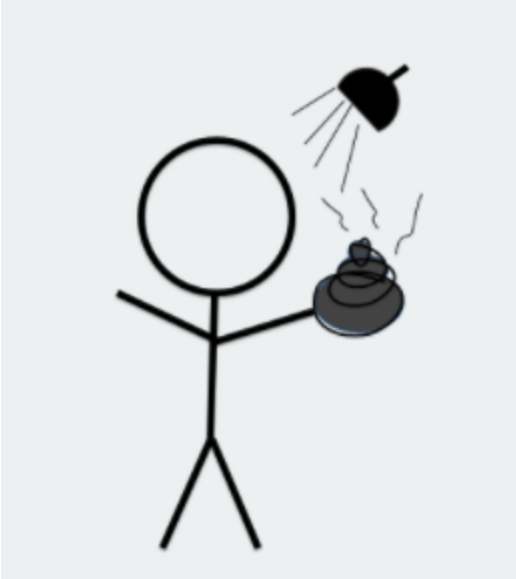
16. You see a boy score a goal against his own team to help the other team win.



V. SANCTITY/PURITY

A. Hygiene

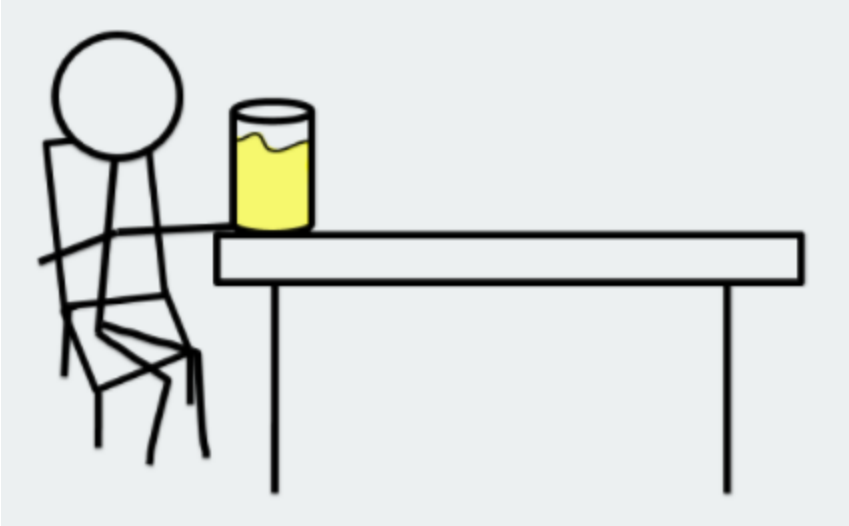
17. You see a boy rubbing poop on himself in the shower.



