Enhancing behavioral control increases sharing in children

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Abstract

Young children endorse norms of fairness but rarely act on them. We investigate whether a failure of behavioral control can partially explain why children do not share more generously than they do. We experimentally manipulated behavioral control and observed its effects on sharing in 120 children aged 6-9 years of age. Using a between-subject design, we presented children with stories in which a protagonist either exerted behavioral control in an unrelated context or not. Following this, children engaged in a sharing task. We found that children who had been read a story promoting behavioral control shared more than children who had been read a neutral story. This effect held over two different types of instruction. Perceptions of fairness, on the other hand, were identical across conditions. These findings speak to the importance of behavioral control in prosocial behavior, and specifically sharing, during middle childhood.

Enhancing behavioural control increases sharing in children

Prosocial behavior is crucial for initiating and sustaining interpersonal relationships (Over, 2016; Steinbeis, Bernhardt, & Singer, 2012). Children help (Warneken & Tomasello, 2006), share with (Benenson, Pascoe, & Radmore, 2007; Harbaugh, Liday, & Krause, 2003; House et al., 2013; Schmidt & Sommerville, 2011) and comfort others (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992) from early in development. While the occurrence of prosocial behavior early in development is uncontested, there is much less agreement regarding its underlying mechanisms. This is a crucial topic for empirical research because if we can understand the mechanisms that influence prosocial behavior, then we can help support and encourage its development. It has been shown that mechanisms underlying prosocial behavior early in development do not necessarily correlate with those later in development (Paulus et al., 2015) and that individual differences in various types of prosocial behavior (i.e. helping, sharing and comforting) do not correlate with each other (Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011). This suggests a potential multitude of different mechanisms operating in support of prosocial behavior throughout development. Here we focus on the role of behavioural control as a potential mechanism underlying sharing in middle childhood, an age when children reliably show sharing behavior (Benenson et al., 2007; Blake, Piovesan, Montinari, Warneken, & Gino, 2015; Smith, Blake, & Harris, 2013).

When considering the development of prosociality, it is necessary to consider both children's knowledge about social norms and their actual behavior (Blake, McAuliffe, & Warneken, 2014). Previous research has shown that children

demonstrate a sensitivity towards fair (equal) distributions from around 16 months (Geraci & Surian, 2011). From at least three years of age, children explicitly endorse fairness norms, stating that they ought to share equally (Smith et al., 2013). Infants also engage in some sharing behavior themselves, but they typically share considerably less than half of the resources they have available (Schmidt & Sommerville, 2011). Sharing of valuable resources such as sweets or stickers undergoes considerable development from then onwards, increasing with age (Benenson et al., 2007; Fehr, Bernhard, & Rockenbach, 2008; Harbaugh et al., 2003; House et al., 2013) and taking several years until it conforms to explicitly held norms regarding how much should be shared (Smith et al., 2013). There is thus an interesting discrepancy between the very early onset of fairness sensitivities in infancy and the much later development of acting in accordance with ideas of fairness. This so-called knowledge-behavior gap has been argued to decrease with age (Smith et al., 2013). This leaves us with an important question, which is why do children not share more generously than they do?

One important candidate for enabling children to share more generously and align their behavior with explicitly endorsed norms is behavioral control (Steinbeis, in press; Steinbeis et al., 2012). Especially when resources are valuable, behavioral control could allow children to curb the temptation to keep more for themselves than dictated by their stated fairness norm. Behavioral control refers to the ability to align behavior with one's goals (Ajzen & Madden, 1986; Miller & Cohen, 2001). It comprises both the control of thoughts and actions and is thus closely related to the concept of self-regulation (Rothbart, Sheese, Rueda, & Posner, 2011). Sharing has been shown to correlate with

independent measures of behavioral control (Blake et al., 2015), which would predispose such a mechanism to aligning behavior and goals. The evidence however is contradictory. In a recent study children aged 3-8 years stated that they themselves should share equally but failed to engage in equal sharing until around 7-8 years of age (Smith et al., 2013). A concomitantly acquired experimental task of behavioral control (i.e. bear-dragon task) failed to explain this behavioral discrepancy. As a result it was concluded that increasing willpower and behavioral control were not responsible for closing the knowledge-behavior gap (Blake et al., 2014; Smith et al., 2013). More recently however it was shown that other measures of behavioral control (i.e. parental questionnaires of self-regulation) could account for age-related changes in closing the knowledge-behavior gap (Blake et al., 2015). These discrepancies in previous research might, in large part, be due to different methodologies employed and the use of correlational rather than experimental research designs. We sought to provide an experimental test of the relationship between behavioral control and sharing behaviour through an experimental manipulation.

