Toys are me: Children's extension of self to objects

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ABSTRACT

Adults tend to believe that objects can function as extensions of people's selves. This belief has been demonstrated in that changes to people's sense of self affect their attachment to personally valuable objects, and vice-versa. Here we tested the development of this belief. In Study 1 we found that manipulating 5-year-olds' self-worth via positive or negative feedback on performance, affected their willingness to part with personally valuable objects, but had no effect vis-à-vis non-valuable objects. In Study 2 we found that 9-, but not 5-year-olds were more willing to give a personally valuable object to someone morally repulsive after the object had been cleaned of all remnants of the child's self, than before. Study 2b showed an analogous effect in 5-year-olds' willingness to receive an object from someone morally repulsive. These findings intimate that the extension of self to objects via contagion may derive not only from cultural values such as consumerism, materialism, or individualism, but also from basic human needs.

1. Introduction

People feel attached to a variety of material possessions: a college t-shirt that a 40-year-old still uses as a pajama, a ring passed down for generations within a family, or a famous football player's jersey. What these types of objects have in common, is that they derive their value not so much from their functionality, but from the histories of the people – oneself or others – to which they have been attached.

Philosophers (Sartre, 1943/1956), psychologists (Csikszentmihalyi & Rochberg-Halton, 1981; James, 1890; Winnicott, 1953), and consumer researchers (Belk, 1988) converge in interpreting such valuation as manifesting a tendency in people to represent objects as extensions of the self. Objects become physical manifestations of one's, or others', personal identities, values, and characteristics, such that we become the objects that we own. Why and how objects come to have this role is subject to much debate: is it a product of exposure to consumerist culture, of the learned compulsion to express oneself, of awareness to the indeterminacy of self? The goal of the present studies was to shed light on these questions by examining the phenomenon of self-extension in young children.

A number of studies have documented a relation between one's sense of well-being and a desire to obtain material objects (Bauer, Wilkie, Kim, & Bodenhausen, 2012; Kleine, Kleine, & Allen, 1995; Norris, Lambert, DeWall, & Fincham, 2012). In particular, studies have documented relations between one's sense of self and attachment to personally valuable objects. For instance, loss of personal objects due to natural disasters or disposal in old age, has been associated with injuries to people's sense of self (Ferraro, Escalas, & Bettman, 2011; Kleine & Baker, 2004; Price, Arnould, & Curasi, 2000). Complementarily, experimental studies reveal that injury to one's sense of self leads to changes in the valuation of objects. Thus, shaking people's confidence about themselves affected their valuation of objects (Gao, Wheeler, & Shiv, 2009), and priming uncertainty about social support led adults to a...
stronger attachment to objects (Keefer, Landau, Rothschild, & Sullivan, 2012; see also, Chang & Arkin, 2002; Clark et al., 2011; Frost, Kyrios, McCarthy, & Matthews, 2007; Morrison & Johnson, 2011). In fact, recent imaging studies indicate that overlapping brain systems are active when people are engaged in evaluating their self and in processing objects that they own (Kim & Johnson, 2013; Turk, van Bussel, Waiter, & Macrae, 2011).

The goal of Study 1 was to assess whether a similar dynamic to the one found among adults, occurs also among young children. It has been found that 8-year-olds view souvenirs as serving a communicative role about their personal identities (Baker, Kleine, & Bowen, 2006), 6-year-olds view their cherished possessions as meaningful to their representations of themselves (Dyl & Wapner, 1996), and indeed preschoolers prefer their cherished objects over perfect copies of them (Hood & Bloom, 2008). Study 1 adapted the experimental methodology used with adults, to examine the effect of manipulations of children’s sense of self on their attachment to personally valuable objects.

A further question of interest is how selves get extended onto objects. That is, what is the conceptual mechanism that allows such an extension? One proposed answer to this question is the belief that the self can have a contagious effect on objects, and vice versa (Rozin, Millman, & Nemeroff, 1986), and thus that something of the self remains in objects. According to this proposal, “contact” between self and object is critical for extension to occur effectively. And indeed, people are more willing to purchase a piece of clothing after it had been worn by an attractive sales-person than an unattractive one (Argo, Dahl, & Morales, 2008), and adults are willing to pay a higher price if an object has been used by a celebrity than if it has not (Newman, Diesendruck, & Bloom, 2011). In fact, Newman et al. (2011) found that this pattern of pricing was related to adults’ beliefs about contagion.

