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Anticipatory concern: A study in autism

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Abstract

There has been substantial research on children's empathic responsiveness towards distressed people, and on the limited responsiveness of children with autism. To date, however, there have not been experimental studies to test how far children show concern towards someone who might be *expected* to feel badly, when that person has *not* (yet) expressed any negative feelings. We tested matched groups of children with autism and learning disability, and typically developing children of similar verbal mental age (approximately six years), with a novel procedure in which participants witnessed one person (E1) tearing the drawing of another (E2). In a comparison condition, a blank card was torn. In the torn-drawing condition, as predicted, fewer participants with autism orientated towards E2 with an immediate look, and as a group, they were rated as showing less concern for, and fewer concerned looks towards, E2. We discuss possible implications for theoretical perspectives on the early development of empathy in typically as well as atypically developing children.

Anticipatory concern: A study in autism

There is a rich tradition of research into young children's emerging capacities to show empathy and concern towards other people (see, for example, contributions to Eisenberg & Strayer, 1987a; also Barrett, Zahn-Waxler, & Cole, 1993; Cole, Barrett, & Zahn-Waxler, 1992; Zahn-Waxler & Robinson, 1995). Although there have been a variety of theoretical perspectives concerning the nature and origins of empathy (well reviewed from an historical perspective by Wispé, 1987, and more recently expressed in peer commentaries on Preston & de Waal, 2002), as well as dispute over the criteria appropriate for judging when 'true' empathy or sympathy is observed among young children (Hoffman, 2007; Thompson, 1987), there has been little empirical research to evaluate children's manifest affective responsiveness to the plight of someone else whose (potential) distress is *not* perceptible in the person's bodily expressions of emotion. For the present set of studies, we devised a novel method to explore this specific aspect of empathic concern from the perspective of developmental psychopathology. Through an investigation of anticipatory concern among children with autism and matched individuals without autism – one group with mental retardation and another typically developing – our aim was to assess the plausibility of the hypothesis that human fellow-feeling is structured by the propensity to identify with the attitudes of other people.

There are several themes that characterize contemporary theorizing about the nature and early development of empathy among children. In part, the debates reflect longstanding controversies about the role of cognitive appraisals in the genesis of emotions (as expressed, for example, in the exchanges between Zajonc, 1984, and Lazarus, 1984), and more specifically about the cognitive abilities that need to have

developed in order for young children to have specific kinds of feeling. In the case of empathy and sympathy, there is a case for arguing that, as Sroufe (1995, p 127) expresses it, ‘In many ways true empathy/altruism and hostile aggression draw on the same cognitive advances – namely, the child’s understanding of the feelings of the other person’. In particular, it appears that the newfound ability to think about oneself and others *as* individual selves around the middle of the second year of life is critical for the new forms of sympathetic role-taking that are observed at this time (Barresi & Moore, 1996; Hobson, 1993a; Hoffman, 1982; Kagan, 1982; Lewis, 2003, 2004; Moore, 2007). Among other cognitive accomplishments that have been highlighted as important for empathy and concern are the ability to take the role of someone else (Feshbach & Roe, 1968), the exercise of the imagination (Harris, 1989), hypothetical thinking and the availability and use of mental models of alternative psychological stances (Perner, 1990), and theory of mind or mentalizing abilities (Frith, 2003).

The question arises whether the development of these *understandings* of self and other is founded upon earlier forms of affective responsiveness to the feelings of another person in which infants register the otherness of the other (Hobson, 1993a, b; Hobson, Chidambi, Lee, & Meyer, 2006; Hoffman, 2007; Strayer, 1987). As Thompson (1987) has discussed, the dominance of cognitive-developmental perspectives on emotional awareness and responsiveness, coupled with an emphasis on relatively detached and intellectually demanding methods to assess empathy, may have underestimated infants’ capacities for feeling towards others who are apprehended, but not conceptualized, as separate beings. Here it is relevant to note a distinction emphasized by Eisenberg

(Eisenberg, 2002; Eisenberg & Strayer, 1987b) concerning empathy, sympathy, and personal distress. Eisenberg and Strayer (1987b, pp. 5-7) state:

In our view, empathy involves sharing the perceived emotion of another – “feeling with” another. This vicarious affective reaction may occur as a response to overt perceptible cues indicative of another’s affective state (e.g., a person’s facial expressions), or as the consequence of inferring another’s state on the basis of indirect cues (e.g., the nature of the other’s situation)...Sympathy is “feeling for” someone, and refers to feelings of sorrow, or feeling sorry, for another. That is to say, sympathy often involves feelings of concern, although the conscious cognitive realization that one is concerned about another’s welfare is an outcome, rather than a part, of sympathizing. Often sympathy is the consequence of empathizing, although it may be possible for sympathy (as well as empathy) to result from processes such as cognitive perspective taking. Whether or not empathy always mediates sympathizing is an open question.

As this quotation makes clear, the distinction between empathy and sympathy may be important for some purposes, yet there might be an intimate developmental relation between the two. If we are to explore this issue, as well as to reconcile differences in emphasis concerning the relative primacy of emotional and cognitive factors in the genesis and elaboration of empathy in early development, it will be important to specify what is already inherent in the structure of basic forms of human social-emotional experience, and what are the processes through which cognitively articulated understandings of, as well as responsiveness to, other persons are achieved. The present

study of sympathetic concern from the perspective of developmental psychopathology is intended to contribute to this domain of research.

The Case of Autism

One approach to uncovering the grounding and developmental implications of young children's propensity to empathize with others, is to study conditions in which there appears to be a diminished capacity for such responsiveness to other people's feelings. Early childhood autism represents the most celebrated case in point. When Kanner (1943) first identified the syndrome, he characterized his cohort of 11 children as having 'inborn autistic disturbances of affective contact' with other people (p. 250). Kanner attempted to capture the children's stance in relation to others by writing of their 'profound aloneness', and conveyed how 'people, so long as they left the child alone, figured in about the same manner as did the desk, the bookshelf, or the filing cabinet' (p. 246). Such descriptions have been amplified by other clinical accounts such as that of Bosch (1970), who concluded that in autism, a "delay occurs in the constituting of the other person in whose place I can put myself" (Bosch, 1970, p. 89).

These observations highlight how empathic human relatedness towards others – a pervasive feature of interpersonal engagement, not reducible to the more specific potential to show concern toward people in distress – appears to be striking for its relative lack among many children with autism. In the last two decades, there has been substantial empirical and theoretical progress in tracing how impairments in intersubjective person-with-person co-ordination and communication might be pivotal for a range of the children's intellectual as well as social difficulties.

The sources of empirical evidence are several. Parental reports (e.g. [Dahlgren and Gillberg, 1989](#); [Hobson et al., 2006](#); [Lord, Storoschuk, Rutter, & Pickles, 1993](#); [Stone & Lemanek, 1990](#); [Vostanis et al., 1998](#); [Wimpory, Hobson, Williams, & Nash, 2000](#); [Wing, 1969](#)) reveal that young children with autism are relatively unresponsive to other people's non-verbal as well as verbal communication, and that such abnormalities occur in one-to-one affective engagement as well as in joint attention and other forms of co-reference towards a shared world. In a study by Wimpory and colleagues (2000), for example, where parents of matched young children with and without autism were asked to describe their offspring in the first two years of life, not one of the infants with autism were reported to have shown frequent and intense eye contact or engaged in turn-taking with adults, and there were also fewer infants with autism who greeted or waved to their parents, or who directed feelings of anger and distress towards people. When interviewed in a recent study by Hobson et al. (2006), parents described how their children with autism showed jealousy towards others and were affected by others' moods, but far fewer were reported to show concern or guilt towards other people than were matched children without autism. As one parent responded when asked if her son showed concern if she were upset: "He might be worried but he doesn't have that empathy sort of concern – he doesn't show that at all... Empathetic sadness isn't there" ([Hobson et al., 2006, p 67](#)). Hobson and colleagues concluded that it is especially in expressing 'person-centred' feelings – that is, feelings *for and in relation to* other people – that children with autism are unusual.