Behavioural control is not easy to manipulate in laboratory settings (hence the dearth of experimental research on this topic). Priming paradigms offer a potential solution to this problem. By randomly assigning children to hear content that activates the mental representation of interest, in this case behavioural control, researchers can gain understanding into the role it plays in determining a particular social behavior (Stupica & Cassidy, 2014). Previous research has shown that social priming can influence children's eating behaviour

(Harris, Bargh, & Brownell, 2009), emotional responses (Cortez & Bugental, 1995), and self concept (Bryant-Tuckett & Silverman, 1984). More recent research has shown that goal priming influences children's tendency to wait for a large reward or choose an immediately available small one (Kesek, Cunningham, Packer, & Zelazo, 2011). By means of stories children were either primed to maximize their rewards or to go for something immediately available. *Maximize* primes led to a greater proportion of children choosing a larger delayed reward compared to *immediacy* primes. The effect was stronger than when children had received explicit instructions to the same effect. A recent study in adults could show that priming reflective or automatic behavioral tendencies had an influence on subsequent sharing behavior (Rand, Greene, & Nowak, 2012). This work demonstrates that priming is an effective means by which to manipulate behavioral control. We use this basic method in order to experimentally investigate the role that behavioural control plays in prosocial behavior.

We devised two stories to use as primes. In one story, a protagonist actively engaged in behavioral control to resist a strong urge not to eat sweets (i.e. a Behavioural Control Prime) whereas in a virtually identical story there was no active engagement of behavioral control as the protagonist chose to leave the scene of temptation thus removing the necessity for behavioral control (i.e. Neutral Prime; see Appendix). We then assessed the effect of the priming conditions on sharing behavior using a child-friendly version of the Dictator Game in which children were asked to distribute 7 monetary units between themselves and an anonymous other. We opted for anonymity to avoid a potential effect of contextual variables which are known to become increasingly

important during childhood (Martin & Olson, 2015). We predicted that, if a failure of behavioral control is one reason for low levels of sharing, then children should share more after behavioral control priming than after neutral priming. We also sought to examine the effect of behavioral control priming over two sharing contexts - when children were told they could share how they wished (Want share) and when children were told to share how they think they should (Should share). Previous research has demonstrated that behavioral control correlates with sharing behavior when children are asked to share as they wish (Blake et al., 2015). This research suggests that the effect of behavioral control priming may be stronger in the Want share condition than in the Should share condition. To control for potential effects of the primes on fairness judgments and mood, which could in turn affect prosocial behavior we also obtained fairness ratings and an indicator of children's emotional state.

Method

***Participants*:** 120 children aged 6 – 9 years were tested (mean = 7.2 years ± .936, range = 5.7 – 8.98 years, 59 females). Children were recruited from schools in the area. This study was approved by the local Ethics Committee (E029-11-24012011) and written parental consent was provided for all participants. Children were recruited from a database of parents in a middle-sized town, who had volunteered their children to participate in child development studies. Although no specific demographic data were collected, participants came from mostly middle-class backgrounds, and approximately 98% of the population from which the sample was drawn was native German.

Design: As part of the priming procedure all children listened to a story via headphones about a gender-matched protagonist and subsequently were given monetary units (henceforth MUs) that they could share with another anonymous child. Half the children (*N* = 60, 30 females) were assigned to a condition in which the story's protagonist had to exercise strong self-restraint (Behavioral Control group), while the story's protagonist for the other half of children (*N* = 60, 29 females) did not (Neutral group). During the subsequent decision phase children in both the Behavioral Control and the Neutral groups were further divided into one of two groups. The first group was told that they could share as they wanted to (N = 30, 15 females), while the second was told they could share like they think they ought to (N = 30, 14 females). There were no age differences between any of the groups.