The goal of Study 2 was to examine whether children believe their selves get extended onto objects via a process of contagion. There is some indication that by age 5 – and increasingly with age – children are sensitive to disgust-based contagion of aversive objects (e.g., cockroaches, nails; Hejmadi, Rozin, & Siegal, 2004); but no studies have assessed children’s beliefs about self-based contagion of plain objects. To address this, Studies 2 and 2b adopted a similar methodology to the one used in the studies mentioned above. Namely, we assessed whether children’s valuation of objects changed as a result of transformations aimed at removing an owner’s remnants from an object.

We expected that these studies on the relation between objects and self in young children would provide valuable insights about our “default” orientation toward objects. In particular, several lines of research indicate that cultural factors may influence children’s language development (Fernald & Morikawa, 1993; Tardif, Shatz, & Naigles, 1997), attentional patterns (Bornstein, Toda, Azuma, Tamis-LeMonda, & Ogino, 1990; Duffy, Toriyama, Itakura, & Kitayama, 2009), and social relations (Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000). These findings indicate that individualism may be a fairly early emerging cultural product (Tamis-LeMonda et al., 2008). Nonetheless, to the best of our knowledge, most studies addressing issues of materialism and consumerism have focused on children 8-years of age and older (Banerjee & Dittmar, 2008; Opree, Buijzen, van Reijmersdal, & Valkenburg, 2011). Thus, if we were to find evidence for the extension of the self to objects among children much younger than 8-years, it would undermine claims that this phenomenon results from exposure to a materialistic culture (Bauer et al., 2012), an individualistic culture (Morrison & Johnson, 2011), or a sophisticated awareness of one’s self (Gao et al., 2009). Analogously, evidence for an effect of contagion at young ages would weaken arguments that the belief in the contagiousness of objects necessarily derives from an understanding of contagion in the context of illnesses, the over-valuation of celebrities, or awareness of the market value of unique items.

2. Study 1

The goal of Study 1 was to evaluate whether, like adults, children extend their selves onto objects. Adapting experimental strategies previously used with adults (Gao et al., 2009; Keefer et al., 2012; Morrison & Johnson, 2011), we pursued this goal by investigating whether manipulations of children’s sense of self-worth would have an effect on their attachment to personally valuable objects – i.e., objects that were potential targets of self-extension. The rationale was that if children extend their selves to favorite objects, then feedback harming their self-esteem would induce a need to compensate for it by – among other things – clinging to those objects. In other words, after such an injury, children should be less willing to part with favorite objects. Complementarily, the hypothesis was that if children receive feedback that boosts their self-esteem, then they would be more willing to part with favorite objects. To assess whether both these processes occur, we also evaluated children’s baseline willingness to part with such objects, i.e., before any feedback was provided.

Two main precautions were taken in designing the study, one conceptual and another ethical. Conceptually, in order to ascertain that any potential differences among feedback conditions were not due only to effects on children’s mood, we asked another group of children about their willingness to part with non-favorite personally-owned objects, following each kind of feedback. The assumption was that the extent of self-extension to such objects would be lower than for favorite objects, and thus the effect of feedback on children’s willingness to cling to these objects would be weaker. The ethical precaution was that in order not to upset children with the negative feedback, we rewarded children for their performance during the procedure and irrespectively of the feedback, and the test always ended with children getting a “definitive” positive feedback on their overall performance.

2.1. Method

2.1.1. Participants

Thirty-six 5-year-olds (Mage = 5 years 11 months, SD = 0.44 years, range = 5 years 0 months – 6 years 6 months; 17 boys and 19 girls) participated in the study. Only
children with signed parental permission participated. All children received stickers for their participation.

2.1.2. Design

The experiment had a mixed design with Object Type (Favorite vs. Neutral, randomly assigned) as a between-subjects factor, and Feedback (none, positive, and negative) as a within-subjects factor. All participants completed the baseline trial first – which constituted the "none" feedback condition – but the order of positive or negative feedback was counterbalanced across participants (i.e., half of the participants got positive feedback first, and the other half got negative feedback first).