Systematic observational and experimental studies of children and adolescents with autism provide complementary evidence for limitations in their *affective relatedness*

towards other people (e.g., Attwood, Frith, & [Hermelin](#), 1988; Dawson et al., 1990; [Hobson & Lee](#), 1998; Lord, 1995; Snow, Hertzog, & Shapiro, 1987). Sigman, Kasari, Kwon, & Yirmiya (1992) conducted direct tests of young children's empathic responsiveness and concern in relation to other people's expressions of distress or other negative feelings. Participants were 30 young autistic children with a mean age under four years, closely matched non-autistic children with learning disabilities and typically developing children. The technique was to code these children's behaviour when an adult (in some conditions the child's parent) pretended to hurt herself by hitting her finger with a hammer, simulated fear towards a remote-controlled robot, and pretended to be ill by lying down on a couch for a minute, feigning discomfort. In each of these situations, children with autism were unusual in rarely looking at or relating to the adult (also Charman, Swettenham, Baron-Cohen, Cox, Baird, & Drew, 1997, for similar studies with 20-month-olds). In one of a set of quasi-experimental studies, Hobson et al. (2006) investigated how children with autism responded to a situation that might be expected to elicit feelings of guilt. Although similar numbers of children in each of the matched groups made attempts to repair an object that broke in their hands, and similar numbers showed a negative emotional response, there was a highly significant group difference in ratings of guilt. For example, only 2 out of 12 participants with autism but 10 out of 12 participants without autism showed "guilty looks" involving a gaze pattern towards and/or away from the tester with accompanying anxiety and reassurance-seeking that tended to elicit the raters' sympathy.

These studies of real-life exchanges are complemented on the one hand by a range of experimental studies suggesting autism-specific impairments in the perception and

expression of emotion (as reviewed by Hobson, 2005), and on the other, interviews with more able children and adolescents with autism that provide telling detail of what the children appear to experience in relation to others ([Bauminger & Kasari, 2000](#); Lee & [Hobson, 1998](#); Yirmiya, Sigman, Kasari, & Mundy, 1992; and Baron-Cohen, Richler, Bisarya, Gurunathan, & Wheelright, 2003, for a questionnaire approach). [Kasari, Chamberlain,](#) and Bauminger (2001) described how high-IQ children with autism could report feeling guilt, but compared with control children they provided fewer self-evaluative statements and fewer instances of empathic guilt, and were more likely to describe situations in terms of rule-breaking, disruptiveness and damage to property, rather than those of causing physical or emotional harm to others

The hypothesis that underpins the present study focuses upon the *quality* of intersubjective impairment that might account for the contrast between individuals with and without autism in the structuring of interpersonal relations. One critical aspect of empathy and related feelings of concern and guilt (and arguably, other emotions that entail engagement with other people's attitudes such as embarrassment, coyness, shame, and mutual joy) is that a person does more than respond to someone emotionally: he or she engages with the other person's feelings *as* the other's feelings. Our hypothesis is that (most) individuals with autism have specific limitations in experiencing and manifesting 'person-centred' feelings such as concern for the reason that such relations are configured by the propensity to *identify with* the psychological stance of another person (a theoretical position partly founded upon Freud, 1955/1921, and elaborated in Hobson, 1993; Hobson et al., 2006; Hobson, 2007). The important thing about this process is that one has feelings that are congruent with those of the person identified-with, but one *also* retains

an affective relation towards this other as experienced. For example, if one identifies with a person's suffering or anger, one might still feel concern or fear towards the person identified-with; and the concern or fear is felt in virtue of the other being experienced *as* suffering or angry, through identification. In keeping with phenomenological approaches to the nature of interpersonal responsiveness ([Merleau-Ponty, 1964](#); Stein, 1989), it is postulated that such modes of apprehending the emotional stance of others underpin (rather than presuppose) one's concepts of people's minds, or so-called Theory of Mind, and are the basis for (not the result of) cognitively articulated role-taking. In addition, this form of self/other structuring of social experience leads one to anticipate - and where appropriate, orientate towards and engage with - feelings that belong to someone else, even in the absence of perceptual evidence of the other person's state. According to this hypothesis, then, identifying-with is a basic unit of analysis of social relatedness, and limitations in this process are pivotal for an adequate account of the developmental psychopathology of autism.

The Present Study

Whereas previous quasi-experimental studies have addressed children's potential for empathy through their manifestations of concern when someone else shows distress, we were interested in evaluating whether they would show concern in anticipation of the person having a negative experience, prior to that person showing any explicit reaction to potentially distressing circumstances. Here any group differences could not be attributed to children's failure to perceive or affectively respond to another person's *expressions* or other manifestations of a state of distress, for none were shown. Rather, this was a test of whether participants apprehended the situation as one that would hurt another person's

feelings as it would their own. If they were to do so, and if they had the potential to care about the person, then they might express and/or convey their concern in anticipation of the reaction they expected.

Thus our aim was to test whether the children would identify with another person's situation and experiences, and in so doing, express sympathy or direct other expressions of fellow-feeling towards the person in question. We predicted that when participants saw an (unreactive) person's drawing torn by someone else, children with autism would be less inclined than matched children without autism to a) orientate towards that person immediately and b) show 'person-centred' sympathy or concern. We employed two measures of such empathic responsiveness, complementing global ratings of the children's expressions of concern for the person, with ratings of the qualities of looks towards the person.

Many of the quasi-experimental studies cited above on the social relatedness of children with autism, as well as research on sympathy among typically developing children, do not include control conditions. For many intents and purposes, for instance in demonstrating children's marked or limited responsiveness to other people's expressions of feeling, a control condition is necessary only to determine the specificity of participants' reactions to any particular context. For the present purposes, too, we considered that the torn-drawing task was a stand-alone condition, and being central to the study and the focus of our predictions (and potentially influenced if children had had prior experience of a similar set of events), it was administered first to all participants. Subsequently, as a subsidiary procedure, we also administered a comparison condition in

which there was one critical difference from the Empathy condition, namely that a blank card instead of a person's drawing was torn.

Method

Participants

We tested three groups of children, comprising a) 20 children (16 boys, 4 girls) with autism, b) 18 matched children (13 boys, 5 girls) without autism but with learning disabilities, mild to moderate mental retardation, and/or developmental delays, and c) 14 children (5 boys, 9 girls) who were typically developing, and whose mean verbal mental age (6 years) was similar to that of the other two groups.

