Reputation Management: Evidence for Ability But Reduced Propensity in Autism

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Previous research has reported that autistic adults do not manage their reputation, purportedly due to problems with theory of mind [Izuma, Matsumoto, Camerer, & Adolphs]. The current study aimed to test alternative explanations for this apparent lack of reputation management. Twenty typical and 19 autistic adults donated to charity and to a person, both when alone and when observed. In an additional manipulation, for half of the participants, the observer was also the recipient of their donations, and participants were told that this observer would subsequently have the opportunity to donate to them (motivation condition). This manipulation was designed to encourage an expectation of a reciprocal "tit-for-tat" strategy in the participant, which may motivate participants to change their behavior to receive more donations. The remaining participants were told that the person watching was just observing the procedure (no motivation condition). Our results replicated Izuma et al.'s finding that autistic adults did not donate more to charity when observed. Yet, in the motivation condition, both typical *and* autistic adults donated significantly more to the observer when watched, although this effect was significantly attenuated in autistic individuals. Results indicate that, while individuals with autism may have the ability to think about reputation, a reduced expectation of reciprocal behavior from others may reduce the degree to which they engage in reputation management. ***Autism Res*** *2013, ••: ••–••.* © 2013 International Society for Autism Research, Wiley Periodicals, Inc.

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Introduction

That we behave differently when with others, compared to when we are alone, is a well-established empirical finding [Bateson, Nettle, & Roberts, 2006; Haley & Fessler, 2005; Zajonc, 1965]. One notable change prompted by the presence of others is an increase in prosocial behavior [Cialdini & Goldstein, 2004; Rege & Telle, 2004]. Rather than being driven by purely altruistic motives, this change may instead be due to a need to manage one's reputation [Benabou & Tirole, 2006], that is, to uphold a good image of oneself in the eyes of others. People seek a good reputation in all likelihood as it is rewarding to be viewed positively by others [Izuma, 2012; Phan, Sripada, Angstadt, & McCabe, 2010]. To engage in reputation management, one needs to be able to represent mentally what other people think of us [Amodio & Frith, 2006], an ability typically referred to as theory of mind (ToM).

Autism is a neurodevelopmental condition characterized by marked social and communicative difficulties [American Psychiatric Association, 2000], which according to some theorists are caused by fundamental problems in ToM [Baron-Cohen, Leslie, & Frith, 1985]. If autistic people[1] have problems with ToM, and reputation management relies on ToM, it follows that those with autism may be less able to manage how they are viewed in the eyes of others. This prediction was supported experimentally by Izuma, Matsumoto, Camerer, and Adolphs [2011], who demonstrated a lack of reputation management in cognitively able autistic adults using a "dictator game." The dictator game is an experimental scenario in which participants are given a sum of money and must choose whether to share some of this money with another individual or group. In the Izuma et al. [2011] study, typical and autistic adults were given the opportunity to donate to charity when alone and when observed, when accepting a donation would incur a loss to the participant. The results showed that typical adults donated more to charity when they were watched but autistic adults did not. Izuma et al. [2011] interpreted

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[1]The term "autistic people" is the preferred language of many individuals on the spectrum [see Sinclair, 1999]. In this paper, we use this term as well as person-first language (such as "individuals with autism") to respect the wishes of all individuals on the spectrum.

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these results as showing that typical adults were attempting to maintain a good reputation but that adults with autism were unable to do so as a result of impaired ToM.

Research has, however, garnered the idea that cognitively able autistic adults come to possess an explicit, but not implicit, ToM [Frith, 2004]. Explicit ToM is the conscious, effortful, flexible means of thinking about another's thoughts, for example, expressing verbal understanding that others' beliefs can be different to the current state of reality ["false beliefs," Frith & Frith, 2008]. Implicit ToM is the unconscious, automatic, inflexible means, such as the fact that the looking behavior of 3-year-old children, who do not verbally pass the false belief task, indicates a subconscious awareness of false beliefs [Clements & Perner, 1994]. Evidence that individuals with autism acquire an explicit, but not implicit, ToM comes from Senju, Southgate, White, and Frith's [2009] eye-tracking study. They found that although adults with autism could give the correct answers to (explicit) false belief tasks, they did not show anticipatory gaze to the location which would indicate implicit awareness of false belief. Due to its hypothesized reliance on ToM [Izuma, 2012], a greater degree of reputation management might, therefore, occur in explicit situations for both typical and autistic individuals.

