



Brief article

Four-year-olds' strategic allocation of resources: Attempts to elicit reciprocation correlate negatively with spontaneous helping



Ben Kenward*, Kahl Hellmer, Lina Söderström Winter, Malin Eriksson

Department of Psychology, Uppsala University, Box 1225, 751 42 Uppsala, Sweden

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ABSTRACT

Behaviour benefitting others (prosocial behaviour) can be motivated by self-interested strategic concerns as well as by genuine concern for others. Even in very young children such behaviour can be motivated by concern for others, but whether it can be strategically motivated by self-interest is currently less clear. Here, children had to distribute resources in a game in which a rich but not a poor recipient could reciprocate. From four years of age participants strategically favoured the rich recipient, but only when recipients had stated an intention to reciprocate. Six- and eight-year-olds distributed more equally. Children allocating strategically to the rich recipient were less likely to help when an adult needed assistance but was not in a position to immediately reciprocate, demonstrating consistent cross-task individual differences in the extent to which social behaviour is self- versus other-oriented even in early childhood. By four years of age children are capable of strategically allocating resources to others as a tool to advance their own self-interest.

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1. Introduction

Humans display unusually high levels of behaviour benefitting even unrelated others, because others tend to reciprocate (Nowak & Sigmund, 2005). This functional explanation does not, however, solve the question of the psychological mechanisms that cause such prosocial behaviour (de Waal, 2008). It can be motivated by strategic self-interested concerns such as expectations of reciprocation, but also by feelings of genuine sympathy, and debate continues as to the nature of the complex interplay between concerns for self and others (Stich, Doris, & Roedder, 2010). The developmental perspective necessary to understand this interplay is missing, however, because although there is evidence that sympathetic concern motivates prosocial behaviour in very young children (Hepach,

Vaish, & Tomasello, 2013; Vaish, Carpenter, & Tomasello, 2009; Warneken & Tomasello, 2009), it is less clear whether self-interested strategic concerns can motivate their prosocial behaviour.

An investigation of strategic social behaviour in preschoolers would also be highly revealing because such behaviour requires advanced socio-cognitive problem solving abilities that are not otherwise clearly evident in children of this age (Green & Rechis, 2006; Rubin & Rose-Krasnor, 1992). An individual difference approach would also be valuable in this context because while clear individual differences in strategic social behaviour are seen in adults and school-age children (Jones & Paulhus, 2009; Steinbeis, Bernhardt, & Singer, 2012; Wilson, Near, & Miller, 1996), nothing is known about these differences' earlier developmental roots. The current study fills these gaps.

Motivations for young children's prosocial behaviour are diverse (Paulus & Moore, 2012). Apart from sympathy,

* Corresponding author. Tel.: +46 768 500221.

E-mail address: ben.kenward@wolfson.oxon.org (B. Kenward).

other factors include socialization (Brownell, 2013; Brownell, Svetlova, Anderson, Nichols, & Drummond, 2013), fairness concerns (Paulus & Moore, 2012), and the desire to participate in the activities of others (Rheingold, 1982). Furthermore, there are observations consistent with the hypothesis that preschoolers, like older children (Repacholi, Slaughter, Pritchard, & Gibbs, 2003; Steinbeis et al., 2012), may engage in strategic prosociality. Specific patterns of prosocial and aggressive behaviour correlate with social dominance in a manner suggesting that preschoolers use prosocial behaviour to mitigate the negative consequences of aggression (Hawley, 2002; Hawley & Geldhof, 2012; Roseth et al., 2011). When choosing how to share, preschoolers take into account factors that are of strategic importance, for example by sharing more with those who were themselves generous or worked hard or are friends (Kanngiesser & Warneken, 2012; Paulus & Moore, 2012). Audience effects are very suggestive: five-year-olds are more generous when they are observed (Engelmann, Herrmann, & Tomasello, 2012; Leimgruber, Shaw, Santos, & Olson, 2012). While such selective prosociality is clearly functionally strategic, it is not yet fully clear that it is psychologically motivated by strategic cognition such as concern for reputation or reciprocation. Such functional social behaviour can also be subserved by automatic mechanisms (Bargh, Schwader, Hailey, Dyer, & Boothby, 2012) such as automatic tendencies to give more to those you like or to behave more prosocially when observed. Audience effects can be unconscious in adults (Haley & Fessler, 2005; Nettle et al., 2013) and even cleaner fish cheat less when cleaning in the presence of bystander client fish (Pinto, Oates, Grutter, & Bshary, 2011).

Here we conduct an experiment in which strategic resource allocation is possible but can only arise from an explicitly strategic motivation. This is because participants must consider not only the presence or absence of others, but also their material ability to reciprocate (Experiments 1 and 2), and whether or not they state an intention to reciprocate (Experiment 2). Participants play a game with two experimenters. One round consists of each player in turn using a token (if they have one) to buy from a vending machine a plastic egg containing either one or two candies (ostensibly at random but in fact in a predetermined sequence). One candy is always kept, but an extra candy must be given to either of the other players (Fig. 1). If the hypothesis that children are able and motivated to engage in strategic resource allocation holds, then they are predicted to prefer to allocate candies to participants who have access to tokens and who have stated an intention to reciprocate. Experimenters' access to tokens is manipulated in Experiments 1 and 2 and their stated intention to reciprocate is manipulated in Experiment 2.

We also examine whether there are consistent individual differences in the extent to which social behaviour is self- or other-oriented that produce individually consistent behaviour across different situations with the possibility for prosocial behaviour. Although such consistent individual differences have not previously been found in young children (Dunfield & Kuhlmeier, 2010, 2013; Paulus, Kühn-Popp, Licata, Sodian, & Meinhardt, 2013; Thompson & Newton, 2013), their presence in older children and



Fig. 1. A participant handing a candy to the token-rich experimenter.

adults indicates that they might exist (Penner, Dovidio, Piliavin, & Schroeder, 2005). Participants are tested for their tendency to spontaneously help an adult in need, a behaviour that has been argued to be motivated by concern for others (Hepach et al., 2013; Warneken & Tomasello, 2009). We use a helping test in which there is little motive for strategic helping as reciprocation is unlikely to be forthcoming because the adult is not present when helped. If individuals consistently differ across tasks in the extent to which their choices concerning social behaviour are self- versus other-oriented, then helping in this situation is predicted to correlate negatively with strategic distribution in the sharing game.

We test four-year-olds; the procedure would presumably be extremely challenging for younger children because of their limited understanding of others' verbally expressed intentions (Apperly & Butterfill, 2009). We also test older children to explore the competing influences of different developmental processes: older children are able to be more strategic because of improved cognitive skills (Steinbeis et al., 2012), but might act less strategically because of increased commitment to fair distribution (Damon, 1994; Gummerum, Hanoch, & Keller, 2008).

2. Experiment 1

2.1. Method

Fifty-two participants were clustered in three age-groups: 16 four-year-olds (7 girls, $M = 50$ months, $SD = 3$), 24 six-year-olds (11 girls, $M = 80$ months, $SD = 3$), and 12 eight-year-olds (5 girls, $M = 98$ months, $SD = 3$). Two additional six-year-olds were tested but excluded from analysis due to experimenter error. One four-year-old and two six-year-olds were included in analysis of the sharing game but excluded from analysis of spontaneous helping because of parental interference, likewise one six-year-old because of experimenter error.

Participants first observed the three-player sharing game. A model experimenter played two rounds with a

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