Participants with autism displayed impairments in social interaction and communication, coupled with repetitive or stereotyped interests and activities, characteristic of the disorder. We confirmed the clinical diagnosis by completing a DSM-IV criteria checklist (American Psychiatric Association, 1994) on the basis of systematic interviews with teachers, and by rating classroom observations of the children using the Childhood Autism Rating Scale (CARS; Schopler, Reichler, & Renner, 1988). The CARS covers such domains as social relatedness, verbal and nonverbal communication, repetitive behaviour, sensory abnormalities, and emotion regulation. Scores of 30 or above are in keeping with a diagnosis of autism. On the CARS, children with autism received scores ranging from 26.5 – 54.5 ($M = 37.2$, $SD = 7.3$). The one participant who scored below 30 was an adolescent girl. In order to clarify her diagnostic status, we administered the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, Dilavore, & Risi, 1999), Module 3. Her scores on the ADOS – a series of semi-structured presses designed to assess for the presence of social and communication difficulties –

were consistent with the clinical diagnosis of autism and therefore she was retained in the sample.

The children with autism were group-matched with those in the learning disability (LD) group for chronological age and language performance on the British Picture Vocabulary Scales (BPVS; Dunn, Dunn, & Whetton, 1982), the British version of the Peabody Picture Vocabulary Scale. The BPVS is a standardised, widely used measure of receptive vocabulary, assessing a cognitive ability that is relatively impaired in persons with autism (Jarrold, Boucher, & [Russell](#), 1997; Lockyer & Rutter, 1970). The typically developing children were selected on the basis that their mean chronological age was similar to the mean verbal mental age of the children with autism and those with learning disabilities. To confirm their levels of language ability, they were assessed using the Preschool Language Scale (PLS-3-UK, Zimmerman et al., 1997) which has been developed for use with children of this age and offers standard scores, percentile ranks, and language age equivalents.

Participant characteristics appear in Table 1.

Table 1 about here.

Procedure

There were two parts to the procedure. The first part was the Empathy condition in which a person's drawing was torn. The second part was a Comparison condition in which there was a similar sequence of events, except that a blank piece of paper was torn instead of the person's drawing. As already discussed, we decided to administer the

Empathy condition first, for the reason that this was the critical condition for studying participants' expressions of concern, and all the principal analyses of group differences involved data from this condition and did not involve analyses of group by task interactions. We considered that children who had already received the Comparison condition might have had an altered reaction to what was supposed to be a novel (and potentially shocking) event if many aspects of the set-up were already familiar. In order to lessen the chance of interference effects on participants' responses in the Comparison condition – which was not intended as a strict control condition, but an evaluation of participants' orientation and emotional reaction towards E2 when the tearing of a piece of paper should have no special meaning for E2 - we ensured that for the children with autism and those with learning disabilities, there was a gap of six months between administration of the Empathy and Comparison conditions. This was not possible in the case of the typically developing children due to constraints on their availability, and for these participants we conducted the two procedures in the same testing session, with an additional set of activities interpolated between the two.

Empathy condition. Two female testers, E1 and E2, each familiar to the children as regular visitors to their classroom, invited the children to participate individually in videotaped sessions that took place in quiet rooms in their own schools. E1 (the perpetrator of the potentially hurtful act) sat beside the child at a table, directly across from E2 (the victim). For most of the time, all three testers appeared on videotape, but the camera was facing the participant and E1 in order to capture the participant's reactions. The arrangement was such that it was always clear when the participant looked to E2's face or elsewhere.

Partly in order to establish a setting in which empathic responses might be anticipated, the testers conducted the procedure in an atmosphere of joint enterprise and mutual involvement. E2 distributed blank 4" x 6" index cards to each person present, and placed a box of colored pens in the center of the table. She said: "Let's each draw an animal." E1 drew a rabbit, E2 drew a turtle, and the child drew an animal of his or her own choice. In order to engage the children with the testers, as well as to familiarize the children with the drawings of each, E1 announced that she was drawing a purple rabbit, and E2 showed her turtle to the child when it was almost complete (with the exception of a tail) and asked the child, "Do turtles have tails?" before adding a tail to the turtle. She also complimented E1 on her rabbit. Meanwhile, both testers asked the child about his or her drawing as it was being drawn, and gave praise when it was completed.

Once the drawings were completed, E2 gathered them together and placed them into transparent sleeves with a zip across the top. As a brief game, these folders were mixed around and the child was asked to identify his or her own drawing. Then E2 placed the three folders into a basket which she gave to E1, and asked E1 to remove the drawings from their sleeves and put them away. E2 turned away and prepared materials for another purpose.

At this point E1, seated beside the child, secured the child's attention, and one by one removed the drawings from the sleeves. First she held up her own drawing and said, "This is the rabbit that I drew." Next she held up the child's drawing and stated, "This is the [named animal] that you drew." Finally, she held up E2's drawing and, once again having checked that the child was attending, stated, "and this is the turtle that [name of E2] drew, isn't it?"

Once the child affirmed that this was the case, E2 looked up to observe what was happening. At this moment, with a neutral expression and without acknowledgement towards E2, E1 matter-of-factly *tore E2's drawing of the turtle into four pieces*. E2 was watching as this happened, but sat motionless and maintained a neutral expression. E1 and E2 did not look at each other, and remained still for about three seconds, so that it was possible to capture the child's spontaneous reactions on videotape.

At the conclusion of this very brief period following the tearing of the drawing, the testers talked with the participant about what had happened, and offered reassurance that E2 had told E1 that she did not want to keep her drawing, and had asked that it be thrown away. The duration of this interaction depended upon participants' responses, in that in some cases the children asked for explanation, made comments, or even protected or tore up their own drawings.

Comparison condition. All participants (with the exception of five participants with autism and two with learning disabilities who were not available for testing on a second visit) received a Comparison condition to confirm that any empathic reactions they had shown in the Empathy condition were related to the potential feelings of the person whose drawing was torn. Here the procedure was similar to that already described, except that an additional blank index card had been added to the basket so that this time, E1 gained the child's attention not only for each animal drawing, but also for the blank card. Upon discovering the blank card, E1 stated, "This one is blank", before tearing the blank drawing into four pieces. There was a further modification for the typically developing children because they were given both conditions on the same day.

Here, the testers drew animals (a lion and a dog) that were different to those they had drawn previously.

Ratings of the Videotapes

The videotapes were edited into brief excerpts. Each excerpt began when E1 said, ‘This one is blank’ in the Comparison condition, or ‘This is the drawing that E2 drew’ in the Empathy condition, immediately prior to the tearing episode. We included this part of the procedure in the excerpt, because there was plenty of indication in the ensuing exchanges between participants and testers whether or not E2’s drawing had been torn (see illustrative vignettes and ratings of these interactions in Tables 2-4), and so it was not possible to achieve ‘blindness’ of raters in this respect. In addition, we wanted to confirm that all participants were attentive to the actions of E1 at this point, which proved to be the case in all instances. The excerpt ended following the child’s response to the tearing and the testers’ subsequent explanation and/or reassurance. Although certain of our ratings pertain to the moments immediately after the tearing event, others concern affective responses that waned only after subsequent communicative exchanges with the children had been completed, and they had been reassured that E2 was not troubled by what had happened (again, Tables 2-4 for examples).