Izuma et al. [2011] also suggested an alternate possible explanation for their results—that autistic people *can* represent reputation but are not intrinsically motivated to do so due to decreased sensitivity to social reward. Evidence of altered reward processing in autism has been provided by neuroimaging experiments, with mixed evidence as to whether this is specific for social rewards [Cascio et al., 2012; Scott-Van Zeeland, Dapretto, Ghahremani, Poldrack, & Bookheimer, 2010] or a domain-general reward processing problem [Dichter, Richey, Rittenberg, Sabatino, & Bodfish, 2012; Kohls et al., 2012]. The social motivation hypothesis of autism suggests that social stimuli are not motivating to individuals with autism, possibly because these stimuli do not engage the brain's reward systems, and as such primary difficulties in social reward processing lead to secondary impairments in social cognition [Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012]. It is, therefore, possible that while adults with autism might have the ability to manage reputation, the propensity to engage in reputation management is reduced due to diminished social motivation.

The current experiment, therefore, aimed to test whether cognitively able autistic adults could manage their reputation when provided with a potentially motivating situation. We replicated Izuma et al.'s [2011] experiment by asking typical and autistic participants to donate to charity when alone and when watched, but extended it by also asking them to donate to a person. Furthermore, we manipulated the extent to which participants were motivated to make a donation. To this end, half of all participants were presented with a situation in which the person they were donating to was the observer (a confederate), in the knowledge that this observer would be donating to them next. Participants were therefore motivated to take into account this person's opinion, believing the person watching not only could see how generous they were being, but also had the power to reciprocate (i.e. respond to the participant's offer) and be generous in return. The remaining half believed the observer was simply watching the procedure.

Following Izuma et al. [2011], we predicted that in the no motivation condition, when reputation is merely implied, typical adults, but not those with autism, would donate more in an attempt to manage their reputation—particularly when donating to charity as this recipient would be seen as more deserving [Eckel & Grossman, 1996]. Behavior changes in the motivation condition allows for us to disentangle the two competing hypotheses for the lack of reputation management seen in autistic adults in Izuma et al. [2011]. If they completely lack the ability to think about others' minds, then even when motivated to do so they would not increase their donations to the observer. In contrast, if a previous lack of reputation management is due to a reduced propensity, then providing a situation in which individuals could gain more by changing their behavior in front of an observer may result in an instrumental increase in donations to the observer. In this way, reputation management becomes instrumental in gaining a good outcome by encouraging reciprocity.

Method

Participants

Thirty-nine male participants took part in the study: 19 cognitively able adults with autism and 20 typical adults. Two additional typical adults were excluded for guessing the observer was a confederate, and one additional autistic adult was excluded for not fully understanding the task. Participants within each group were randomly assigned into either "motivation" or "no motivation" conditions (see below), yielding four groups. These groups were matched for chronological age and intellectual functioning, as measured by the Wechsler Abbreviated Scale of Intelligence—II [Wechsler, 2011] or the Wechsler Adult Intelligence Scale [Wechsler, 1997] (Table 1). A 2 (group; autistic or typical) × 2 (condition; no motivation or motivation) between-participants analysis of variance (ANOVA) confirmed that there were no significant group differences in Full-Scale IQ, $F(1, 35) = 1.97$, $P = 0.17$, $\eta_p^2 = 0.05$, or differences between conditions, $F(1, 35) = 0.94$, $P = 0.34$, $\eta_p^2 = 0.03$. There were also no significant differences in age between

Table 1. Descriptive Statistics for Typical and Autistic Participants in Motivation and No Motivation Conditions

	Typical		Autistic	
	No motivation	Motivation	No motivation	Motivation
N	10	10	9	10
Mean age (SD)	27.9 (7.4)	34.7 (9.6)	34.2 (7.6)	34.7 (5.6)
Mean IQ (SD)	102.2 (13.9)	106.1 (17.1)	108.2 (14.8)	113.9 (15.5)
Mean ADOS score (SD)	–	–	10.1 (2.4)	9.0 (1.8)
ADOS range	–	–	7–15	7–11

Note. Standard deviations shown in parentheses.
ADOS, Autism Diagnostic Observational Schedule.

groups, $F(1, 35) = 1.59$, $P = 0.22$, $\eta_p^2 = 0.04$, or between conditions, $F(1, 35) = 2.12$, $P = 0.15$, $\eta_p^2 = 0.06$.