Priming**:** Children listened via headphones to a story of a protagonist (Paul/Paula) who was matched to the participants' gender. For female participants the story was as follows: Paula was visiting her grandmother. Her grandmother had been busy all morning baking cakes including her favourite cakes for a tea party that was to take place later in the day. The delicious aroma of cake pervaded the kitchen and she realized how hungry she was. Her grandmother told her not to touch any of the cakes because they were for later after which she left the house to do some shopping. In the Neutral Prime condition, Paula goes to the garden after her grandmother leaves to spend the rest of the afternoon there. In the Behavioural Control prime condition, Paul/Paula remains in the kitchen until her grandmother returned and did not touch any of her favourite cakes in spite of them smelling delicious and her being

very hungry. Both audio clips were exactly 103 seconds long. The experimenter was unaware of how each subject was primed and had never heard the audio clips.

***Sharing*:** Prior to listening to the story, children were shown a table stacked with rewards such as games and toys that would be of interest to their age group. The rewards were arranged from left to right by increasing attractiveness as determined through extensive previous piloting with this age range (Steinbeis et al., 2012; Steinbeis, Bernhardt, & Singer, 2015; Steinbeis, Haushofer, Fehr, & Singer, 2014; Steinbeis & Singer, 2013). Children were told that they were going to play some games during which they could win poker chips (the MUs), which they could subsequently trade in for one of the rewards. Depending on how many chips they had, the larger the range of rewards was from which they could chose.

To test for children's willingness to share they played one round of the Dictator Game (DG) in the role of the proposer. For this, children were given 7 MUs and shown two round boxes marked with differing colors, one of which belonged to the participant and the other to another child that was anonymous. Half the children were told they could share as they wished by dividing the poker chips whichever way they wanted between the two boxes, while the other half were told they could share how they feel they should. We were unsure if sharing MUs would be sensitive to the influence of the preceding primes. As a result we decided to let children decide over an unequal number of MUs as that would

force them to decide to give either more or less than they have themselves to the anonymous other.

It was insured that all children had fully understood the instructions. This was checked by means of control questions pertaining to the number of MUs children were endowed with, who they thought they were playing with and which of the two boxes was for whom. If children responded incorrectly on any of the questions the instructions were reiterated up to two times. As a result all children were graded on their understanding of the task with deductions for having had to reiterate the instructions. In spite of repeated instructions, six children repeatedly gave wrong answers to at least one of the questions. They participated in the study but their data was subsequently excluded from further analysis. All other children understood the instructions and nature of the game at least after one repetition.

To ensure that not too much time would be taken up through the instruction of the games and wash out any effect of the previous manipulation on behavior, participants were first instructed on the Dictator game, then listened to one version of the story and then played the game immediately after.

***Fairness ratings*:** After having played the DG, children were asked to indicate whether the different ways in which 7 MUs could be shared (7:0; 6:1; 5:2, 4:3) were fair or not. To do so they were given a sheet with the four distributions depicted and asked to tick a Yes box or a No box if they considered the distribution fair or not. Note that there was no indication that these were the

result of decisions with a proposer or a responder; children were merely shown four distributions and asked to rate whether they thought the distributions were fair or not. This was done in order to see what children's understanding of a fair distribution was.

***Emotion ratings*:** To check for any differences in emotional experience following the procedure, we also asked children how they felt after they played the DG. They were presented with three scales denoting happiness, sadness and anger. Each scale was marked with a representative drawing of a face depicting the relevant emotion. Each scale was flanked by a large and a small version of the depicted image, in each case indicating how weak or strong the specific emotion was felt. Children could indicate on a line going between the small and the large face how they felt. Fairness and emotion ratings were counterbalanced across participants.