Participants’ responses to E2 following E1’s tearing of the paper were rated by judges who were blind to the children’s diagnoses and the hypotheses and predictions of the study. There were two sets of ratings by separate pairs of raters – one pair recorded whether participants gave a spontaneous and immediate look to E2, and made a rating of overall concern; the second pair made ratings of the occurrence and qualities of looks,

across the videotape excerpt. The ratings, with estimates of inter-rater reliabilities, were as follows:

Spontaneous look to E2. The first set of judges were asked to indicate whether or not the child showed a *spontaneous look to E2 during or immediately following (i.e. within one second) the tearing of the paper.* On the Comparison condition (45 videotapes), kappa = .83; and on the Empathy condition (52 videotapes) there was 100% agreement between the two judges regarding the presence or absence of such a look.

Degree of concern for E2. The first pair of judges was also asked to rate the degree of *concern for E2* shown by the participant. The possible scores were 0 (No concern), 1 (Limited concern) or 2 (Clear concern). The estimate of inter-rater reliability for the Empathy condition (52 videotapes) was kappa = .78; for the Comparison condition (45 videotapes), there was 100% agreement. Tables 2 – 4 provide illustrations of participants' reactions that were given scores of 0, 1, or 2. These descriptions were written by one of the raters, while blind to the children's diagnoses.

Tables 2 – 4 about here.

Looks to E2. The second pair of judges was asked to look at the videotape excerpts and note *each time the child looked to E2.* On counts of the numbers of looks made by each participant, for each condition there was almost perfect inter-rater reliability (for the Empathy condition, ICC = .99; for the Comparison condition, ICC = .95). For those very few instances where one rater had judged a look to be present whilst the other had not, the judges were asked to review the specific looks together and decide

jointly whether or not eye contact had occurred. The agreed instances of looks were used for the ratings on quality of eye contact.

Quality of each look to E2. Here, each look was categorized either as being a concerned look, or a non-concerned look of three possible kinds. A concerned look was defined as expressing interpersonal contact with empathic concern for the tester's feelings, including a sense of discomfort on her behalf. For the present purposes, the three remaining types of looks (looks to establish reciprocal contact and to share what was happening, usually with positive affect; looks to 'check' the situation and/or E2's response; and looks prompted by the behaviour or comments of the testers) will not be considered separately, because there was some ambiguity among these types of look when the testers and participants were engaged in dialogue, and for the present purposes, the critical feature of these looks is that they did *not* include expressions of concern.

In order to train the raters to arrive at a shared understanding of the definitions of the different kinds of look, we discussed seven of the 155 looks with the raters together. On the remaining 147 looks that were rated independently, estimates of inter-rater reliability were $\kappa = .82$ for concerned vs. not concerned looks.

Results

There was a categorical yes/no judgment for the presence of an immediate spontaneous look to E2, and scores for the degree of concern for E2 were limited in range (0 – 2). Therefore we employed non-parametric analyses for these data, as we did for subsequent group comparisons of the numbers of individuals showing any concerned looks.

In order to analyze the data on rates of looks per minute (frequencies), for which parametric statistics were employed, it was necessary to adjust for variability in the total lengths of the videotape excerpts. In particular, the duration of the Comparison condition tended to be short, principally because there was little dialogue or need to reassure the children after the blank card was torn (for participants with autism, $M = 5.9$ seconds, $SD = 1.4$ seconds, range = 4 to 9 seconds; for LD participants, $M = 5.7$ seconds, $SD = 1.9$ seconds, range = 4 to 11 seconds; for typically developing participants, $M = 9.5$ seconds, $SD = 2.1$ seconds, range = 7 to 15 seconds). In the Empathy condition, the videotape excerpts were very similar in length for participants with autism and those with learning disabilities (for children with autism, $M = 16.1$ seconds, $SD = 10.9$ seconds, range = 5 – 48 seconds; for those with learning disabilities, the $M = 15.1$ seconds, $SD = 5.6$ seconds, range = 6 – 24 seconds). However, for the younger, typically developing children the mean length was substantially longer at $M = 25.2$ seconds, $SD = 7.3$ seconds, range = 17 – 45 seconds. Therefore in order to compare the three groups for the prevalence of different kinds of looks to E2, we computed rates of looks per minute. Although we had made directional predictions as described earlier, all significance values are reported at two-tailed levels.

Spontaneous and Immediate Look to E2

On the Comparison condition involving a blank drawing, there were only a small number of participants (1 with autism, 4 LD, and 3 TD) who looked at E2 spontaneously during or immediately after the blank card was torn ($\chi^2 = 1.97$, $df = 2$, *ns*).

On the Empathy condition, only 2 out of 20 participants with autism gave an immediate, spontaneous look to E2 when her drawing was torn. In contrast, 11 out of 18

children with LD, and 11 out of 14 TD children, gave an immediate look to E2 ($\chi^2 = 18.06$, $df = 2$, $p < .001$). Children with autism were significantly different from both LD and TD participants (Fisher's Exact $p = .002$ and $p = .000$, respectively). Obviously, the two groups without autism were not significantly different from one another.

Degree of Concern for E2

The results appear in Figure 1. In the blank drawing condition, not a single participant in any group was rated as showing concern for E2. On the Empathy Condition, by contrast, there were significant group differences (Kruskal-Wallis Test $\chi^2 = 15.67$, $df = 2$, $p < .001$). For example, three-quarters of participants with autism fell into the category of showing *no* concern, whereas the majority of children in the LD and TD groups fell into the category of showing *clear* concern. As predicted, children and adolescents with autism were less likely to be judged as showing concern relative to those with learning disabilities, Mann-Whitney $U = 80.5$, $z = 3.23$, $p < .01$, and relative to those who were typically developing, Mann-Whitney $U = 33.0$, $z = 4.07$, $p < .001$. LD and TD participants were not different in this respect (Mann-Whitney $U = 106.5$, $z = .88$, *ns*).

 Figure 1 about here.

Frequency of Looks to E2

In the Comparison condition with a blank card, there were significant group differences in rates of looking per minute, $F(2, 44) = 8.46$, $p < .001$. Although there was a non-significant trend for children with autism to look towards E2 less often than those with learning disabilities, $t(29) = 1.93$, $p < .10$, the principal contrasts were that typically

developing children looked at E2 significantly *less* than children with autism, $t(27) = 2.62, p < .05$ as well as children with learning disabilities, $t(28) = 3.93, p < .01$.

The results for the Empathy condition appear in Figure 2. Once again, the groups were significantly different in terms of their rates of looking to E2, after E2's drawing was torn, $F(2, 51) = 6.44, p < .01$. In this case, children with autism looked to E2 less often than the children with learning disabilities, $t(36) = 3.35, p < .01$ as well as those who were typically developing, $t(32) = 2.29, p < .05$. LD and TD participants were not significantly different from one another, $t(30) = 1.25, ns$.

Inspection of Figure 2 reveals how the pattern of responses across the two conditions were different for the TD children, in that they were much less likely to look at E2 when the blank card was torn than when her drawing was torn. There is a significant group (3) x task (2) interaction for rates per minute of looking in the Comparison and Empathy conditions, $F(2, 42) = 9.46, p < .001$. For participants with autism and LD, there was not a significant difference between rates per minute of looking across conditions, $t(14)$ and $t(16) = 1.2$ and $.58, ns$. For those in the TD group, there was a significant difference, $t(14) = 4.73, p < .001$.

 Figure 2 about here.