All participants with autism had received independent clinical diagnoses of an Autism Spectrum Condition according to DSM-IV-TR [American Psychiatric Association, 2000], and met the algorithm criteria for autism or autism spectrum disorder on the Autism Diagnostic Observational Schedule—Generic [Lord et al., 2000]. Autistic participants were recruited through a participant database held at the Institute of Cognitive Neuroscience at University College London. Typical participants were recruited through volunteer databases at Birkbeck College and the Institute of Education, London, and the group comprised a range of occupations.

All participants gave informed consent prior to participation and were fully debriefed on its completion. Ethical approval was gained from the Faculty of Policy and Society's Research Ethics Committee at the Institute of Education, London.

Materials and Procedure

In this study, participants played a variation of the dictator game, following Izuma et al. [2011]. At the beginning of the task, participants were told they would receive £40 of real money for participating. The choice they had to make was whether they were willing to *lose* some of this money, so that a charity or a person could *gain* some money. Participants completed this task once when alone (absence) and once when watched (presence), the order of which was counterbalanced across participants.

Motivation and No Motivation Conditions

Following Izuma et al. [2011], participants were told that they could donate to the charity UNICEF, but unlike Izuma et al. [2011], they could also donate to a person, which they were told was another participant. When completing the task alone, all participants were told that the person's name was a participant who had completed the task previously. Crucially, we extended Izuma et al.'s study to manipulate the motivation to donate between participants. Participants in the "no motivation" condition were watched by the observer (a confederate), who was simply observing the task procedure before she (allegedly) participated. In this condition, participants again believed they were donating to a person who had previously completed the task. For those in the "motivation" condition, participants were told that the person to whom they could donate was the observer (the same confederate) currently observing them completing the task. In earshot of the participant, the confederate was told that when she participated next, she would have the opportunity to donate to the current participant. Thus, those in the motivation condition were led to believe that the individual observing them, and to whom they were donating money, would have the opportunity to donate to them in the near future.

The Donation Task

The payoff matrix for losses and gains can be seen in Figure 1. This payoff matrix was the same as that used by Izuma et al. [2011], except the gain to recipients was doubled. We increased the amount the recipient could gain because (a) it becomes more logical to donate to the recipient as greater returns can be expected if they reciprocate, and (b) this modification reduced the number of redundant trials where it made no sense to donate (i.e. where the participant's loss was greater than the recipient's gain; red cells in Fig. 1).

We tested each cell in the payoff matrix twice for each recipient (i.e. twice for the person and twice for charity: 50 trials each). These 100 trials were randomized, and whether participants were donating to a person or to charity was also randomized within each session. Since each cell was tested more than once, to avoid memory of choices, each cell had a random amount (range £0.1–£0.3) added or subtracted from both participant loss and recipient gain. If losses and gains were equal (two green cells), the random amount added or subtracted was the same, and if the amount was zero, nothing was subtracted or added.

Participants had to decide to *accept* or *reject* the trial they saw on screen using a keyboard press (Fig. 2). Once the choice was made, the selected option was highlighted in red for 1000 ms before proceeding to the next trial. Following Izuma et al. [2011], we excluded from analysis trials on which participants would lose nothing and the recipient would gain nothing (four trials; gray cell in Fig. 1), as decisions to accept or reject could be random. It was stressed to participants that only one trial would be selected randomly at the end of the experiment, the choice made on that trial would take effect, and the participant would lose the specified amount of money if they had accepted that trial. We excluded participants who rejected all of the trials, including those where they would be losing nothing, as this suggested they did not understand the task (one autistic participant).

Participants completed 10 practice trials at the beginning of the experiment to familiarize them with the procedure. MATLAB (The Mathworks, Massachusetts, USA) and Cogent (LON, FIL, & ICN, London, UK) were used to display the stimuli. The stimuli were shown on a non-reflective 42" screen, and the confederate sat approximately 1 m behind the participant, to their left.