18. You see a boy using a dirty diaper as a pillow.

B. Food

19. You see a boy drinking pee with his dinner.

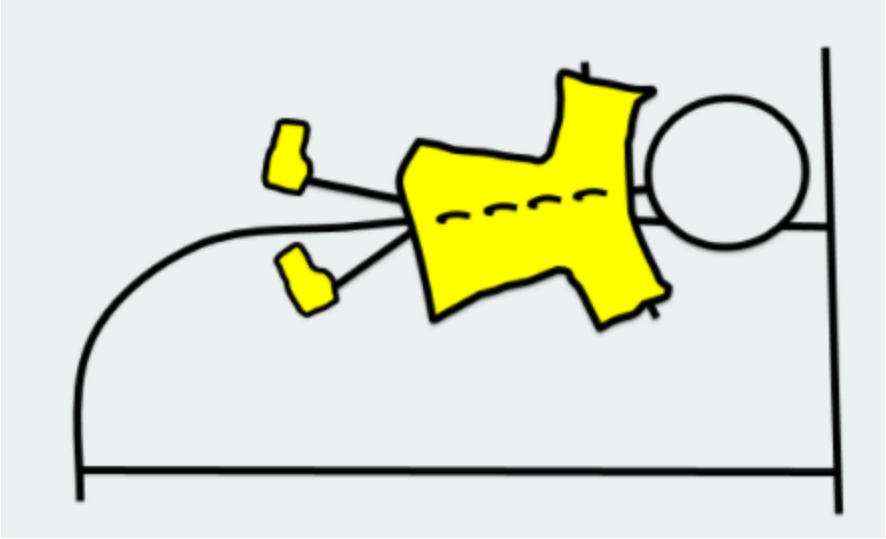


20. You see a boy loudly burping and farting while eating.

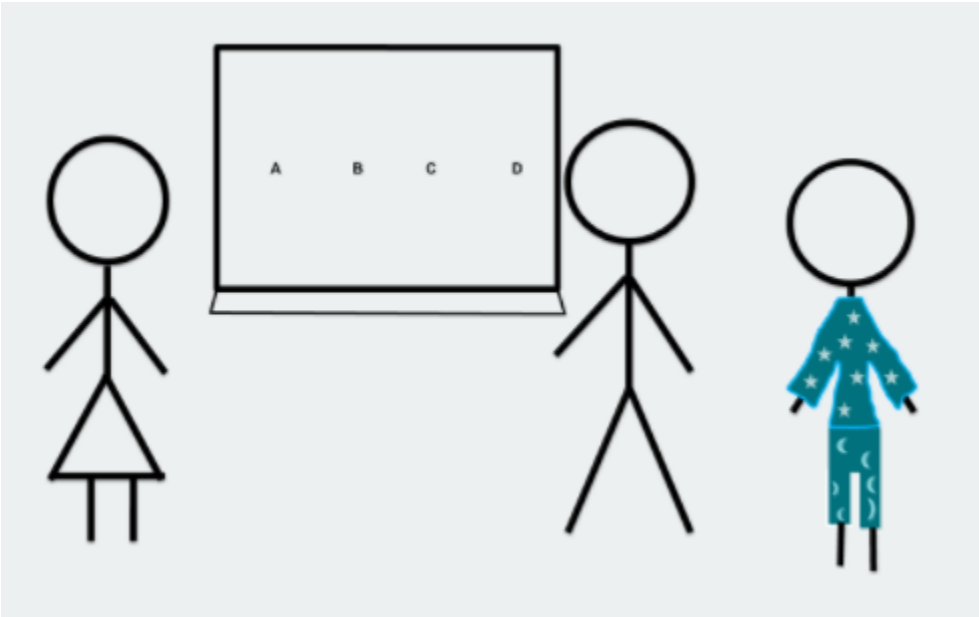
VI. ODD BEHAVIOUR

A. Clothing

21. You see a boy sleeping in his raincoat, instead of sleeping in pajamas.

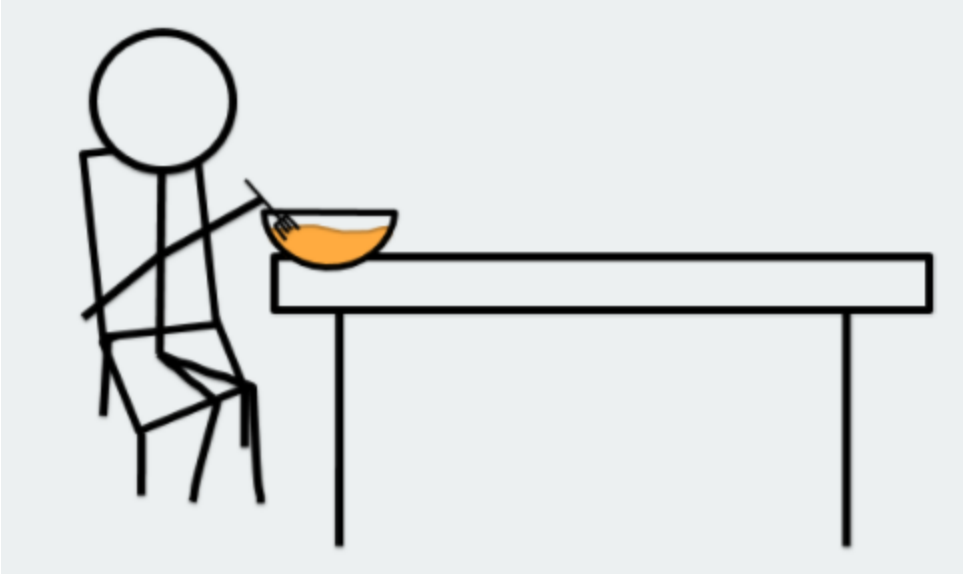


22. You see a boy wearing his pajamas to school.

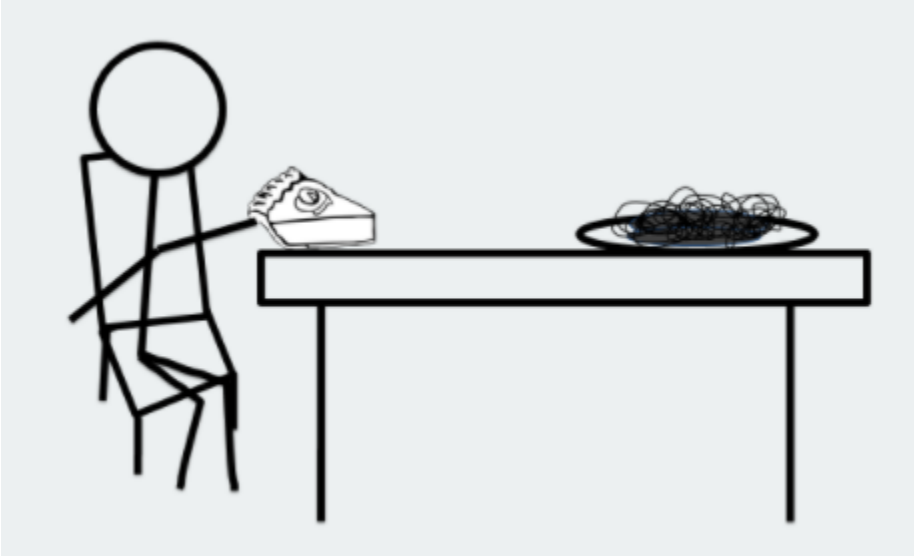


B. Food

23. You see a boy eating his soup with a fork.