Although the children with autism showed significantly fewer looks than the other participants only in the Empathy condition, it was also the case that they showed relatively few looks in the Comparison condition. In order to assess the meaning of these results, as well as those concerning the similarities in frequencies of looking across

conditions by participants with autism and LD, it was important to examine whether there were group differences in the qualities of looks.

Quality of Looks to E2

We adopted two approaches to analyzing the quality of looks. Firstly, we considered whether participants showed *any* concerned and/or other kinds of look in the two conditions. Secondly, we analyzed the rates and proportions of different kinds of look that were shown.

In the Comparison condition, there was only a single participant, a girl with a learning disability, who was judged to have made a concerned look, and she made only one. All of the remaining looks were rated as non-concerned.

In the Empathy condition, only three out of the 20 (15%) participants with autism showed at least one concerned look, whereas 12 out of 18 (67%) of those in the LD group and 100% of the TD children did so ($\chi^2 = 25.44$, $df = 2$, $p < .001$). In this respect, participants with autism were significantly different from those with LD (Fisher's Exact $p = .002$) and TD children (Fisher's Exact $p = .000$). TD participants were also more likely to show concerned looks than the LD children (Fisher's Exact $p = .024$). This profile of group differences appeared specific to concerned looks, because there were 11 out of 20 children with autism, 11 out of 18 LD participants, and six out of 14 TD participants who showed at least one non-concerned look during the Empathy condition ($\chi^2 = 1.07$, $df = 2$, *ns*).

Participants with autism who showed concern. Two of the three children with autism who showed a concerned look were also judged to show concern according to the global rating made by the separate raters. The first of these participants was a male aged

13 years 4 months with a verbal mental age of 14 years 3 months and a CARS score of 32. He had clinical features of Asperger syndrome and was very sociable and friendly. The second individual was a soft-spoken, shy boy aged 10 years 5 months with a verbal mental age of 7 years 10 months and a CARS score of 31.5. The third child with autism judged as showing a concerned look by one set of raters was judged by the other raters as not showing any concern at all. She was a female aged 14 years 6 months with a verbal mental age of 9 years 9 months and a CARS score of 35.5. The clinical description of her response to the tearing, written by one of the raters (still blind to diagnosis) who judged her as showing no concern, illustrates how there was ambiguity in whether the look expressed concern *for E2*:

She has a neutral expression and her arms are crossed in front of her body. She nods and says, “yeah” when shown E2’s drawing. Her eyes widen slightly as E1 tears the drawing. She then asks E1, “why you ripping it for?” Her tone of voice suggests that she doesn’t approve of what E1 is doing. She stares at E1 and then at E2.

Specificity of concerned looks. To confirm the specificity of the dearth of concerned looks among participants with autism, we conducted a further analysis in which we considered only those participants who showed at least one look during the Empathy condition. There were 12 of the 20 participants with autism, all 18 of those with learning disabilities, and all 14 of those who were typically developing who showed a look. Here there were group differences in the percentages of looks judged to be concerned, $F(2, 43) = 13.85, p < .001$. Among participants with autism, 17% of their

looks were rated as concerned looks, whereas this was the case for 55% of the looks for LD participants, $t(28) = 2.55, p < .05$), and 87% of the looks made by TD children, $t(24) = 7.4, p < .001$ (and this latter group also showed a higher proportion than the LD participants, $t(30) = 2.64, p < .05$). These results indicate that even in relation to overall levels of looking, it was specifically in relation to concerned looks that participants with autism were atypical.

This pattern of results needs to be considered in relation to the finding that across the Comparison and Empathy conditions, neither among participants with autism, nor among those with LD, was there a significant difference in frequencies of looking. Considered in isolation, this result might have suggested that the two conditions were little different in their effects on looking, or that the two groups were affected in similar ways by the two conditions. However, for participants with autism, the proportions of concerned looks were 0% in the Comparison condition and 17% of the looks in the Empathy condition; for LD participants, by contrast, the proportion of concerned looks were 4% and 55%, respectively. This indicates how among the LD participants but less so for those with autism, the Empathy condition produced a very different profile of looking, even though the frequency of looks overall changed relatively little within each group.

This picture is filled out by analyses of rates per minute of participants' looks. The results on the Empathy condition appear in Figure 3. Here it may be observed that although it was very rare for participants with autism to show relatively high rates of concerned look, this was common for LD and TD participants. In this same condition, the rates per minute of *non*-concerned looks to E2 are shown in Figure 4. Here there was

little to distinguish the groups. The one feature that distinguishes the typically developing children is that none showed more than 7 non-concerned looks per minute, whereas a minority of participants in the other two groups did so.

Figures 3 and 4 about here.

Discussion

For this study we devised a novel methodological approach to assess whether children with autism, those with learning disabilities, and others who were typically developing, showed concern for another person in a relatively natural (albeit contrived) situation. The setting was one in which there was no requirement - and indeed, no opportunity - for participants to perceive and respond to another person's bodily expressions of distress, because there were none. Participants simply saw someone else tear a person's drawing, in the person's presence. The critical question was whether they would react to this event by turning to look at the person who might be affected, and show concern towards her.

Our principal focus was upon the potentially limited responsiveness of the participants with autism. The results were clear-cut, and in keeping with our predictions: in contrast with matched children with learning disabilities on the one hand, and young typically developing children on the other, it was rare for participants with autism to show spontaneous, immediate looks to the person. Moreover, as judged both by reliable 'subjective' ratings of concern, and by counts of 'concerned looks' towards the other person, participants with autism were less likely to show concern for the person. At this

level of description, then, the study demonstrates how children with autism were unusual in showing little orientation towards, or concern for, another person who might be expected to feel distress.

It was not merely the tearing of a blank piece of paper that elicited a reaction from participants, because in the Comparison condition, unsurprisingly, very few of the children of any group showed concern for anyone. We had decided not to counterbalance the order of the Empathy and Comparison conditions because the Empathy condition was critical to the group comparisons, and commonsense suggested that there would be little reason for participants to orientate to E2 when a blank card was torn. On the other hand, prior experience with this condition might have influenced participants' subsequent behaviour if the Empathy condition had followed. Especially given that the Comparison condition was administered six months after the Empathy condition, it is most unlikely that participants' almost total lack of concerned looks to either adult in the Comparison condition was due to order effects. In the case of the TD participants, who received the two conditions on the same day, it remains possible that their earlier experience with the Empathy condition increased their seeming disinterest when the blank card was torn; but among the participants with LD, too, and even among a very small minority of those with autism, there was clear evidence from the timing and quality of their looks, as well as global ratings of concern, that the two conditions were experienced in very different ways.

Yet this appeared to be less the case for participants with autism, who rarely looked to E2 while or immediately after her drawing was torn, and who showed fewer concerned looks in the subsequent phases of the procedure. This was not explicable in

terms of a lack of looks *per se*, for the reason that compared with participants without autism, a significantly smaller proportion of their looks were concerned in quality. In addition, global ratings of concern encompassed evidence beyond looking patterns, for instance in what participants expressed in words, and while three-quarters of this group showed *no* evidence of concern, this was the case for only a minority of the LD participants and almost none of the typically developing children. An interesting question remains about the motivation for the looks to E2 that were made by children with autism, and mostly such looks appeared to be checking out what might happen next, or to be prompted by tester-initiated interaction.