2.1.3. Materials

Three web-available computer games, adequate for 5-year-olds and with 2 min per round durations, were used to prompt the different feedbacks. The games were: "hit the donkey", "bubble hit", and "ocean bubbles", and they were presented in this order for all children. In other words, "ocean bubbles" was always the final game played, and the other two were either followed by positive or negative feedback, depending on the order of feedback conditions that the participant underwent. A laptop computer was used for presentation of the games and feedback.

2.1.4. Procedure

Each child was interviewed individually in a quiet room in their kindergarten. The procedure started with the experimenter asking children to describe an object/toy that they have and either really like and play a lot with (Favorite condition), or do not especially like and play a lot with (Neutral condition). Children were encouraged to describe the objects, so as to make both types of objects readily accessible and vivid. In both conditions, most children described “functional” objects, such as cars, balls, and dolls. The experimenter then conducted the baseline trial assessing children’s willingness to lend the object under the “none” feedback condition. The experimenter told children that she knew a child from another kindergarten, and asked the participant whether he/she would be willing to lend the Favorite/Neutral toy to this child for one night. To derive a finer-grained measure of children’s willingness to lend, children were first asked to give a yes/no response, and then, depending on their response, were asked, “how much do you/don’t you want to lend it?”: “I’m really willing to give”, “I’m ok with giving”, and “I don’t care, but I’ll give”; or “I’m really not willing to give”, “I pretty much don’t want to give”, and “I don’t care, but I won’t give.” The above six options were also depicted by “Smiley” faces with different expressions, ranging from a wide smile to a sad expression. Note however that each child was only presented with the three options that logically followed from their yes/no response, thus making their selection more constrained and easier. Children pointed to the Smiley faces or said their responses out loud. These responses were coded into a single “willingness-to-lend score”, ranging from 1 – most unwilling, to 6 – most willing. Responses were coded online by the experimenter. Given the two-stage response system, and the visual aids, children’s responses were quite unambiguous.

Upon completion of the baseline trial, children underwent either the positive or negative Feedback manipulation. In either case, the experimenter told children that they would now play a computer game for 2 min, and they would then check on the computer how the child performed compared to other children who had played this game. Children were introduced to one of the three games, and upon conclusion the experimenter opened a "score board" prepared ahead of time in Powerpoint, with the child’s name placed in it next to several other names of fictitious competitors.

In the positive feedback condition, the child’s name appeared at the very top of the score board, and the experimenter said: “Well done! You’ve finished in the first place compared to all other children who’ve played the game.” In the negative feedback condition, the child’s name appeared toward the bottom of the score board, and the experimenter said: “Oh, too bad! You’ve finished among the last places compared to all other children who’ve played the game.” Immediately after delivering the feedback, the experimenter again asked children about their willingness to lend their Favorite/Neutral toy to yet another child (“You know, I know another child, your age, from another kindergarten. Would you be willing to lend to this child, just for one night, your [Favorite/Neutral] toy?”) The same response options as the ones provided in the baseline trial were offered here. After each game, children were allowed to choose stickers as rewards.

In order to leave children with a positive experience, at the end of the procedure we told them that they would now play a third computer game, and that this was the most important game because it really determined how well they did compared to others. Children played a 2-min game, and the experimenter told them that they did great and won the whole thing, pointing to a Powerpoint slide showing a child raising a trophy.

2.2. Results and discussion

We conducted a repeated-measures ANOVA with Gender and Object Type (Favorite, Neutral) as between-subjects factors, and Feedback (none, positive, negative) as a within-subjects factor, using the mean willingness-to-lend scores (1–6) as the dependent variable. The analysis revealed significant effects of Object Type, $F(1,32) = 5.94, p < .01, \eta^2 = .16$, Feedback, $F(2,31) = 13.29, p < .001, \eta^2 = .46$, and the interaction between the two, $F(2,31) = 4.19, p < .05, \eta^2 = .21$ (see Fig. 1).