24. You see a boy eat dessert before dinner is served, instead of eating it afterwards.

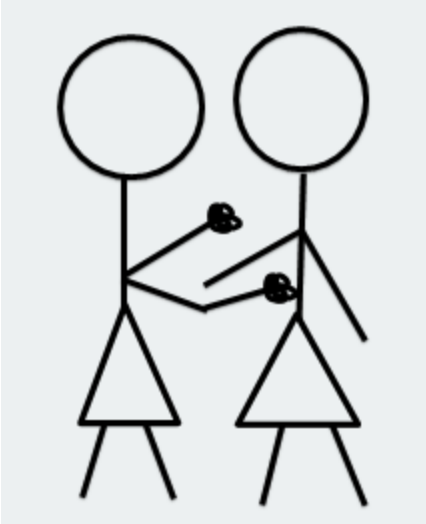


Female Items

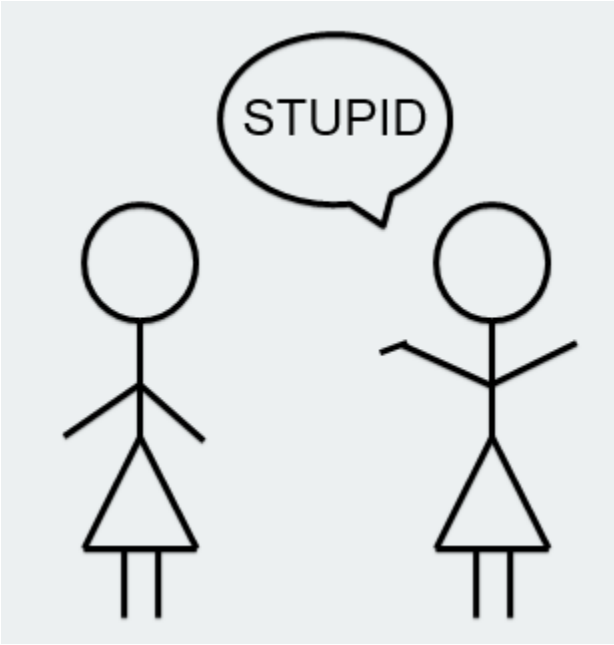
I. CARE/HARM

A. Harm to Human

1. You see a girl punch another girl in the stomach.

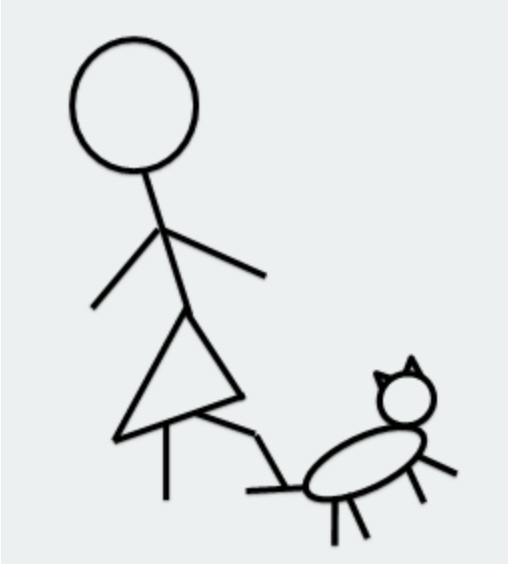


2. You see a girl calling a girl stupid.

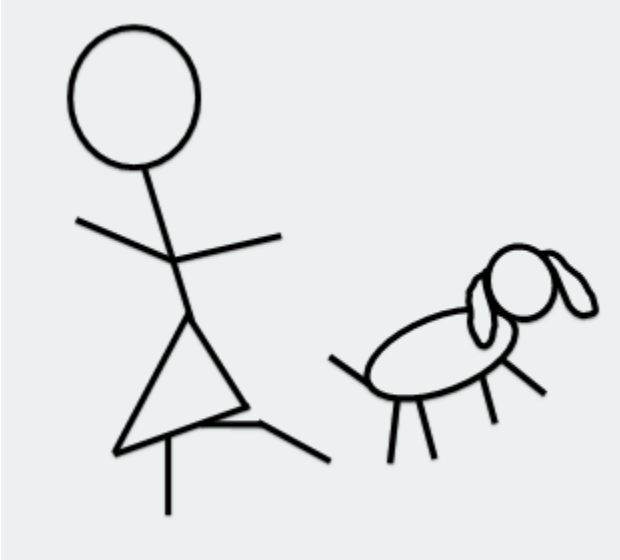


B. Harm to Animal

3. You see a girl stomp on the tail of her pet cat.



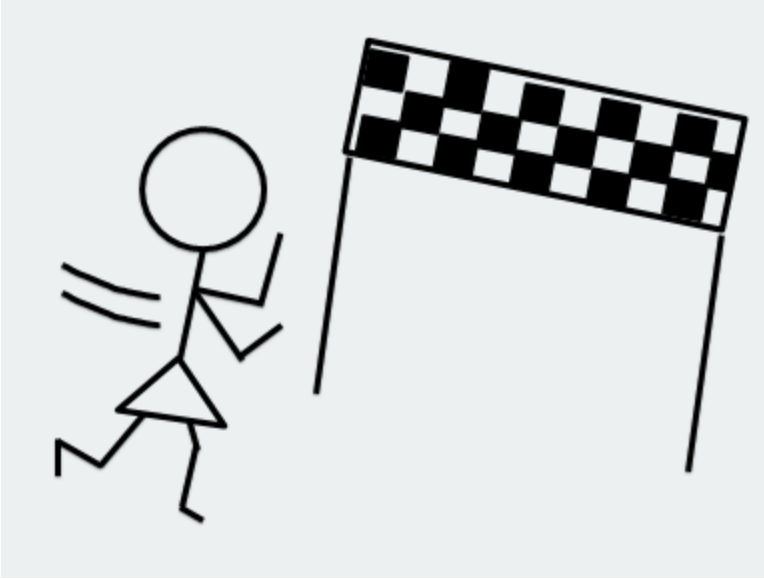
4. You see a girl kick a stray dog.