There are, of course, several ways to interpret these group differences. For example, it might be argued that children with autism tend to be undemonstrative in their feelings in many social and even non-social settings, so it is unjustifiable to suppose that there was specificity to their apparent indifference in the present circumstances. There are several reasons why this (hypothetical) explanation is implausible. Firstly, although there is evidence to suggest that sometimes children with autism show their feelings in atypical ways (e.g., MacDonald et al., 1989; Ricks, 1975; Yirmiya, Kasari, Sigman, & Mundy, 1989), and that in a variety of social situations their orientation and expressiveness towards people is diminished (as illustrated in the Introduction, and as one would expect if their empathic engagement with others is limited), it is also the case that children with autism of the age and ability tested here show clear manifestations of certain feelings, even seemingly complex and socially orientated feelings such as jealousy ([Bauminger, 2004](#)). For example, the systematic semi-structured interviews with parents undertaken by Hobson et al. (2006) yielded evidence that children with

autism manifest clear signs of jealousy and the emotions of happiness, distress, anger and fear, as well as emotional responsiveness to the moods of others; and subsequent quasi-experimental ‘real-life’ observations of children and adolescents with autism recorded abundant signs of self-consciousness as well as coherent behavioural responses to events such as a doll’s leg breaking off, praise of the child’s drawing, and nuzzling by a cuddly Teddy. Studies by Capps, Kehres, and Sigman (1998), Dawson and Adams (1984), and García-Pérez, Lee, & Hobson (2007) provide further examples of children with autism manifesting organized, if not wholly typical, affective responsiveness in situations of social interaction and one-to-one conversation. In view of these findings, it is difficult to propose that the present group differences reflect emotional ‘flatness’ per se.

An alternative, more refined position would be to argue that rather than demonstrating how children with autism have little empathy and/or concern for others, the present study simply shows that the children do not care about the fate of a person’s drawings, whether one of their own or one sketched by someone else. Under these circumstances, no wonder if they failed to show a reaction in the circumstances we had contrived. Although ethical considerations would preclude a control condition in which the children’s own drawings were torn in order to see if they were upset, one might have devised further settings in which the adult might be expected to feel distressed. Yet again, the present results are in keeping both with clinical descriptions of children with autism, and with parental reports of lack of concern – in both of which, a *variety* of circumstances have been cited as instances in which concern might have been expected, but was unforthcoming. For example, one parent of a child with autism reported of her son, “When I’m sad, it disturbs him, he doesn’t quite know what to do and then he just

looks and if I don't say anything, he just moves away. A normal child would ask or say what is happening, he wouldn't." (Hobson et al., 2006, p 67).

There is also evidence that for children with autism of the age and ability tested here, drawings *are* personally meaningful. In one of the conditions devised by Hobson et al. (2006), participants with autism were praised for a drawing they had completed. In a control condition, they were praised for a drawing someone else had made. Here there was a significant effect of condition, in that participants with as well as without autism displayed more pride in the former rather than the control condition. [Bauminger](#) (2004) reported how children with autism showed jealousy when their parents praised another child's drawing and not their own. [Kasari](#) et al. (1993) described how children with autism showed pride accomplishing a puzzle, and again this attests to their experience of pleasure in what they produce. These results speak not only to the question of whether children with autism show any feelings, but also to the personal significance for the children themselves of having completed a drawing.

For at least one empirical and one theoretical reason, it is important to note that this was not so much a study of 'affective expressiveness' among the participants, but rather, a study of a particular form of interpersonal relatedness, namely that of showing concern towards a person. One reason this is important is that the measures we employed extend beyond those that are conventionally considered instances of affective expression. For example, we recorded immediate and spontaneous looks to the person whose drawing was torn, regardless of its affective quality; and we took note of where participants looked subsequently, and how they behaved. The point is that concern is manifest in a combination of expressions and actions, and the *pattern* of relatedness that concern

involves was relatively absent among the participants with autism, in contrast to participants from the other groups – and indeed, Vaish and Tomasello (2007) have employed a modified version of our ‘torn drawing’ task to demonstrate prosocial behaviour as well as sympathy towards a victim among typically developing 18- and 24-month-olds. From a theoretical standpoint, this focus on interpersonal relatedness highlights how we need to avoid pre-judging whether or not humans are biologically predisposed to have forms of feeling that are organized *in relation to persons* from early in development, rather than (for example) supposing that infants begin with emotions like pleasure, distress and frustration that become focussed upon and oriented towards people through domain-general forms of learning, and only at subsequent stages of development.

This, indeed, is at the core of the hypothesis that children with autism have a relative lack of such person-related organization to their affective states. Evidence that children with autism have a limited propensity to identify with another person’s attitudes comes from a range of studies beyond those of affective responsiveness cited in the Introduction. In particular, children with autism have diminished inclination to imitate the self/other-orientated aspects of action (Hobson & Meyer, 2005; Meyer & Hobson, 2004) with an associated dearth of ‘sharing looks’ in joint attention (Hobson & Hobson, 2007); they rarely imitate another person’s style of executing actions ([Hobson & Lee, 1999](#)); they show a relative lack of head-nodding when another person speaks to them (García-Pérez, Lee, & Hobson, 2007); they have inconsistent role-taking when re-casting stories (García-Pérez, Hobson, & Lee, 2007); they show little discrimination in their drawings of human figures but not houses (Lee & Hobson, 2006); and they are distinctive in communicating with a relative lack of emotional engagement, sharing

experience in joint attention, communication of style, and shifting in communicative role (Hobson, Lee, & Hobson, 2007).

We have argued that such abnormalities in autism reflect a relative lack of what in children *without* autism is a motivational-cum-affective process through which one person has the propensity to register and in part assimilate – and at the same time, respond to – the bodily-anchored psychological stance of another person, either as perceived or as imagined. We consider this to be a basic human psychological propensity, where ‘basic’ means that on a psychological level, the process is non-reducible to other terms, is almost specific to the social domain (although not entirely so, as Lipps argued), and is developmentally prior to, and formative of, many aspects of subsequent social and social-cognitive development (see [Bråten](#), 1998; Cooley, 1902; [Fairbairn](#), 1952; Meltzoff & Brooks, 2001; [Tomasello](#), 2005; Trevarthen, 1979; [andTrevarthen & Aitken](#), 2001, for related lines of thinking). Indeed, it would be valuable if future studies addressed the conditions under which identification might be facilitated or inhibited among children with autism – for example, by testing whether it would make a difference if parents took the place of experimenters in the ‘torn drawing’ scenario.

Such considerations return us to the question of how far in typical development, sympathy and concern are dependent upon empathy on the one hand, and conceptual development on the other. According to the present account, one manifestation of the propensity to identify with someone else is to experience empathy, but such ‘feeling with’ another may be just one element within a more complex relational stance, for example that of concern; and an implication is that one is predisposed to experience

events in relation to a ‘virtual other’ (as Bråten, 1998, has expressed the matter) to whom feelings are attributed, where an actual person may assume the place of this other created in the mind. If this is the case, even such sympathetic responses as those reported in this study need *not* amount to instances of ‘cognitive empathy’, for example defined as ‘a top-down process whereby the *subject effortfully tries to represent the state of the object*; also referred to as “putting oneself in the place of the other” or “imaginatively projecting oneself into the situation of another”’ (Preston et al., 2007, p. 255, italics in original).