Results

We tested for differences in sharing as a function of the prime (Control / Neutral), the sharing instruction (Want / Should) as well as an interaction between factors prime and instruction. A Univariate ANOVA with factors prime and instruction yielded a significant effect of prime ($F(1,110) = 5.394$; $p = 0.022$; partial $\eta^2 = 0.047$; Control prime: mean = 5.11, std.error = 0.185; Neutral Prime: mean = 4.54, std. error = 0.166), a significant effect of instructions ($F(1,110) = 29.045$; $p = 0.001$; partial $\eta^2 = 0.209$; Want Instruction: mean = 4.22, std. error = 0.137; Should Instruction: mean = 5.45, std. error = ±0.182) and no interaction between the two factors (see Figure). Children shared more after the

Behavioural Control prime than the Neutral prime and more when instructed to share how they should than how they wanted. These effects remained significant also when controlling for the factors age, gender, performance on the control questions, fairness ratings and self-reports of emotional experience as indicated by an ANCOVA (factor prime: $F(1,102) = 5.74$; $p = 0.018$; partial $\eta^2 = 0.053$; factor instruction: $F(1,102) = 29.045$; $p = 0.001$; partial $\eta^2 = 0.222$).

Children rated the fairness of the four distributions in the following way (% of children who said the distribution was fair): 4:3, 98.3%; 5:2, 93.3%; 6:1, 88.3%; 7:0, 0.8%. More importantly, there were no differences in the fairness ratings between any of the groups ($F < 1$; $p > 0.3$) nor in their self-reports of emotional experience ($F < 2.2$; $p > 0.14$).

Discussion

In this study we used an experimental manipulation to test for the role of behavioral control in bringing about increased sharing in 6-9 year old children. We used a short gender-matched vignette portraying a child exerting behavioral control in a non-sharing context to prime behavior in a subsequent sharing task. Using a between-subjects design, we found that children who had listened to the behavioral control story shared more with an anonymous other child compared to children who had listened to identical stories but without the protagonist needing to exert behavioral control. We also found that this effect held to a similar extent over two different sharing instructions, namely telling children to either share as they wished or as they thought they should. The results cannot be

easily accounted for by changes in emotional experiences or different perceptions of fairness as a function of the primes, which did not differ between the groups. Nor can they be explained by simple mimicry of the characters in the primes, as the primes described behavioral control in a context entirely different to the experimental situation (i.e. resisting the temptation to eat something sweet vs. resisting the temptation to keep coins to oneself). These findings suggest that behavioral control plays an important role in promoting sharing during childhood.

It is worth emphasizing that our Neutral Prime condition was a relatively conservative control to the Behavioral Control prime condition. In the Neutral Prime condition the protagonist chooses to leave the room of temptation and go out into the garden. It could be reasonably argued that this is already a form of self-regulation, whereby in order not to be tempted any further, the child decides to extract themselves from the potentially compromising situation. Arguably however, the level of behavioral control exerted occurs to a lesser degree than continuing to resist temptation. The fact that there is a significant difference between the Neutral Prime and the Behavioral Control condition in spite of the similarity of the two conditions and the relative degree of behavioral control required also in the neutral prime suggests the potential power of the present approach in modifying child behavior in socially appropriate ways. When thinking about the nature of the priming manipulation, it is interesting to note that hearing about another child exerting behavioural control had a significant effect on children's own sharing behaviour. Social psychological research has shown that this also occurs in other domains. For example, in work on ostracism,

observing someone else being excluded from the group (Over & Carpenter, 2009; Pawling, Kirkham, Tipper, & Over, 2016; Song, Over, & Carpenter, 2015; Watson-Jones, Legare, Whitehouse, & Clegg, 2014) has similar behavioural consequences to being excluded oneself (Watson-Jones, Whitehouse, & Legare, 2016; Williams, 2007). The present study shows that this technique can also be applied to processes like behavioral control. We do no believe the priming manipulation to increase behavioral control capacity but rather to lead to a temporary shift towards greater behavioral control. The concomitant increase in sharing suggests that behavioral control and types of prosocial behavior are linked in childhood.