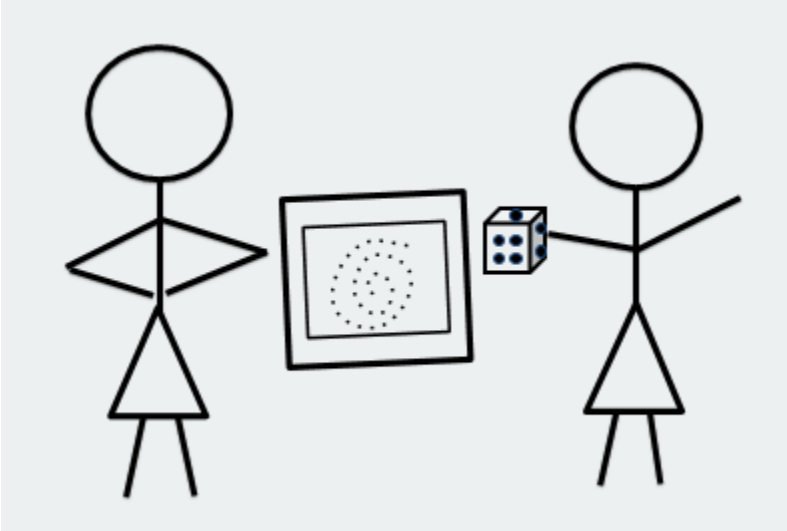
II. FAIRNESS

A. Cheating

5. You see a girl cheating in a race by taking a shortcut.

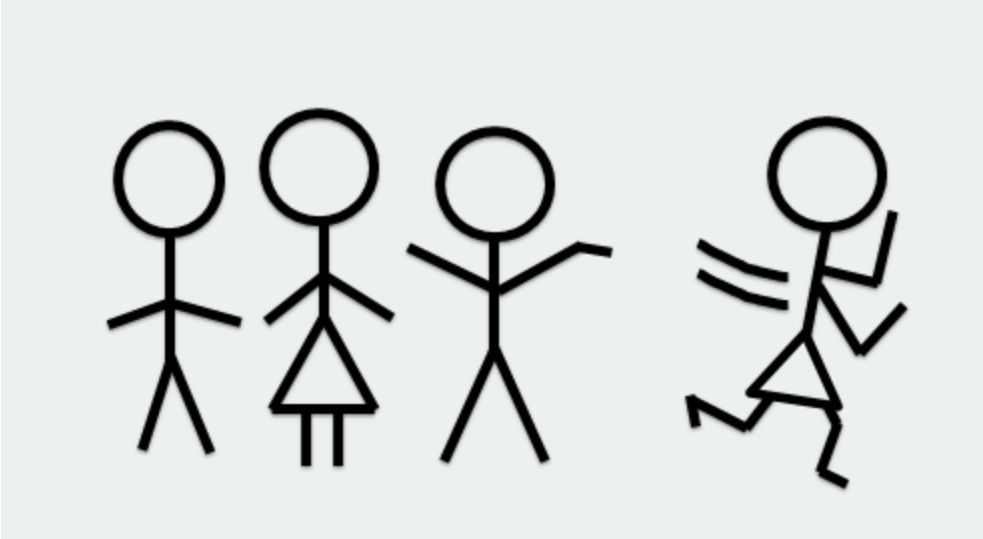


6. You see a girl cheating in a board game.

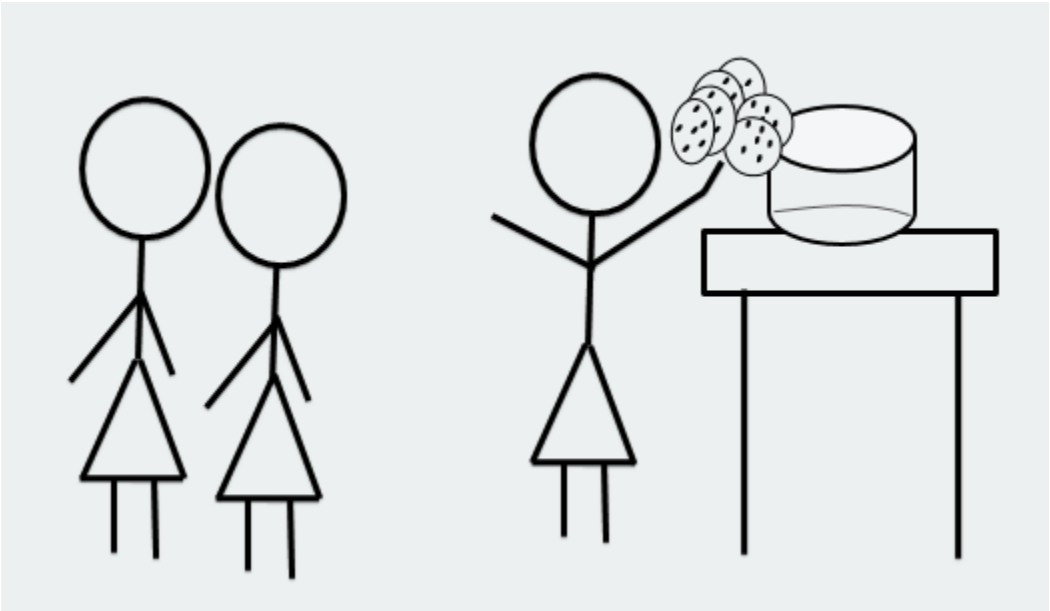


B. Inequality

7. You see a girl cut to the front of the line.



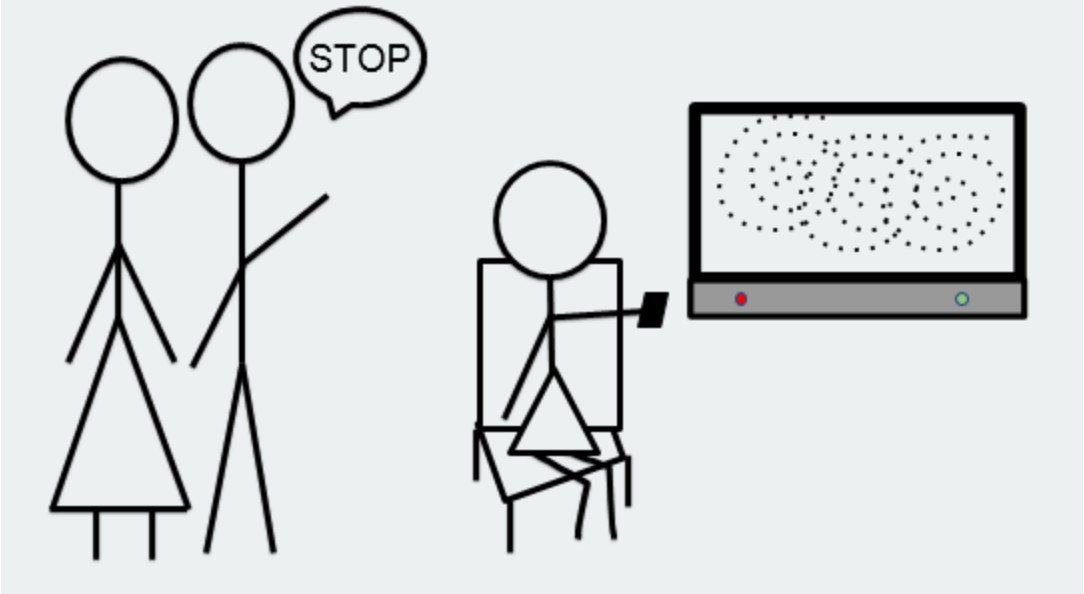
8. You see a girl taking all of the cookies, and leaving none for others.