We do not deny that there is something *like* imagination involved in turning to someone whose drawing is torn, and we do not deny that understandings or thoughts are important for this. Yet we doubt whether the immediacy and patterning of one person’s concerned reaction to another justifies the qualifier ‘cognitive’ for the empathic reaction, as if thinking or effortful role-taking – or indeed, inferential reasoning based on ‘theory of mind’ concepts - is essential to the emotional-cum-motivational relational force of such events. Indeed, we suggest that in important respects, cognitive *components* of role-taking are the developmentally elaborated distillate of cognitive *aspects* of an affectively and motivationally configured process by which one is moved by and to the bodily expressed attitudes of other persons (also [Frijda, 1993](#)). The process is early in onset, and then evolves and endures throughout the lifespan. Such a view on the ‘primitiveness’ of self-other relations appears to have been entertained by [Darwin](#) (1872, reprinted 1965, p [358](#)), who wrote about his six-month-old’s expression of melancholy in response to his nurse’s feigned distress, ‘Therefore it seems to me that an innate feeling must have told him that the pretended crying of his nurse expressed grief; and this through the instinct of sympathy excited grief in him’. If in this way, one person’s motivation to look to and

care about someone else arises out of affective engagement with feelings anticipated in or attributed to the other, then no wonder participants with autism who are limited in these respects rarely showed concern.

Although we consider this theoretical approach establishes a basis for the most satisfactory account of the developmental psychopathology of autism, especially when affected children's early (preconceptual) abnormalities are taken into account, we acknowledge that the results of the present study do not yield decisive evidence for or against the theory. Given how participants were matched, one cannot exclude the possibilities that either domain-general imaginative or generative capacities (e.g., Harris, 1989; Jarrold, Boucher, & Lewis, 1993; Minshew, Meyer, & Goldstein, 2002), or conceptually mediated role-taking abilities (for example, built upon 'theory of mind' understanding), were responsible for the observed group differences. Indeed, if a substantial part of the children's limitations in generating thoughts and understanding people develops in virtue of the propensity to identify with the attitudes of others, as one of us has argued (Hobson, 1993a; 2002), then some of the conflicts among these alternative theoretical positions might be resolved. Whether or not this proves possible, the present investigation confirms that children with autism manifest limited anticipatory concern towards the (expected) feelings of someone else. The findings are in keeping with other evidence that the children have a relative lack of empathy and other-person-centred feelings in relation to others, and arguably, that they may be limited in the propensity to identify with other people's attitudes. If so, then the presence of such feelings among young typically developing children may testify to the operation of such

processes, initially shaping and subsequently shaped by the children's concepts of other selves as persons-with-minds, from early in children's lives.

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Table 1

Participant Characteristics

	Chronological Age			Verbal Mental Age		
	<i>M</i>	<i>SD</i>	range	<i>M</i>	<i>SD</i>	range
Autism	11;2	2;2	8;3 - 15;4	6;6	2;11	2;9 - 14;3
Learning Disabilities	10;8	2;4	6;3 - 14;3	6;5	2;8	3;3 - 12;4
Typically Developing	5;9	0;4	5;2 - 6;2	6;0	0;12	3;11 - 7;0

Note: Ages presented in years;months.

Table 2

Degree of Empathy Examples Written by Judge Blind to Diagnosis – Score 0

Degree of Empathy: Score 0 – No Empathy	
Boy with Autism	Participant is quite interested in his own drawing and reaches for it in the box. He is focused on the task and smiles at E2 while saying “turtle,” when he is shown her drawing. His expression changes slightly when her drawing is being torn. His eyes and mouth narrow and he stares at the drawing that is being torn. After the drawing is torn up (and E1 says “okay”), he smiles again slightly and nods. This suggests that he was unsure of how to react when the drawing was torn and that he is guided by the fact that neither adult has reacted.
Boy with Autism	Participant stares at the drawings as they are shown to him, yet doesn’t respond. He reaches for one drawing, but doesn’t follow through with his reach. He knows that E2 drew the turtle, saying “E2” when asked who drew it, but then stares at his lap. When E1 secures his attention, he continues to stare as the drawing is being torn, but doesn’t react to the event and maintains a neutral expression.
Boy with LD	Participant stares intently and smiles at the drawings as they are shown to him and appears to be genuinely interested. He continues to smile (seen throughout) as E1 tears E2’s drawing and proclaims, “oh, oh, why rip it up?” He doesn’t look at E2 throughout the task and reaches for his own drawing to indicate that he would like to keep it. He appears to be more concerned about the drawing than about E2.

Table 3

Degree of Empathy Examples Written by Judge Blind to Diagnosis – Score 1

Degree of Empathy: Score 1 – Limited Empathy	
Boy with Autism	Participant is focused on the drawings with a slight smile on his face, looking occasionally at E2. He gives E2 a big smile after being shown the turtle that she drew. He is then briefly distracted and stares into space, but is looking at the drawing when E1 is tearing it up. His expression remains neutral while E1 is tearing the drawing and he has a delayed reaction to the act. He gasps, but responds with “I don’t know,” when E1 asks him what happened. He smiles in response to the reassurance of the two testers (which indicates that E2 didn’t want her drawing), but he doesn’t react to the act itself. He decides that he would also like to mimic the act, ripping his own picture in four pieces.
Girl with Autism	Participant focuses intently on the pictures when they are shown to her, with a slight smile on her face. When shown the drawing that E2 drew, she smiles and looks at E2. When the drawing is ripped, she doesn’t really react to the act. She looks at E2, but her expression here is comparable to what it was before. While she is studying what E1 is doing, she does not display any outward expression of empathy.
Boy with LD	Participant looks at the turtle that E2 drew when it is shown to him. His expression is pretty much the same throughout the activity (he is focusing on the pictures yet al.so looks a bit unsure about everything). When E2's drawing is torn, his eye movements suggest that he registers this act, yet he still keeps the same facial expression. He smiles slightly and then empathetically looks at E2 a few times after the drawing has been completely torn.

Table 4

Degree of Empathy Examples Written by Judge Blind to Diagnosis – Score 2

Degree of Empathy: Score 2 – Clear Empathy	
Girl with LD	Participant stares at the drawings when they are being presented to her. When E1 tears E2's drawing, participant gasps in shock, looking at E2 while pointing to E1 and the drawing that is being torn. Her eyes widen and her mouth opens slightly to physically express these sentiments. She examines E2's face with an empathetic look, looking for signs of how E2 is responding.
Girl with TD	Participant stares at the drawings and up to E2, with a neutral expression on her face. Her eyes widen when E1 tears E2's drawing – she immediately looks at E2, and then back to E1 with a questioning look. She appears to be a bit uncertain when E1 tells her that E2 didn't want her turtle, and immediately looks towards E2 to confirm this. Her facial expression throughout suggests that she does understand that the drawing is being torn and feels empathy for E2. She would like to keep her own drawing and still looks up at E2 twice after she has been given her own to keep.
Boy with LD	Participant watches intensely as E2's drawing is torn then looks at E1 and E2 with curiosity and surprise. He looks at E2 and laughs nervously. He seems nervous and guilty for the action of E1. When E1 asks him, "what happened?" he laughs nervously and says "you ripped up E2's drawing!" He looks into E2's eyes to try to recognize her reaction and feelings. He tries to show empathy and concern about E2's torn drawing. He keeps looking at E2 until E1 reassures him that E2 didn't want the drawing.