We followed-up on the interaction by conducting two repeated-measures ANOVAs in each Object Type condition, looking at the effect of Feedback. The analysis of the Neutral condition revealed that the effect of Feedback was not significant, $p = .1$. As can be seen in Fig. 1, children’s willingness to lend a neutral toy was similar across feedback conditions. In contrast, the analysis of the Favorite condition revealed a significant effect of Feedback, $F(2,16) = 11.08, p < .005, \eta^2 = .58$. Bonferroni post hoc tests showed that the differences among all three Feedback trials were significant ($ps < .05$), with children most willing to lend their favorite toy after positive feedback, then at the baseline, and the least after negative feedback.
we should have found them acting on this pro-sociality perhaps even more strongly in regards to neutral objects. After all, relinquishing neutral objects would be less costly to the children, than relinquishing favorite objects (see for instance, Blake & Rand, 2010). As we report, no such effect was found. This argument notwithstanding, we decided to assess a second implication of the possibility that mood or pro-sociality affected children’s responses. Namely, whether or not there was a significant effect of feedback order on children’s responses.

Recall that after the baseline trial, half of the children underwent the positive feedback manipulation first and the negative one second, and the other half underwent the negative feedback first and the positive second. In addition to serving as a methodological control, we believe that this manipulation of order could provide additional information as to the possible effect of mood or pro-sociality on children’s willingness to lend. Namely, we reasoned that if mood or pro-sociality had a strong effect on children’s response, then we should find a substantial effect of order. In particular, the argument would be that giving children negative feedback about their self-worth first, could potentially unleash a stronger anti-social response, than if the negative self-worth trigger came after children had been put in a positive mood (i.e., giving them negative feedback second). The same argument would lead us to expect a stronger pro-social response after positive feedback when it came first than when it came second. To address these hypotheses, we calculated the change in children’s willingness-to-lend scores from baseline to either after the positive or negative feedback, in the Favorite condition. These scores were entered into a repeated-measures ANOVA with Order (Positive 1st, Negative 1st) as a between-subjects factor, and Feedback type (Positive, Negative) as the within-subjects factor. We reasoned that if mood or pro-sociality had a strong effect on children’s response, then we should find a substantial effect of order. Specifically, children’s willingness to lend after positive feedback increased by a mean 1.22 points (SD = 1.76) when receiving Positive feedback 1st. Similarly, children’s willingness to lend after negative feedback decreased by a mean 0.89 points (SD = 1.83) in the scale when receiving Negative feedback 1st.

Provided this initial indication that children extend their selves to objects, Study 2 tested a potential mechanism by which such extensions take place. Namely, whether children believe that the extension occurs via a process of contagion.

3. Study 2

As Rozin and others (e.g., Newman et al., 2011; Rozin et al., 1986) have argued, one of the reasons people pursue or avoid contact with objects owned by honorable or repugnant individuals, respectively, is because they believe something of the owner physically remains in the object – a process Rozin and Nemeroff (2002) referred to as “forward contagion”. Consequently, people’s willingness to
have contact with objects changes substantially if told that the objects underwent some kind of cleansing transformation – e.g., sterilization, intense washing, etc. – that removed all remnants of the objects’ previous owners.

Given our interest in investigating children’s beliefs about the extension of their own, rather than someone else’s, self onto objects, we addressed a slightly different version of contagion; namely, what Rozin and Nemeroff (2002) referred to as “backward contagion”. In this process, people believe that if an object onto which they have extended their self gets touched by someone else, then that contact might propagate back to their self. For instance, Rozin and Nemeroff found that people were reluctant to donate blood if they thought their blood might end up in someone regarded negatively (e.g., AIDS patients).

In Study 2, we adopted an analogous experimental strategy in order to assess whether children’s willingness to give a favorite object to someone repugnant would change, if the object was first cleansed of the remnants of their selves. As a control for a possible general effect of the cleansing transformation, we also asked children about their willingness to give to someone honorable – the assumption being that the transformation should not have an effect in this case. Finally, in order to address potential developmental changes in children’s beliefs about contagion, we included two age groups in this study: 4- to 6-year-olds and 8- to 9-year-olds. These ages were selected because, as Hejmadi et al. (2004) report in their study with 3.1.1. Participants

Forty-four children participated: 21 4- to 6-year-olds (Mage = 5 years 11 months, SD = 0.42 years, range = 4 years 8 months – 6 years 5 months; 11 boys and 10 girls), and 23 8- to 9-year-olds (Mage = 9 years 2 months, SD = 0.27 years, range = 8 years 7 months – 9 years 7 months; 12 boys and 11 girls). Only children with signed parental permission participated. All children received a sticker for their participation.