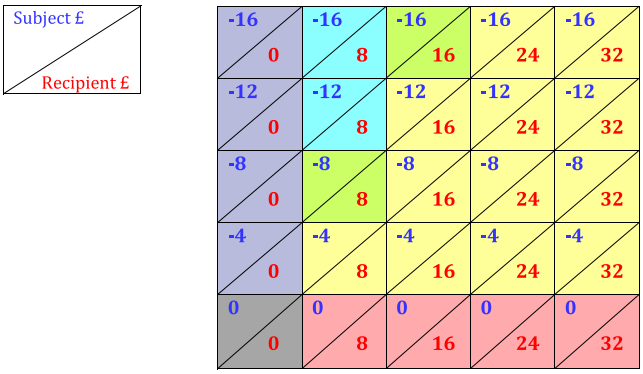

Figure 1. Payoff matrix in the donation task. Each individual cell (25 in total) shows the amount the participant could lose (top left of cell) and the recipient could gain (bottom right). Red cells reflect trials during which the participant could lose more than the recipient could gain, and yellow cells are where the recipient's gain is larger than the participant's loss. Green cells denote equal gain to loss, and purple cells are where the participant loses nothing. The gray cell, where participants would lose nothing and the recipient would gain nothing, was excluded from analyses.

General Procedure

Each participant completed the task twice on the same day: one session in which participants completed the task alone (absence) and a second in which they were observed by another person (presence). Participants completed other experiments during the break between sessions (60–90 min). Questionnaires relating to the experiment were administered at the end of the second session.

Each participant met Experimenter 1 (E1) at a designated location before arriving at the laboratory. Upon meeting, E1 explained they were waiting for another participant (the confederate). When the confederate arrived, E1 introduced the participant and the confederate to each other and brought them to the lab, where together they were presented with the task instructions. For participants who completed the presence condition first, E1 explained that the confederate was going to watch them complete the task before she (allegedly) completed the task herself. After the participant completed the task, E1 introduced another experimenter (E2), who accompanied the confederate to another room to complete unrelated tasks with them, while the participant performed unrelated tasks before completing the donation task again when alone. For participants who completed the absence condition first, E2 entered at the beginning of the experiment and immediately took the confederate with her to "complete some different tasks." When the confederate returned for the second session, E1 explained she had been doing different tasks and missed the procedure of the donation task, so was going to watch the current participant perform the task.

In the second session, regardless of whether the observer was present, all participants were told that the task was

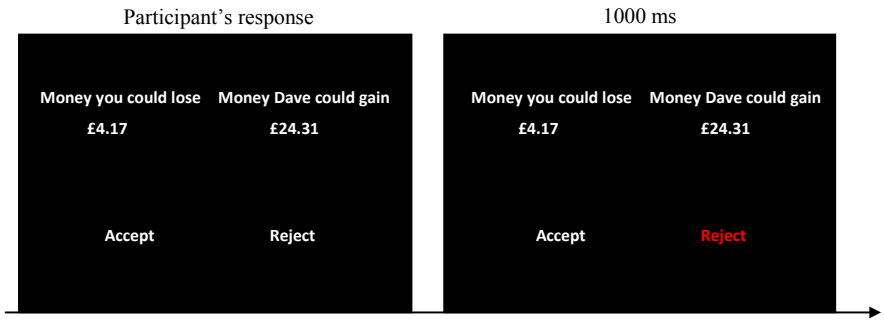

Figure 2. Example trial in donation task: Participants saw money they could lose from £40, and money a charity or person could gain. They had the option to accept or reject the choice, and their decision was highlighted for 1000 ms.

being repeated to collect as much data as possible. E1 left the room before the task began in each session.

Questionnaire Measures

Following the experimental session, all participants were asked whether they believed their behavior changed and by how much when they were being watched, which they rated on a 4-point scale, with 1 indicating "I was not aware of the person," 2 "I was aware of the person but did not change in any way," 3 "I changed a little," and 4 "I changed a lot."

With autistic participants specifically, we measured their understanding of reciprocity using the Personal Norm of Reciprocity questionnaire [Perugini, Gallucci, Presaghi, & Ercolani, 2003]. This questionnaire is designed to measure three aspects of reciprocity: positive reciprocity (the likelihood of reacting and paying attention to positive reciprocal behaviors, such as sharing), negative reciprocity (the likelihood of reacting and paying attention to negative reciprocal behaviors, such as revenge), and beliefs in reciprocity (belief in the use of reciprocal behavior, e.g., "to help somebody is the best policy to be certain s/he will help you in the future"). Participants rated 27 statements on a 7-point scale as to how true the statements were of themselves.