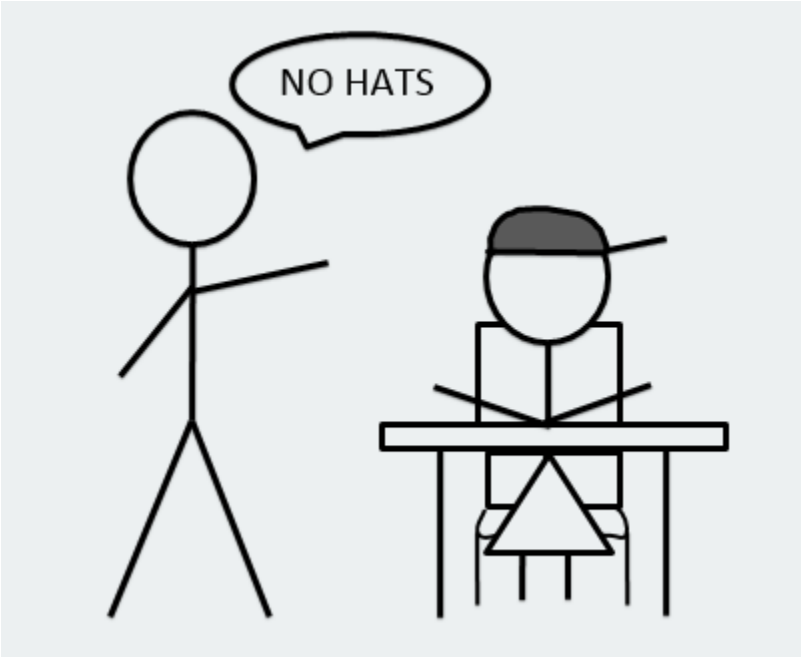
III. AUTHORITY

A. Disobedience

9. You see a girl ignore her parents when they tell her to stop watching TV.

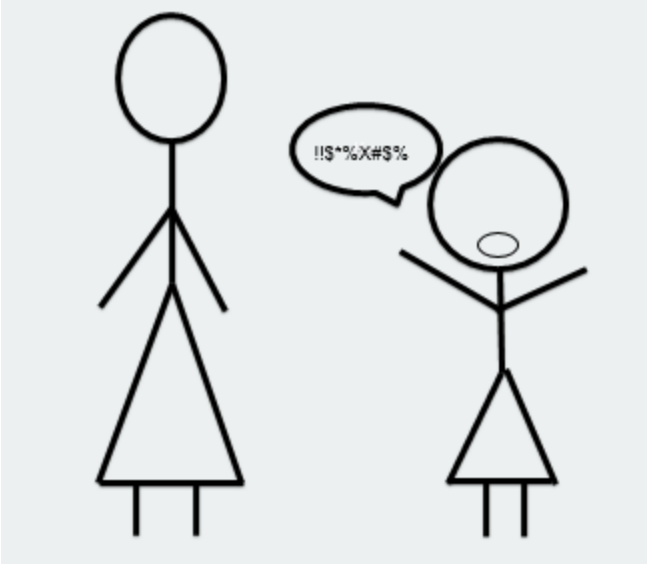


10. You see a girl wearing a hat at school, even after the teacher asks her not to.

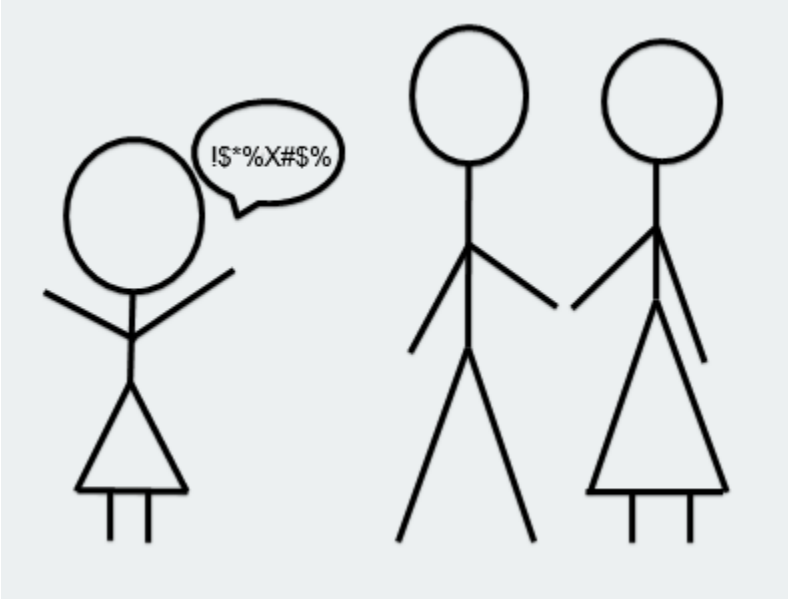


B. Disrespect

11. You see a girl calling her teacher bad words.



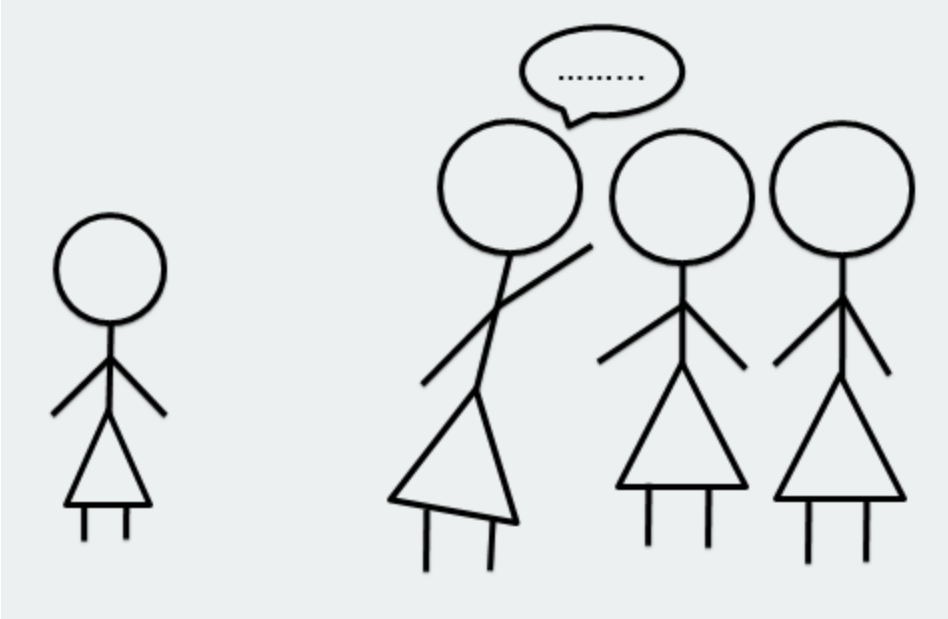
12. You see a girl calling her parents bad words.