3.1.2. Design

The experiment had a mixed design with Age Group (hereafter called 5s vs. 9s) as a between-subjects factor, and Recipient Type (good vs. bad) and Transformation (before vs. after) as within-subjects factors. Order of presentation of the recipients (good or bad first) was counterbalanced across participants.

3.1.3. Materials

Four pictures of children were used: 2 depicted a smiling boy or girl (the “good” children), and 2 depicted a frowning boy or girl (the “bad” children).

3.1.4. Procedure

Each child was interviewed individually in a quiet room in their kindergarten or school. The procedure started with the experimenter introducing children to a gender-matched picture of either a good or a bad child, describing their typical behavior with specific positive or negative examples (e.g., the good child is always smiling, is nice, helps others, and listens to his/her parents; the bad child is always angry, is mad, hits others, and doesn’t listen to his/her parents).

After this introduction, the experimenter asked participants to think about, and describe, a piece of clothing (e.g., shirt) or blanket that they really like and use a lot. The vast majority of children described a piece of clothing (e.g., sports-team shirt). The experimenter then told children: “Do you know how sometimes we give things to others, and that thing becomes theirs? So look at the boy/girl I told you about before. Would you be willing to give your [shirt] to him/her?” Children were prompted to respond as in Study 1, thus rendering a before-transformation “willingness-to-give” score ranging from 1 – most unwilling, to 6 – most willing.

After children’s response, the experimenter introduced the transformation scenario, telling all children: “What if we were to take the [shirt] that you like and wear a lot, and put it in a special machine that cleans out all the little pieces of you that were on the [shirt], and everything from you that was on the [shirt]. Then would you be willing to give it to this boy/girl?” Children’s responses were coded as above, thus rendering an after-transformation willingness-to-give score ranging from 1 to 6. The experimenter then repeated the procedure, but in regard to the other potential recipient, either good or bad depending on the order to which the child was assigned.

3.2. Results and discussion

We conducted a repeated-measures ANOVA with Age Group (5s, 9s) and Gender (boys, girls) as between-subjects factors, and Recipient Type (good, bad) and Transformation (before, after) as within-subjects factors, using the mean before- and after-transformation willingness-to-give scores (1–6) as the dependent variables. The analysis revealed significant main effects of Age Group, F (1,40) = 6.95, p < .05, η² = .15, Recipient Type, F (1,40) = 189.41, p < .001, η² = .83, and Transformation, F (1,40) = 6.32, p < .05, η² = .14, and the two-way interactions between Age Group and Recipient Type, F (1,40) = 22.37, p < .001, η² = .36, Age Group and Transformation, F (1,40) = 7.26, p < .05, η² = .15, and most important theoretically, between Recipient Type and Transformation, F (1,40) = 7.22, p < .05, η² = .15. There were no other significant effects.

Given the significant interactions involving age, we next conducted separate repeated-measures ANOVAs on each Age Group, including Recipient Type and Transformation as within-subjects factors. Fig. 2 displays the relevant data. The analysis on 5-year-olds revealed a significant effect of Recipient Type, F (1,20) = 222.31, p < .001, η² = .92, such that children were more willing to give to a good than to a bad recipient. The interaction between Recipient Type and Transformation only approached significance, F (1,20) = 4.09, p = .056, η² = .17. Paired t-tests revealed no significant differences in 5-year-olds’ willingness to give either to a good or a bad recipient, before and after the transformation. In contrast, the analysis on 9-year-olds revealed a significant effect of Recipient Type,
Importantly, the effect of transformation was observed among 9-year-olds. Five-year-olds, in contrast, were primarily affected by the valence of the recipient, but not so comprehensively by the transformation. On the one hand, this developmental increase regarding sensitivity to contagion is consistent with previous findings in the context of the contagiousness of disgusting items (Hejmadi et al., 2004). On the other hand, in Hejmadi et al.’s study, 5-year-olds did show some evidence for beliefs about contagion. One crucial difference between Hejmadi et al.’s study and the present one that might explain the disparity in findings, is that whereas the former investigated forward contagion, the latter involved backward contagion. Backward contagion is arguably more complex conceptually, because the child needs to imagine the continuation of the self, and that contamination might occur even in
the absence of direct contact between the child and the contaminant. To start addressing this explanation, and to verify whether 5-year-olds could understand our instructions, we conducted a follow-up study. In this study, the same 5-year-olds who participated in Study 2 took part in a forward contagion version of the scenarios presented in Study 2.