To test further understanding of reciprocity, we also asked participants direct questions about sharing money with others, namely "if *you* were given £10, and shared £5 of this with another person, how much would they share with you if they were then given £10?" and "if *another person* was given £10, and shared £5 of this with you, how much would you share with them if you were then given £10?" Finally, we also measured participants' attitudes toward money using the Money Attitudes Scale [Yamauchi & Templer, 1982], which includes 29 questions pertaining to people's attitudes to money, rated on a 7-point scale from "always" to "never." We also asked participants to rate on a 4-point scale (from "not at all" to "very much") how much they needed and wanted extra money.

ToM Measures

Data on 16 autistic participants' explicit ToM skills had previously been collected using advanced ToM tasks, including the Ice Cream Story [Perner & Wimmer, 1985], the Penny Hiding task [Baron-Cohen, 1992], and Happé's [1994] mental state Strange Stories. Higher scores or pass rates on these tasks indicate better ToM ability.

Results

Figure 3 shows the total accepted donations to the recipients (charity or person), when alone and when observed, for typical and autistic individuals in either the motivation or no motivation condition. To test for the effects of these variables on donation decisions, a 2 (group; autistic or typical) × 2 (observer; absence and presence) × 2 (condition; motivation or no motivation) × 2 (recipient; charity and person) mixed-design ANOVA was performed on the total number of accepted donations. There was a significant main effect of observer, $F(1, 35) = 24.8$, $P < 0.001$, $\eta_p^2 = 0.42$, and recipient, $F(1, 35) = 35.3$, $P < 0.001$, $\eta_p^2 = 0.50$, and a significant two-way observer × group interaction, $F(1, 35) = 4.61$, $P = 0.039$, $\eta_p^2 = 0.12$. There were also significant three-way interactions among observer, recipient, and condition, $F(1, 35) = 7.92$, $P = 0.008$, $\eta_p^2 = 0.19$, and recipient, group, and condition, $F(1, 35) = 6.67$, $P = 0.014$, $\eta_p^2 = 0.16$. These interactions were qualified by a significant four-way interaction among observer, recipient, condition, and group, $F(1, 35) = 4.76$, $P = 0.036$, $\eta_p^2 = 0.12$. All

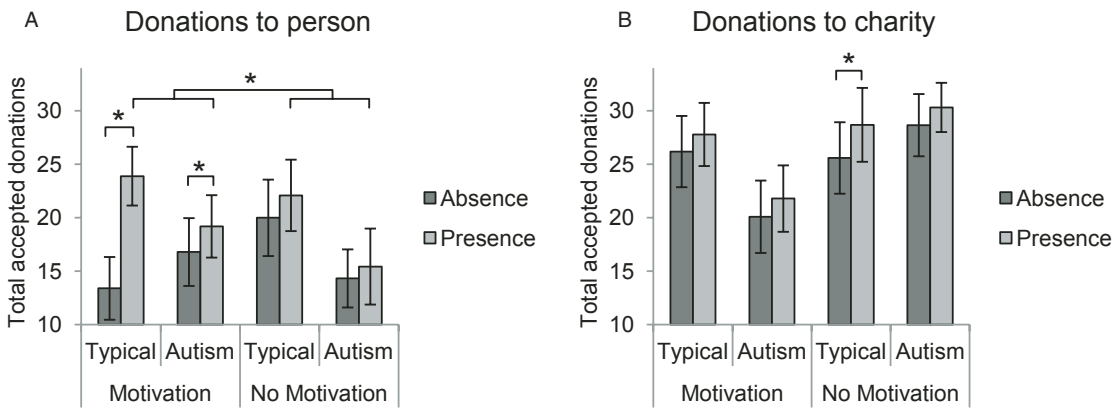

Figure 3. Mean total donations by typical and autistic individuals to the person (A) and to charity (B) in absence and presence conditions, for motivation and no motivation groups. Asterisks and bar groupings indicate significant differences between groups at an alpha level of 0.05.