We show a priming effect of behavioral control in two different sharing conditions. Thus, children share more when primed by behavioral control both when told to share as they wish and when told to share as they think they should. Children also shared more in the Should than the Want condition, which indicates that they appear to be sensitive to the suggestion of sharing according to prescribed norms. This finding is in line with existing literature on sharing behaviour in this age group (Smith et al., 2013). We did not find an interaction between the prime and the sharing instruction. The fact that behavioral control primes also had an effect on sharing even when norms were invoked suggests that the mere act of giving up a valuable resource irrespective of the context requires behavioral control. This interpretation is buttressed by the lack of a priming effect on perceived fairness, implying that the primes selectively influenced the act of sharing and not the perception of fairness. However, note that the Dictator Game and the fairness ratings of various distributions were not

counterbalanced. This was done in order to avoid questions related to fairness influencing sharing decisions in the Dictator Game. An alternative explanation for the lack of group differences in the perception of fairness may be that priming effects may have dissipated following the decision of how much to share. Also, children might respond differently if they were making fairness judgments and thought themselves to be the donor or recipient. Future studies should also include explicit measures of the stated norms and preferences (Smith et al., 2013). Finally, the fact that fairness ratings were presented simultaneously may have skewed the ratings to a certain degree in that they could have been made relative to other possible options.

Our experimental demonstration of a role of behavioral control in sharing during childhood is of particular interest in the light of recent debates on the underlying mechanisms of sharing behavior. Whereas some have argued that sharing occurs automatically, intuitively and effortlessly (Rand et al., 2012; Zaki & Mitchell, 2013), others claim that sharing requires effort, self-restraint and mechanisms of behavioral control (Knoch, Pascual-Leone, Meyer, Treyer, & Fehr, 2006; Rachlin, 2002). The findings of our study suggest that sharing, at least during middle childhood, requires behavioral control. This simultaneously implies that during this developmental period altruistic decisions are not automatic and effortless. These results fit with previous research demonstrating that prosocial decisions become increasingly subject to contextual variables, such as moral status of the recipient (Vaish, Carpenter, & Tomasello, 2010), group membership (Dunham, Baron, & Carey, 2011) and reputation concerns (Engelmann, Herrmann, & Tomasello, 2012; Leimgruber, Shaw, Santos, & Olson, 2012). Such an increasing

context-related variability implies the necessity of a behavioral control in order to titrate behavior according to the need to adhere to social norms and expectations and form relationships with others and, at the same time, accumulate resources for the self.

Recent work has shown that briefly taxing behavioral control leads to a subsequent reduction in prosocial behavior in middle childhood, the same ages as in the present study (Steinbeis, in press). The present findings extend this work by showing that increasing behavioural control through priming leads to greater prosocial behavior in the same age group. They thus pave the way for future more applied work on how to encourage prosocial behavior in children through enhancing behavioural control These sets of findings suggest that prosocial behavior is malleable at least for short periods of time through targeting behavioral control. One open question relates to how this can be translated into more long-lasting changes. Studying the effects of training executive functions over longer periods of time for durable changes in transfer tasks has witnessed increased scientific interest (Diamond & Lee, 2011). If such trainings however also lead to transfer effects onto other domains such as prosocial behavior remains to be seen. One confound that needs to be considered is a potential experimenter demand effect. While the priming context and the experimental context differed substantially, it might be that the prime of increased behavioral control might have been perceived by children as a demand to exert behavioral control in an unrelated context.

The present study used an experimental manipulation to demonstrate the role of behavioral control in sharing behavior in children aged 6-9 years of age. Priming behavioral control led to increased sharing compared to neutral primes across two sharing contexts. The influence of behavioral control primes on young children's sharing speaks to a privileged role of behavioral control in prosocial acts during childhood, a mechanism capable of accounting for both age-related and individual differences in sharing (Steinbeis et al., 2012). This research add to a small but growing literature on the value of priming as technique for experimentally investigating social behavior in development (Over & Carpenter, 2009; Stupica & Cassidy, 2014) and could potentially be incorporated into interventions. For example, storybooks may prove useful ways of encouraging children to demonstrate self restraint within important educational contexts. To this end, it would be useful to test for the longevity of priming effects and their utility over repeated. Understanding the influence of priming over a one-shot interaction is already a promising step in creating positive interpersonal relationships.