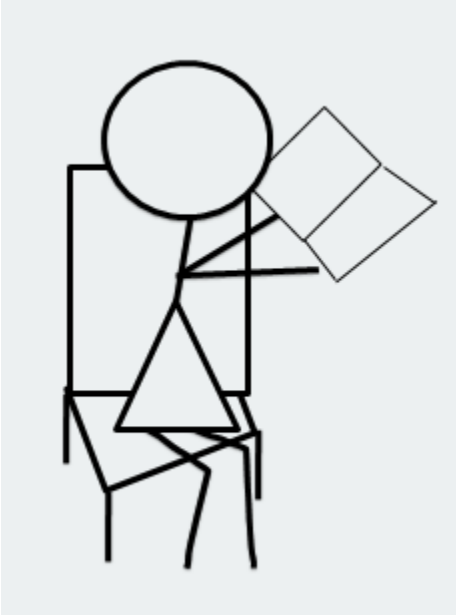
IV. LOYALTY

A. Disloyalty to Sibling

13. You see a girl telling secrets about her sister to people her sister doesn't like.

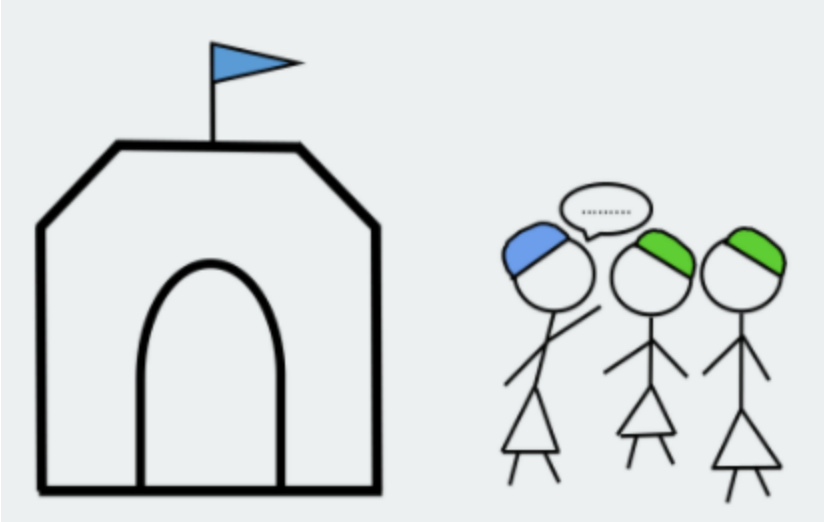


14. You see a girl reading her sister's diary.

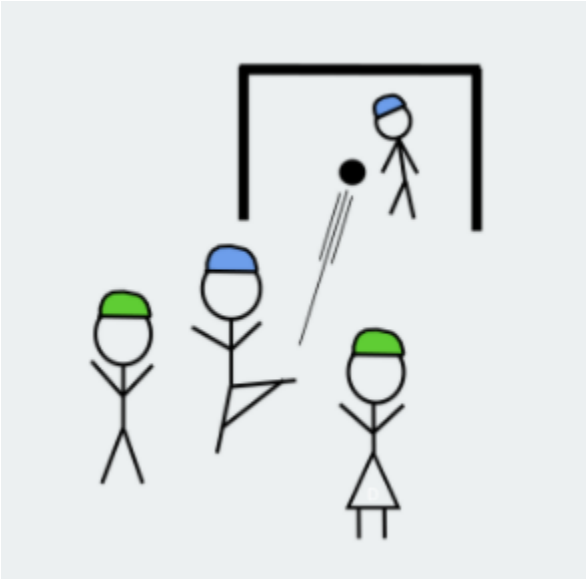


B. Disloyalty to Group

15. You see a girl teach a secret password to people who are not in her club.



16. You see a girl score a goal against her own team to help the other team win.

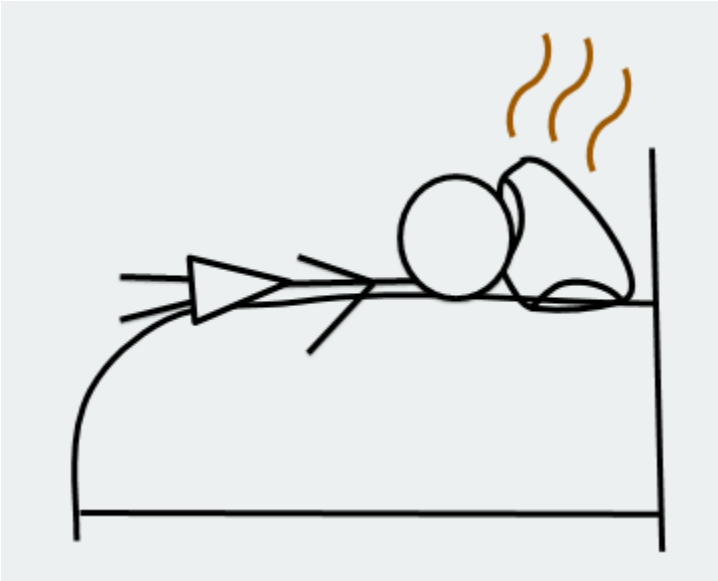


V. SANCTITY/PURITY

A. Hygiene

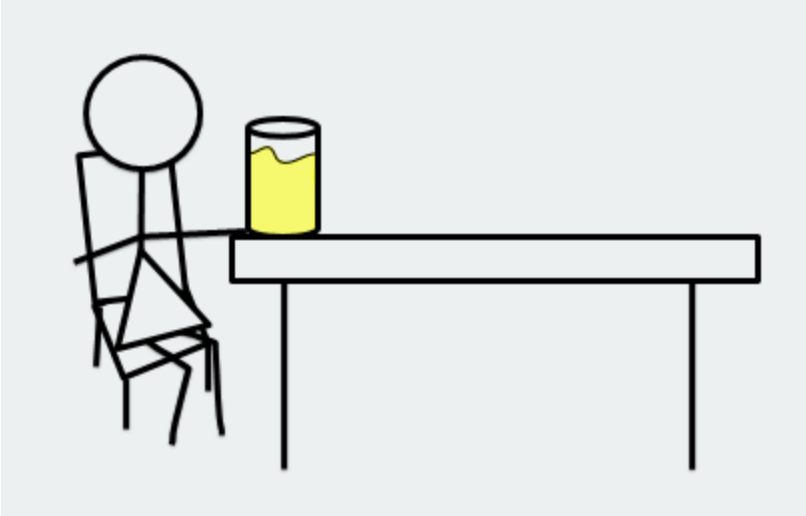
17. You see a girl rubbing poop on herself in the shower.

18. You see a girl using a dirty diaper as a pillow.

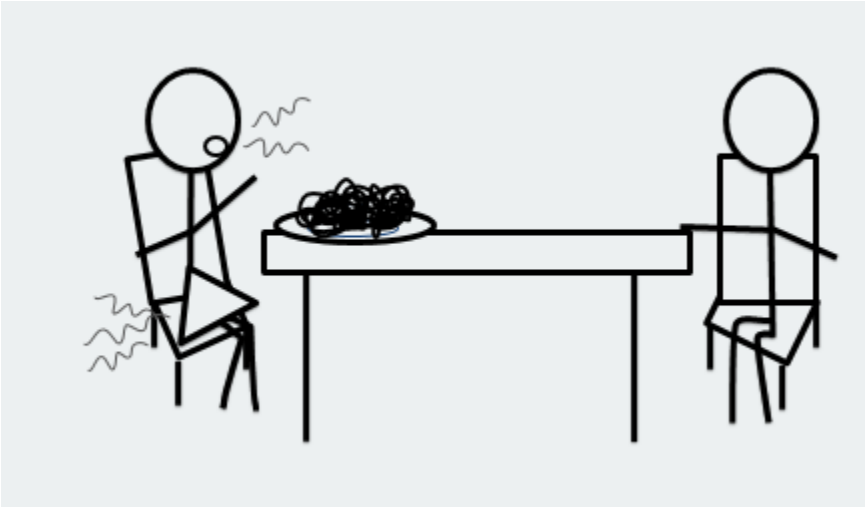


B. Food

19. You see a girl drinking pee with her dinner.



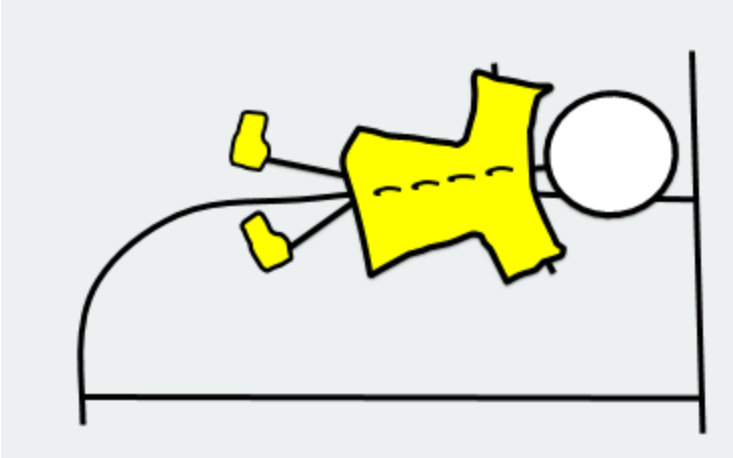
20. You see a girl loudly burping and farting while eating.