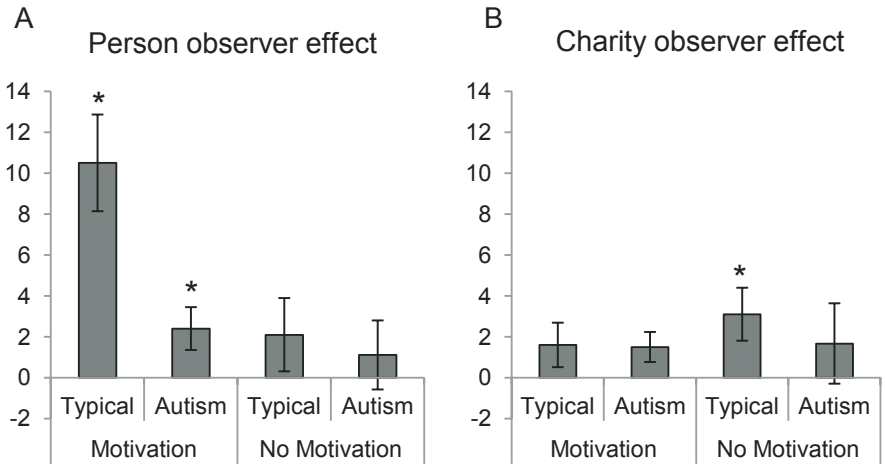

Figure 4. Observer effects (difference score between presence and absence conditions) on person (A) and charity (B) donations for each group (typical or autism) and condition (no motivation or motivation). Asterisks indicate observer effects significantly different from zero at an alpha level of 0.05.

other main effects and interactions were nonsignificant (*P*s > 0.06). An additional ANOVA controlling for age, IQ, and session order did not alter the pattern of significance. Higher order interactions were decomposed using orthogonal planned comparisons, thereby obviating the need for multiple comparison correction.

To determine the source of the significant four-way interaction, we calculated the difference scores between the presence and absence conditions (i.e. the "observer effect," Fig. 4), and performed a 2 (group; autistic or typical) × 2 (condition; motivation or no motivation) × 2 (recipient; person or charity) mixed-design ANOVA on the observer effect. This analysis revealed significant main effects of recipient, $F(1, 35) = 4.31$, $P = 0.045$, $\eta_p^2 = 0.11$, and group, $F(1, 35) = 4.77$, $P = 0.036$, $\eta_p^2 = 0.12$, and a significant interaction between recipient and condition, $F(1, 35) = 8.18$, $P = 0.007$, $\eta_p^2 = 0.19$. The three-way interaction among recipient, group, and condition was also significant, $F(1, 35) = 4.52$, $P = 0.041$, $\eta_p^2 = 0.11$.

One-sample *t*-tests were used to determine whether the observer effects in each group were significantly different from zero. When donating to the person (Fig. 4, panel A), typical individuals in the motivation condition showed a significant observer effect, $t(9) = 4.44$, $P = 0.002$, $r = 0.83$. Adults with autism in the motivation condition also showed a significant observer effect, $t(9) = 2.30$, $P = 0.047$, $r = 0.61$, although the observer effect was significantly *smaller* than that shown by typical adults in this condition, $t(18) = 3.14$, $P = 0.008$, $r = 0.59$.

When donating to charity (Fig. 4, panel B), only typical individuals in the no motivation condition showed a significant observer effect, $t(9) = 2.39$, $P = 0.040$, $r = 0.62$. All other effects were nonsignificant (all *P*s > 0.07). Notably, when donating to charity in the no motivation condition—the closest replication of the original Izuma et al. [2011] study—adults with autism did *not* show an observer effect that was significantly different from zero, $t(8) = 0.85$, $P = 0.42$, $r = 0.29$.

Questionnaire Data

To determine whether participants believed their behavior had changed when observed, a 2 (group; autistic or typical) × 2 (condition; motivation or no motivation) ANOVA revealed a significant main effect of condition, $F(1, 38) = 4.79$, $P = 0.035$, $\eta_p^2 = 0.12$, with participants in the motivation group reporting that their behavior had changed more when watched ($M = 2.80$, SD = 0.83) than those in the no motivation group ($M = 2.26$, SD = 0.65). There was no effect of group or any interactions involving group (all *P*s > 0.57). There were also no group differences with regard to participants' responses on the Money Attitude Scale (all *P*s > 0.17), or with how much participants reported they *needed* extra money ($P = 0.91$) or would *like* extra money ($P = 0.61$).

Attitudes Toward Reciprocity

Data from 16 autistic participants' attitudes toward the norm of reciprocation were compared with the means obtained from Perugini et al.'s [2003] normative sample. This analysis revealed no significant difference in negative or positive reciprocity (both *P*s > 0.12), but there was a significant difference in beliefs about reciprocity, $t(15) = 5.79$, $P < .001$, such that the adults with autism had higher beliefs in reciprocation ($M = 4.76$, SD = 0.56) than the norm ($M = 3.96$).