References

Ajzen, I., & Madden, T. J. (1986). Prediction of Goal-Directed Behavior - Attitudes, Intentions, and Perceived Behavioral-Control. *Journal of Experimental Social Psychology, 22*(5), 453-474. doi: Doi 10.1016/0022-1031(86)90045-4

Benenson, J. F., Pascoe, J., & Radmore, N. (2007). Children's altruistic behaviour in the dictator game. *Evolution of Human Behaviour, 28*, 168-175.

Blake, P. R., McAuliffe, K., & Warneken, F. (2014). The developmental origins of fairness: the knowledge-behavior gap. *Trends Cogn Sci, 18*(11), 559-561. doi: 10.1016/j.tics.2014.08.003

Blake, P. R., Piovesan, M., Montinari, N., Warneken, F., & Gino, F. (2015). Prosocial norms in the classroom: The role of self-regulation in following norms of giving. *Journal of Economic Behavior and Organization, 115*, 18-29.

Bryant-Tuckett, R., & Silverman, L. (1984). Effects of the subliminal stimulation of symbiotic fantasies on the academic
performance of emotionally handicapped
. *Journal of Counseling Psychology, 31*, 295-305.

Cortez, V. L., & Bugental, D. B. (1995). Priming of perceived control in young children as a buffer against fear-inducing events. *Child Dev, 66*(3), 687-696.

Diamond, A., & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old (vol 333, pg 959, 2011). *Science, 334*(6054), 311-311.

Dunfield, K., Kuhlmeier, V. A., O'Connell, L., & Kelley, E. (2011). Examining the Diversity of Prosocial Behavior: Helping, Sharing, and Comforting in Infancy. *Infancy, 16*(3), 227-247. doi: DOI 10.1111/j.1532-7078.2010.00041.x

Dunham, Y., Baron, A. S., & Carey, S. (2011). Consequences of "minimal" group affiliations in children. *Child Dev, 82*(3), 793-811. doi: 10.1111/j.1467-8624.2011.01577.x

Engelmann, J. M., Herrmann, E., & Tomasello, M. (2012). Five-Year Olds, but Not Chimpanzees, Attempt to Manage Their Reputations. *PLoS One, 7*(10).

Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature, 454*(7208), 1079-U1022. doi: Doi 10.1038/Nature07155

Geraci, A., & Surian, L. (2011). The developmental roots of fairness: infants' reactions to equal and unequal distributions of resources. *Dev Sci, 14*(5), 1012-1020. doi: 10.1111/j.1467-7687.2011.01048.x

Harbaugh, W. T., Liday, S. G., & Krause, K. (2003). Bargaining by Children. *Working Paper*, 1-38.

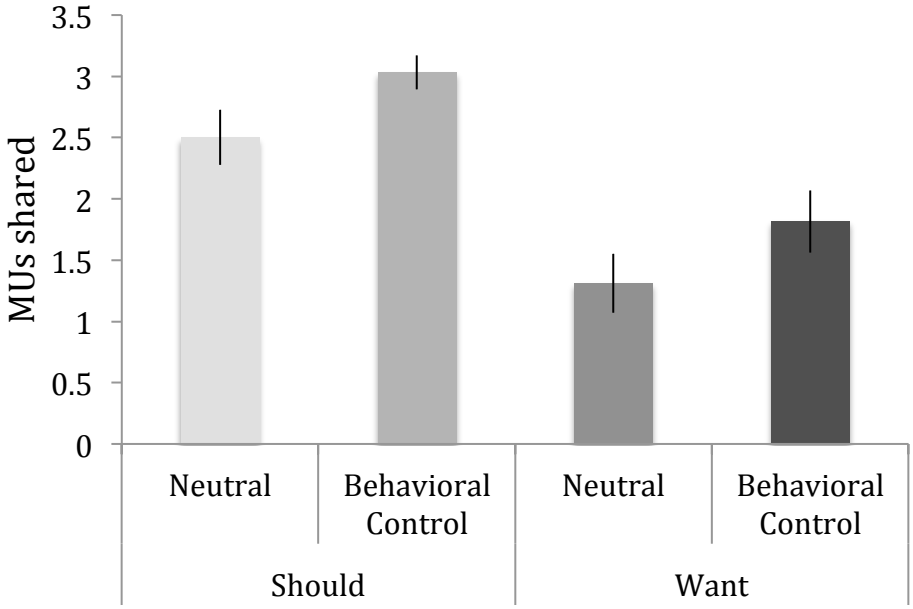
Harris, J. L., Bargh, J. A., & Brownell, K. D. (2009). Priming effects of television food advertising on eating behavior. *Health Psychol, 28*(4), 404-413. doi: 10.1037/a0014399