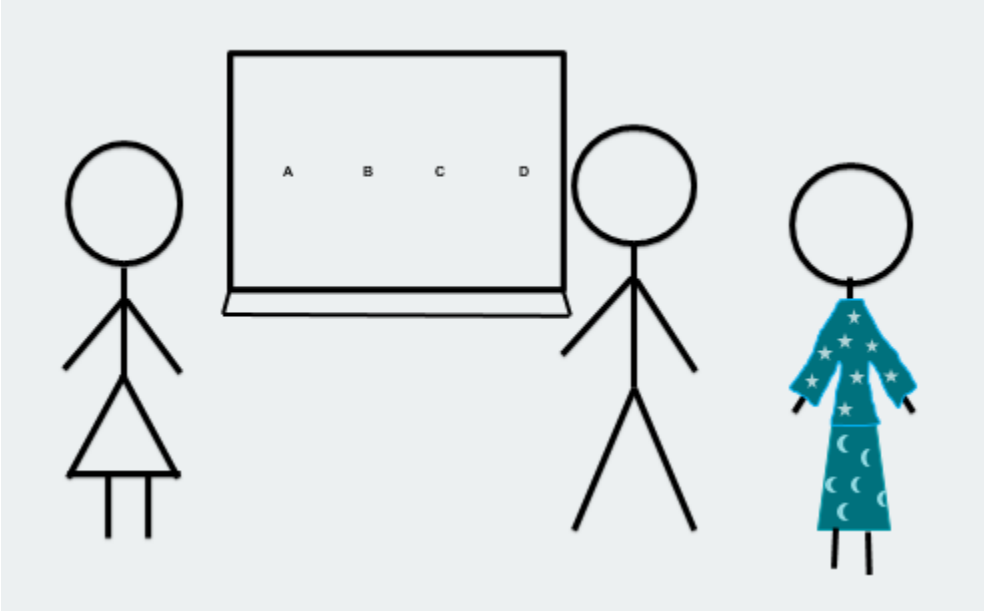
VI. ODD BEHAVIOUR

A. Clothing

21. You see a girl sleeping in her raincoat, instead of sleeping in pajamas.

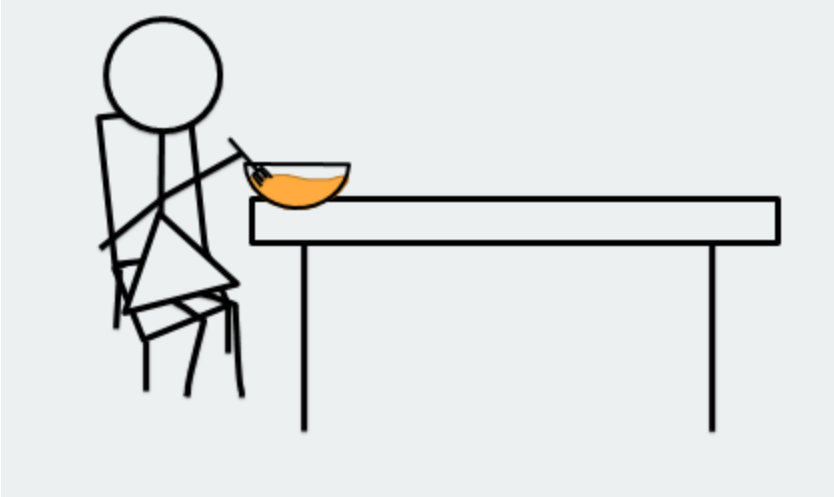


22. You see a girl wearing her pajamas to school.

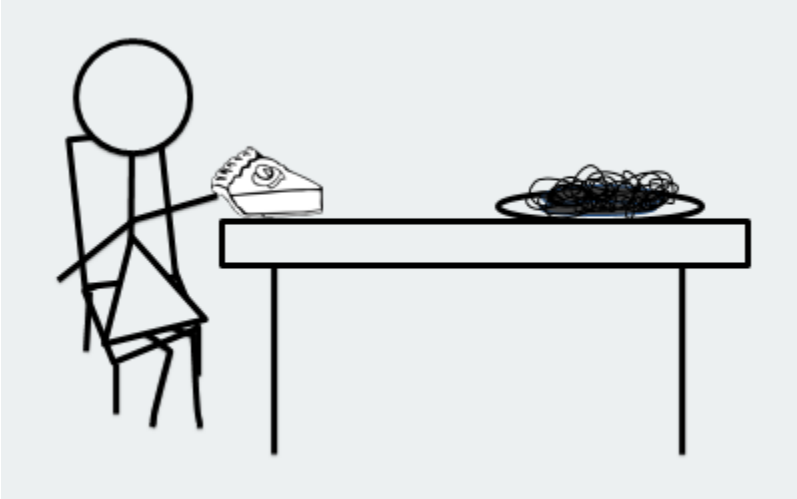


B. Food

23. You see a girl eating her soup with a fork.



24. You see a girl eat dessert before dinner is served, instead of eating it afterwards.



APPENDIX B

November 9, 2020
Morality in autism spectrum disorder: A systematic review

Development and Psychopathology
Cambridge University Press
University Printing House
Shaftesbury Road
Cambridge
CB2 8BS
United Kingdom

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Publication: Development and Psychopathology
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APPENDIX C

November 9, 2020
Moral foundations theory in autism spectrum disorder: A qualitative Investigation

Autism
Sage Publishing
Los Angeles
2455 Teller Road
Thousand Oaks
Los Angeles, CA 91320
United States

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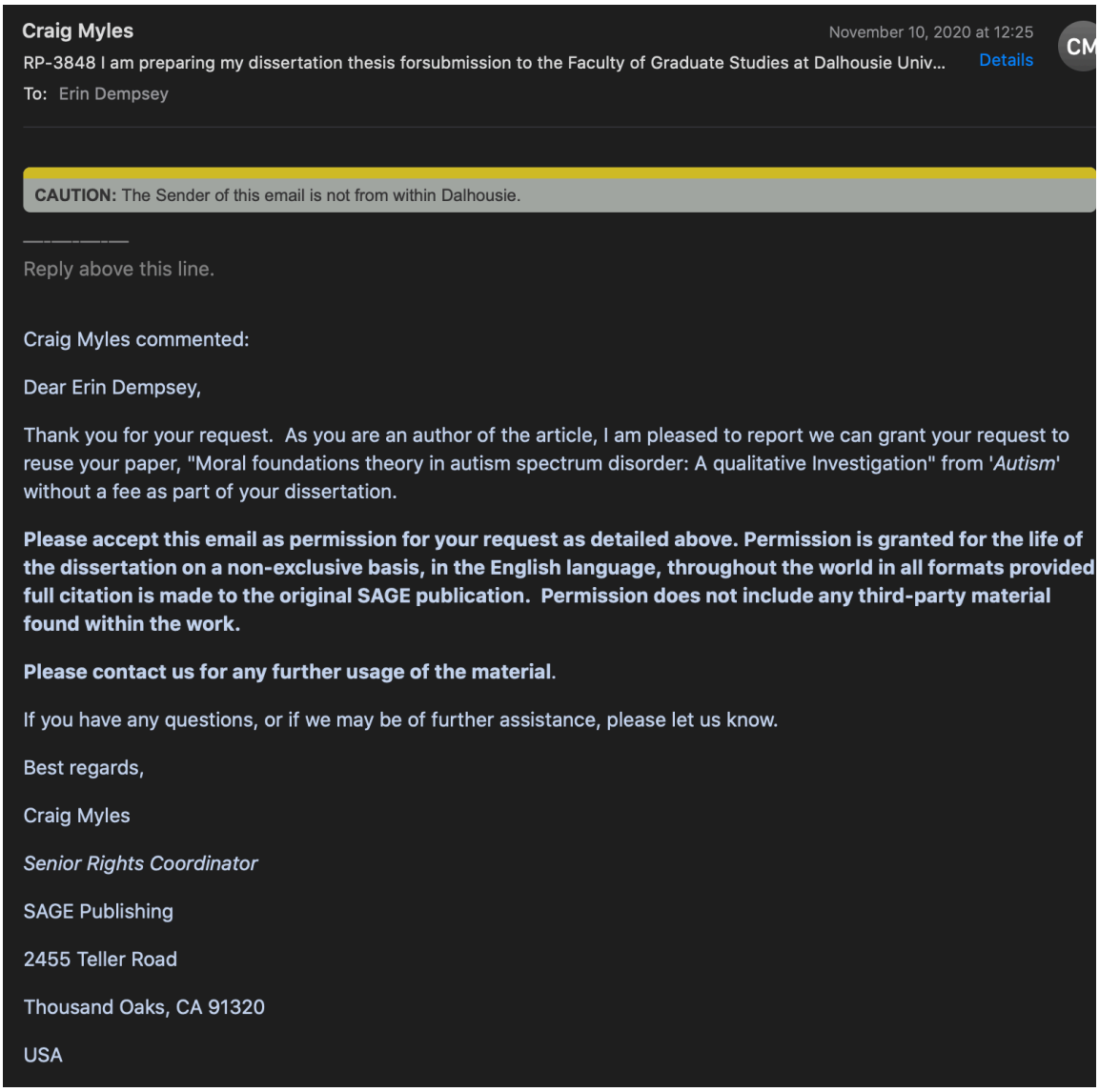