We also obtained responses from 16 autistic participants and 12 typical participants to the question "if you were given £10, and decided to share half of this (£5) with

Table 2. Measures of Theory of Mind Completed by Autistic Participants, with Percentage of Participants Giving Correct Responses or Mean Scores

Measure	Result (n = 16)
Ice Cream Story	73%
Penny Hiding (max = 6)	$M = 4.93$ (SD = 1.28)
Strange Stories (max = 16)	$M = 11.5$ (SD = 2.45)

another person, and then this same person was given £10, how much of that do you think they would share with you?" and found that while all typical participants said they would receive £5 from the other person, the mean amount autistic participants believed they would get in return was £3.83 (SD = 2.08)—an amount significantly lower than that of the typical group, $t(14) = 2.17$, $P = 0.048$. Yet when participants were asked the reverse question, "if another person was given £10, and decided to share half of this with you, and then you were given £10, how much would you then share with that same person?" there was no significant difference between groups, $t(26) = 0.12$, $P = 0.91$.

ToM

Data from 16 autistic participants' ToM skills were available (see Table 2), of which eight participants came from the motivation group and eight from the no motivation group. *t*-tests confirmed there were no significant differences between these two groups for any of the ToM measures (all $P > 0.37$). To test whether these measures could predict the observer effect, we conducted linear regression with Strange Stories, Penny Hiding, and Ice Cream Story scores as predictors, controlling for age and IQ. For the person observer effect, only the Strange Stories was marginally significant in predicting the person observer effect, $t = 2.21$, $\beta = 0.69$, $P = 0.054$, with higher scores on the Strange Stories relating to larger person observer effects. For the charity observer effect, no predictors were significant (all Ps > 0.24).

Discussion

The current study aimed to test whether autistic adults could manage their reputation when motivated to do so, in order to explain purportedly absent reputation management in these individuals. Three main findings require explanation. First, unlike typical adults, adults with autism did not manage their reputation by increasing donations to charity when watched. Second, when provided with motivation, autistic adults *did* demonstrate an observer effect when donating to the person. Third, the magnitude of this observer effect was significantly attenuated relative to the effect shown by typical adults. These findings suggest that autistic individuals have the ability to show a degree of reputation management, under conditions in which it is beneficial to think about another person's opinion.

The charity data replicate those obtained by Izuma et al. [2011]: typical adults donated more to charity when watched, while adults with autism did not. Two candidate explanations for this effect were previously advanced: (a) that those with autism are unable to manage their reputation because of ToM difficulties; or (b) that those with autism do not find reputation rewarding, and thus do not change how they behave in front of others to manage their reputation. Our additional manipulation of participants' motivation allowed us to attempt to distinguish these competing explanations. Here, we found that when autistic participants were motivated by an explicit situation to gain a financial reward, they significantly increased their donations when watched. These results suggest that difficulties with *implicit* ToM might be the primary driver of the lack of an observer effect in the no motivation condition. This would follow suggestions of previous research that autistic adults do not *automatically* think about what others think of them [Frith, 2004; Senju et al., 2009]. In our study, an explicit situation appeared to make autistic people consciously aware of their behavior, and as such led to attempts to manage reputation (by increasing donations to the person who was observing them), especially since a financial reward was at stake. Evidence of this explicit awareness is supported by the questionnaire measures, which revealed that all participants in the motivation condition were more aware than those in the no motivation condition that their behavior had changed. This finding is consistent with recent research showing that adults with autism can use abstract social rules (in the current experiment, the norm of reciprocation) during social interactions [Baez et al., 2012]. It seems a degree of reputation management may be possible when autistic people are explicitly aware they should be thinking about what another person thinks—thus, the *ability* to manage reputation may be unaffected in autism.

Nonetheless, the degree to which the autistic participants changed their behavior when observed, even when motivated, was significantly attenuated compared with the typical participants. There are at least two possible explanations for this attenuation: either (a) difficulties with reward processing or (b) further difficulties with ToM. First, if the monetary incentive to manage reputation is less rewarding for those with autism [Kohls et al., 2012], we would expect participants to make less effort to obtain money as a reward. Yet our autistic participants showed no differences in their desire, understanding, or need for money, implying that they found money a

rewarding and motivating stimulus [for similar findings, see Damiano, Aloi, Treadway, Bodfish, & Dichter, 2012; Lin, Rangel, & Adolphs 2012]. This finding also bears on the ecological validity of the dictator game [see Thomae, Zeitlyn, Griffiths, & Van Vugt, 2012, for discussion]; should those with autism have had less desire for money, the dictator game may overestimate the degree to which individuals with autism show reputation management.