List of Figures

- Figure 1.* Overall ratings of degree of concern.
- Figure 2.* Rates per minute of looking to E2
- Figure 3.* Empathy Condition: Rates per minute of concerned looks to E2
- Figure 4.* Empathy Condition: Rates per minute of non-concerned looks to E2.

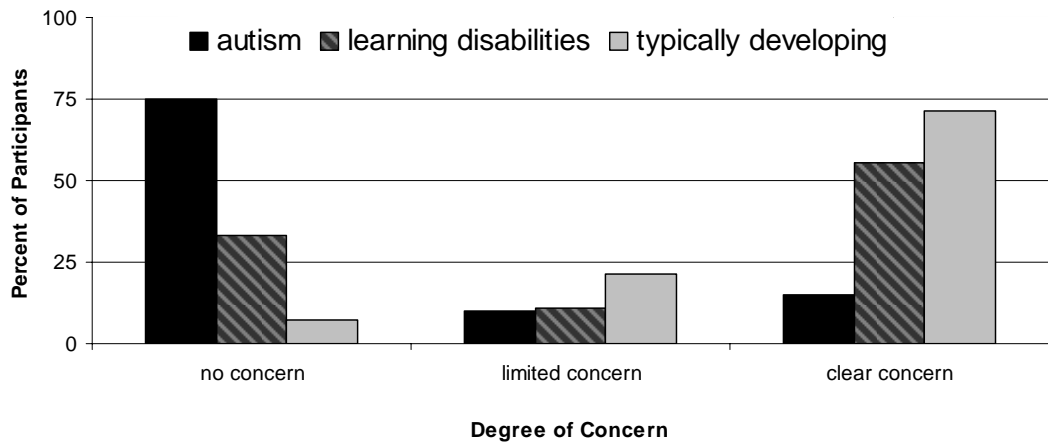


Figure 1.

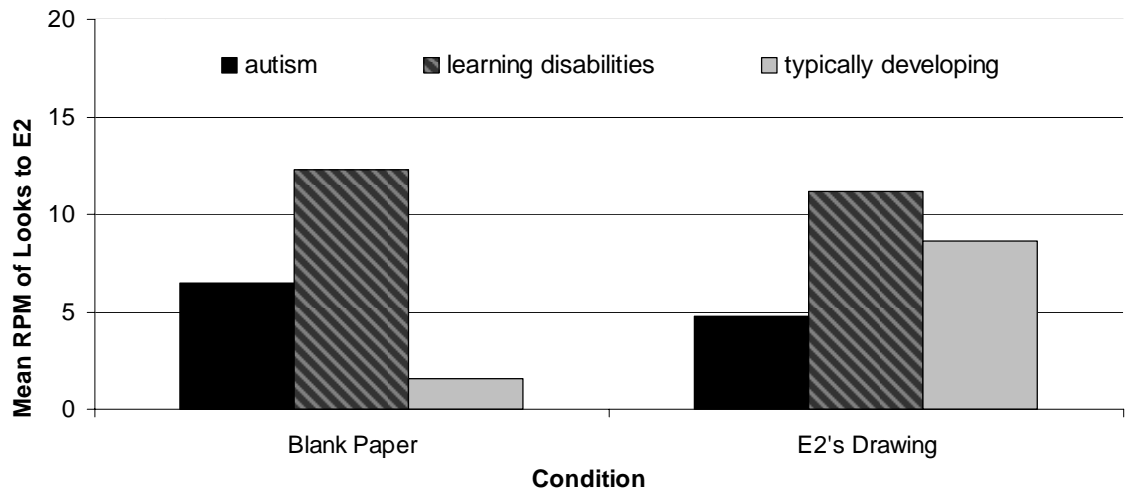


Figure 2.

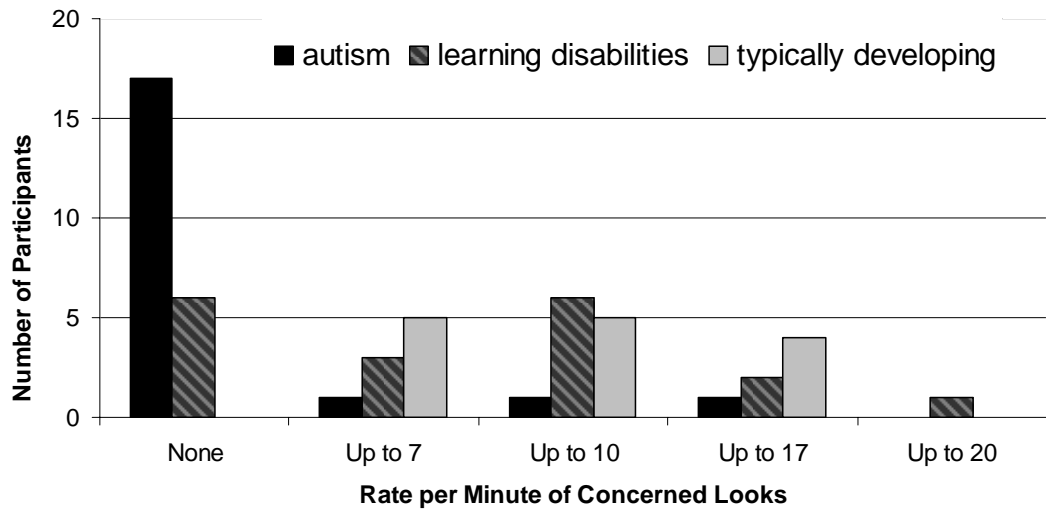


Figure 3.

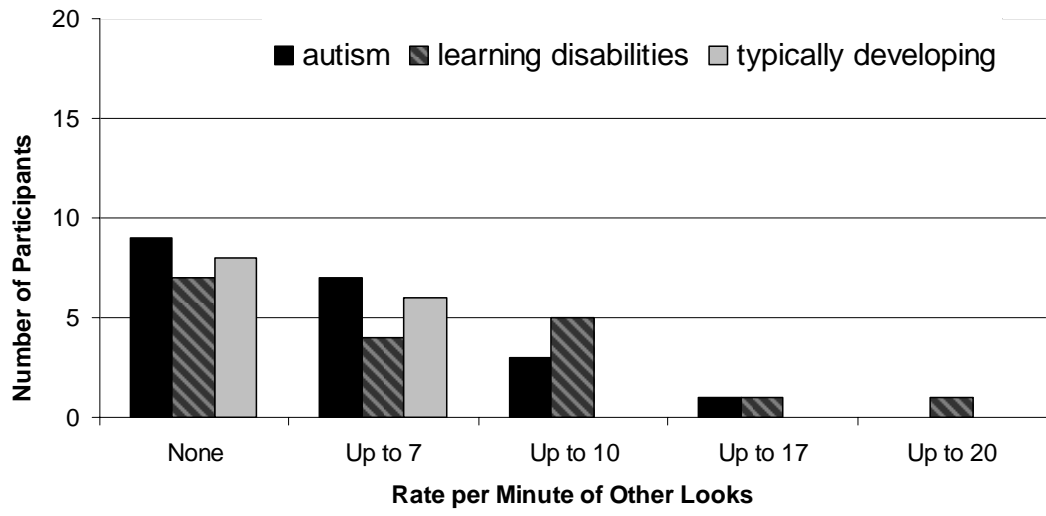


Figure 4.