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APPENDIX D

Interview Template for Moral Foundations Theory in Autistic Adults

Warm-up Interview

Before we talk about morality, I want you to tell me about something that happened recently in your life that you enjoyed. This is so that I can get to know you a bit more, and so you can practice telling me about things. You can tell me about anything you want, like a party, vacation, or any other enjoyable thing that happened. Do you have something in mind to talk about?

If participant has trouble getting started, the interviewer will suggest he or she describe her most recent birthday celebration.

Then the interviewer will say: *Now, I want you to tell me as many details as you can remember about [the event]. There are no right or wrong answers, I just want to hear about [special event] in your own words. Please walk me through it as if you were telling a story, from the beginning to the end.*

After the participant finishes the story, the interviewer should praise the participant's effort and reinforce the details given. If insufficient detail is given, the interviewer will probe for more information, continuing to praise effort and content. After the warm-up interview has concluded, the interviewer will say: *Thank you for sharing that story with me. Now we're going to talk a bit about morality.*

Critical Incidents Interview Regarding Moral Foundations

First off, could you please list five things that you think are morally wrong?

What about five things that are morally right?

I'd now like you to think of one event in your life that felt morally wrong. This could be an event that you were directly involved in, one that you observed, or one that you heard about. It could be something that happened just once, or it could be something that is ongoing.

- *Please tell me about the event.*
- *Why was it morally wrong?*
- *How did it make you feel?*

I'd now like you to think about an event that was also morally right.

- *Please tell me about the event.*
- *Why was it morally right?*
- *How did it make you feel?*

I'd now like you to think about an event that was also morally right or wrong, but for a different reason.

- *Please tell me about the event.*
- *Why was it morally right/wrong?*
- *How did it make you feel?*

The following questions will be asked as needed to cover any moral foundations that were not covered by the previous prompts. The examples will be provided only as necessary, i.e., if participants are unable to provide examples of incidents involving the moral foundations in question or if they indicate lack of understanding of the terms.

I'd now like you to think of an event that seemed wrong because it was disloyal. Additional prompts as needed: *For example, maybe you saw a mayor saying that the neighbouring town is a much better town than her town. Or maybe you could think of a*

situation that was morally right because it showed loyalty. For example, maybe you saw a mayor defending her town when a neighbouring town insulted it.

- *Please tell me about the event.*
- *Why was it morally right/wrong?*
- *How did it make you feel?*

I'd now like you to think of an event that seemed wrong because it was unfair. Additional prompts as needed*: For example, maybe you see a student copying a classmate's answer sheet on a final exam. Or maybe you could think of a situation that was morally right because it showed fairness. For example, maybe you saw a student refusing to allow a classmate to cheat on a final exam.*

- *Please tell me about the event.*
- *Why was it morally right/wrong?*
- *How did it make you feel?*

I'd now like you to think of an event that seemed wrong because it was disrespectful or went against authority. Additional prompts as needed: *For example, maybe you saw a girl ignoring her father's orders by taking the car after her curfew. Or maybe you could think of a situation that was morally right because it showed respect to authority. For example, maybe you saw a girl head home on time to obey her parent's curfew even though she was having fun at a party.*

- *Please tell me about the event.*
- *Why was it morally right/wrong?*
- *How did it make you feel?*

I'd now like you to think of an event that seemed wrong because it was impure, degrading, or disgusting. Additional prompts as needed*: For example, maybe you saw a teenager urinating in the wave pool at a crowded amusement park. Or maybe you could think of a situation that was morally right because it showed purity. For example, maybe you saw a teenager get out of the pool and go to the bathroom to urinate instead of going in the pool.*

- *Please tell me about the event.*
- *Why was it morally right/wrong?*
- *How did it make you feel?*

APPENDIX E

Early Social Development Lab ESDL DALHOUSIE UNIVERSITY IWK Health Centre

Demographics Form

Moral Foundations Theory in Adults with Autism Spectrum Disorder: A Qualitative Investigation

This information will be used only for descriptive purposes. No information will be released in a way that would identify individuals.

1. How old are you?

   _____

2. What is your postal code?

   _____

3. What is your gender?

☑	**Gender**
	Man
	Woman
	Transgender
	Non-binary
	Other (please specify):

4. Please indicate your Ethnic / Cultural Heritage:

☑	**Ethnic / Cultural Heritage**
	"White" / European descent
	African-Canadian / African Descent
	Indigenous (First Nations, Métis, Inuit)
	Middle Eastern
	Asian / South Asian / Southeast Asian
	Latin American / Central American / South American
	Other (please specify):

6. Please indicate your highest level of education:

☑	Highest level of Education
	Grade 9 or less
	Some high school
	Completed high school
	Some trade, technical, vocational school or business college, community college, CEGEP, university
	Completed trade, technical, vocational school or business college, community college, CEGEP,
	Bachelor's/Undergraduate degree (e.g. BA, BSc, BEd)
	Master's degree (e.g. MA, MSc, MEd)
	Doctorate (e.g. PhD, DSc, EdD) or Professional degree [e.g., medicine (MD), dentistry (DDS, DMD), veterinary medicine (DVM), Optometry (OD), or Law (LLB, JD)
	Other (please specify):

7. Please indicate your current occupational status

☑	Current Occupational status
	Employed full time
	Employed part time
	Self employed, full time
	Self employed, part time
	Unemployed
	Retired
	Student
	Homemaker
	Company paid sick leave
	Government disability
	Social assistance
	Other (please specify):

8. If you are currently employed, please indicate the type of work you do:

_____

9. This question is about your **total/combined annual household income (from all sources) before any deductions**. You may choose not to answer this question. However, answering this question will help us better understand the potential effects of economics on moral reasoning.

____ Less than $20,000

____ $20,000-39,999

____ $40,000-59,999

____ $60,000-99,999

____ $100,000-139,000

____ $140,000 or more

____ Prefer not to answer

APPENDIX F

Interview Regarding Moral Foundations Questionnaire Responses

First off, could you please list five things that you think are morally wrong?

What about five things that are morally right?

The interviewer will then review each participants' Moral Foundations Questionnaire for Kids responses. For all vignettes the interviewer will reiterate the vignette supplemented by the cartoon drawing accompanying the vignette, and ask:

- *Why was it wrong/okay?*
- *How did it make you feel?*