Perhaps, then, specific difficulties in autism with *social* reward processing may lead to a lessened propensity to engage in reputation management. The social motivation hypothesis of autism [Chevallier et al., 2012; Dawson, 2008] proposes that the pervasive social difficulties in autism are caused by a primary "deficit" in social motivation, which leads to secondary difficulties in social cognition. In the current study, it is unclear whether the motivational attenuation was observed specifically in response to social rewards—given that our motivation was not purely social—or whether individuals with autism have more pervasive reward processing difficulties. It is possible that social motivation links to an individual's (both typical and those with autism) propensity to actually engage in reputation management—those who are more socially motivated being more likely to attempt reputation management. The current study, however, did not directly test this hypothesis. Future research could test the impact of an explicit social reputation condition, for example, by telling participants the observer was watching to rate people's generosity. Such a study would benefit from a larger sample size than that used in the current study, which may have biased effect sizes [Levine & Hullett, 2002] and prohibited subtle effects from being observed.

Aside from reward processing difficulties, the attenuation in the person observer effect may reflect further problems in ToM. Indeed, we found some evidence for the idea that those with better ToM, as measured by the Strange Stories, showed larger observer effects when donating to the person, suggesting better ability to think about others' thoughts could lead to better reputation management. Further, while autistic participants may realize that they *should* donate more to the observer as she could later reciprocate, they may not fully realize that the degree of reciprocity is determined by their own behavior. Such difficulties would be consistent with the reported difficulties experienced by adults with autism in predicting and influencing the behavior of others [Yoshida et al., 2010]. In the current study, participants in the motivation condition had to predict that the observer would engage in a tit-for-tat strategy, but ToM problems in some adults with autism might have limited the degree to which this behavior was predicted.

Furthermore, our findings are consistent with research into self-presentation in childhood [Begeer et al., 2008; Scheeren, Begeer, Banerjee, Meerum Terwogt, & Koot, 2010]. Such studies have shown that cognitively able children with autism *do* show evidence of the ability to self-promote for a reward, although they do so less effectively and with less sensitivity to their audience than typical children. These results could also be conceptualized as evidence for ability to manage reputation (since self-promotion is a key method in managing one's reputation), but reduced propensity to do so. In support of this idea, Scheeren et al. [2010] suggested that children with autism show less flexibility in their self-presentational ability possibly due to the desire to stick with following rules—such as avoiding lying, even when lying could improve one's reputation.

Furthermore, our participants' questionnaire data indicated that those with autism had unusually high beliefs in the norm of reciprocation, perhaps due to their stated dedication to following rules. Notwithstanding, it seems that our autistic adults did not necessarily expect *others* to reciprocate with them, despite reporting that *they* would reciprocate themselves. Difficulties in being able to plan and predict how others act toward them may be exacerbated by autistic adults' low expectations of reciprocation, which may be based on their experiences with others. Perugini and Gallucci [2001] believe that reciprocity occurs for two reasons: because it is an internalized standard and because people are concerned about what others think. Our results imply that adults with autism reciprocate because it is a social norm that they adhere to, rather than to gain something for their own reputation. Experience and expectations of others' behavior may be an important component of reputation management. Our experiences with others are an important means of learning exactly what to predict from other people and learning about the reputations of others [Frith & Frith, 2006]. Autistic individuals are more likely to have limited experiences with others and may have more negative experiences, such as bullying [Roekel, Scholte, & Didden, 2010]. Arguably, an individual's propensity for reputation management may be lessened if one does not expect a good reputation in the eyes of others to be reciprocated with social rewards in the future.

In conclusion, our results suggest that adults with autism do have the ability to manage reputation but reduced propensity to do so. Frith and Frith [2011] proposed that adults with autism are "free of hypocrisy" since they did not manage their reputation while donating to charity [Izuma et al., 2011]. Although we replicate this finding, we also found that autistic individuals showed a degree of reputation management in our motivation condition. It is likely that the typical adults in the motivation condition were motivated more by self-interest rather than by subtle attempts to manage reputation. Our autistic adults, meanwhile, remain free of hypocrisy, as they attempt to utilize a norm of reciproca-

tion, but do so out of believing in reciprocation itself, rather than to manipulate others.

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