House, B. R., Silk, J. B., Henrich, J., Barrett, H. C., Scelza, B. A., Boyette, A. H., . . . Laurence, S. (2013). Ontogeny of prosocial behavior across diverse societies. *Proc Natl Acad Sci U S A, 110*(36), 14586-14591. doi: 10.1073/pnas.1221217110

Kesek, A., Cunningham, W. A., Packer, D. J., & Zelazo, P. D. (2011). Indirect goal priming is more powerful than explicit instruction in children. *Dev Sci, 14*(5), 944-948. doi: DOI 10.1111/j.1467-7687.2011.01043.x
Knoch, D., Pascual-Leone, A., Meyer, K., Treyer, V., & Fehr, E. (2006). Diminishing reciprocal fairness by disrupting the right prefrontal cortex. *Science, 314*(5800), 829-832. doi: DOI 10.1126/science.1129156
Leimgruber, K. L., Shaw, A., Santos, L. R., & Olson, K. R. (2012). Young children are more generous when others are aware of their actions. *PLoS One, 7*(10), e48292. doi: 10.1371/journal.pone.0048292
Martin, A., & Olson, K. R. (2015). Beyond good and evil: what motivations underlie children's prosocial behavior? *Perspect Psychol Sci, 10*(2), 159-175. doi: 10.1177/1745691615568998
Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annu Rev Neurosci, 24*, 167-202.
Over, H. (2016). The origins of belonging: social motivation in infants and young children. *Philos Trans R Soc Lond B Biol Sci, 371*(1686), 20150072. doi: 10.1098/rstb.2015.0072
Over, H., & Carpenter, M. (2009). Priming third-party ostracism increases affiliative imitation in children. *Dev Sci, 12*(3), F1-8. doi: 10.1111/j.1467-7687.2008.00820.x
Paulus, M., Licata, M., Kristen, S., Thoermer, C., Woodward, A., & Sodian, B. (2015). Social understanding and self-regulation predict preschoolers' sharing with friends and disliked peers: A longitudinal study. *International Journal of Behavioral Development, 39*, 53-64.
Pawling, R., Kirkham, A., Tipper, S. P., & Over, H. (2016). Memory for incidentally perceived social cues: Effects on person perception. *British Journal of Psychology, Early Online publication*.
Rachlin, H. (2002). Altruism and selfishness. *Behav Brain Sci, 25*(2), 239-250; discussion 251-296.
Rand, D. G., Greene, J. D., & Nowak, M. A. (2012). Spontaneous giving and calculated greed. *Nature, 489*(7416), 427-430. doi: Doi 10.1038/Nature11467
Rothbart, M. K., Sheese, B. E., Rueda, M. R., & Posner, M. I. (2011). Developing Mechanisms of Self-Regulation in Early Life. *Emotion Review, 3*(2), 207-213. doi: 10.1177/1754073910387943
Schmidt, M. F. H., & Sommerville, J. A. (2011). Fairness Expectations and Altruistic Sharing in 15-Month-Old Human Infants. *PLoS One, 6*(10). doi: ARTN e23223
10.1371/journal.pone.0023223
Smith, C. E., Blake, P. R., & Harris, P. L. (2013). I should but I won't: why young children endorse norms of fair sharing but do not follow them. *PLoS One, 8*(3), e59510. doi: 10.1371/journal.pone.0059510
Song, R., Over, H., & Carpenter, M. (2015). Children draw more affiliative pictures following priming with third-party ostracism. *Dev Psychol, 51*(6), 831-840. doi: 10.1037/a0039176
Steinbeis, N. (in press). Taxing behavioral control diminishes sharing and costly punishment in childhood. *Dev Sci*.
Steinbeis, N., Bernhardt, B. C., & Singer, T. (2012). Impulse Control and Underlying Functions of the Left DLPFC Mediate Age-Related and Age-

Independent Individual Differences in Strategic Social Behavior. *Neuron, 73*(5), 1040-1051. doi: DOI 10.1016/j.neuron.2011.12.027
Steinbeis, N., Bernhardt, B. C., & Singer, T. (2015). Age-related differences in function and structure of rSMG and reduced functional connectivity with DLPFC explains heightened emotional egocentricity bias in childhood. *Soc Cogn Affect Neurosci, 10*(2), 302-310. doi: 10.1093/scan/nsu057
Steinbeis, N., Haushofer, J., Fehr, E., & Singer, T. (2014). Development of Behavioral Control and Associated vmPFC-DLPFC Connectivity Explains Children's Increased Resistance to Temptation in Intertemporal Choice. *Cereb Cortex*. doi: 10.1093/cercor/bhu167
Steinbeis, N., & Singer, T. (2013). The effects of social comparison on social emotions and behavior during childhood: The ontogeny of envy and Schadenfreude predicts developmental changes in equity-related decisions. *J Exp Child Psychol, 115*(1), 198-209. doi: DOI 10.1016/j.jecp.2012.11.009
Stupica, B., & Cassidy, J. (2014). Priming as a way of understanding children's mental representations of the social world. *Developmental Review, 34*, 77-91.
Vaish, A., Carpenter, M., & Tomasello, M. (2010). Young children selectively avoid helping people with harmful intentions. *Child Dev, 81*(6), 1661-1669. doi: 10.1111/j.1467-8624.2010.01500.x
Watson-Jones, R. E., Legare, C. H., Whitehouse, H., & Clegg, J. M. (2014). Task-specific effects of ostracism on imitation in early childhood. *Evolution and Human Behavior, 35*, 204-210.
Watson-Jones, R. E., Whitehouse, H., & Legare, C. H. (2016). In-Group Ostracism Increases High-Fidelity Imitation in Early Childhood. *Psychol Sci, 27*(1), 34-42. doi: 10.1177/0956797615607205
Williams, K. D. (2007). Ostracism. *Annu Rev Psychol, 58*, 425-452. doi: 10.1146/annurev.psych.58.110405.085641
Zahn-Waxler, C., Radke-Yarrow, M., Wagner, E., & Chapman, M. (1992). Development of concern for others. *Dev Psychol, 28*, 126-136.
Zaki, J., & Mitchell, J. P. (2013). Intuitive Prosociality. *Current Directions in Psychological Science, 22*(6), 466-470. doi: Doi 10.1177/0963721413492764

Figure.



Results. The mean number of monetary units (MUs) children shared in each of the four conditions.

Appendix:
The text of the priming stories

Main story (for female participants):

Paula went to visit her grandmother, who lived in a nearby town. She was going to stay for the weekend. Grandmother had prepared lots of cakes and cookies because later that day some of her friends were going to come round for tea. All the cakes and cookies were laid out in the kitchen – including chocolate cake and strawberry shortbread, which were Paula's favourite. It smelled absolutely delicious in the kitchen and Paula, who had not eaten for some hours, was very hungry and really wanted to try them. Her tummy was rumbling that's how hungry she was! Her grandmother told her not to touch the cakes yet, because they were for later and that she should wait. Grandmother then told Paula that she just had to go outside to buy some tea and coffee and that Paula could stay in the kitchen but that she must not touch any of the cakes and cookies.

Behavioral control ending:

After Grandmother had left, Paula knew she had to be firm and resist the temptation to eat some of the cookies her grandmother had made. They just smelt so delicious! She did not touch any of the cookies. Nor did she eat any of the chocolate cake. She sat very still on his chair and waited patiently for the entire time that her grandmother was away.

Neutral ending:

After Grandmother had left, Paula, decided to leave the kitchen, where her grandmother had made the cookies and cakes, and go into the garden. She walked to the bottom of the garden and looked at the trees and flowers. Then

Paula decided to play on the swing. She played on the swing the entire time her grandmother was away.