4. Study 2b

4.1. Method

4.1.1. Participants

Participants were the same 21 4- to 6-year-olds who participated in Study 2. They were tested after a 5-min break, immediately upon completion of Study 2.

4.1.2. Design

The experiment had a within-subjects design, with Giver Type (good vs. bad) and Transformation (before vs. after) as within-subjects factors. Order of presentation of the givers (good or bad first) followed the counterbalancing across participants established in Study 2.

4.1.3. Materials

The same pictures used in Study 2.

4.1.4. Procedure

Participants were reintroduced to the same Bad and Good children they had seen before, in the same way and order that they had been exposed to them in Study 2. This time, however, instead of asking the participants about their own favorite shirt/blanket, the experimenter told participants about the Bad/Good child’s favorite shirt (“This [Bad/Good] [boy/girl] likes this shirt the most.”) Then, instead of asking participants about their willingness to give their shirt to the Bad/Good child as done in Study 2, the experimenter asked participants about their willingness to wear the shirt of the Bad/Good child (“Would you be willing to wear this shirt?”, and as in Study 2, “how willing are you?”). Thus the dependent variable here was a “willingness-to-wear” score, ranging from 1 (most unwilling) to 6 (most willing). After getting participants’ baseline willingness-to-wear score for either the Bad or Good child, the experimenter told participants the same transformation instruction as the one given to participants in Study 2. Only now, participants were told that the transformation was performed not on their shirts, but on those of the Bad/Good child. Children’s willingness-to-wear was then again assessed, after the transformation. The experimenter then repeated the procedure, but in regard to the other potential recipient, either good or bad, depending on the order to which the child was assigned.

4.2. Results and discussion

The data were analyzed as in Study 2, with a repeated-measures ANOVA including Giver Type (good, bad) and Transformation (before, after) as within-subjects factors, and using the mean before- and after-transformation willingness-to-wear scores (1–6) as the dependent variables. This analysis revealed a significant effect of Giver Type, \( F(1,20) = 130.35, \ p < .001, \ \eta^2 = .87 \), Transformation, \( F(1,20) = 18.18, \ p < .001, \ \eta^2 = .48 \), and of the interaction between the two, \( F(1,20) = 24.85, \ p < .001, \ \eta^2 = .55 \). Fig. 3 displays this interaction. To uncover the source of the interaction, we conducted paired \( t \)-tests for each Giver Type. These revealed that for Good givers, there was no significant difference in the willingness-to-wear scores before and after the transformation. In contrast, the scores were significantly different when the giver was Bad, with children being more willing to wear the shirt of a Bad giver after the transformation than before, \( t(20) = 5.70, \ p < .001 \). In fact, whereas when the giver was Good, the scores of 18 of the 21 children did not increase or decrease (3 decreased), when the giver was Bad, the scores of 13 of the 21 children increased and of none decreased (8 remained the same).

These findings indicate that 5-year-olds were susceptible to the transformation when it was presented in the context of forward contagion. Namely, 5-year-olds were more willing to wear a shirt that belonged to a repulsive person after it had been cleaned of the person’s “remains”, than before it had undergone such cleaning. Thus, consistent with Hejmadi et al.’s (2004) findings on 5-year-olds’ belief about the contagiousness of disgusting objects (e.g., cockroaches), we found that 5-year-olds were sensitive to the contagiousness of repulsive people.

One further implication of these findings is that they suggest that the difference in the performance of 5- and 9-year-olds in Study 2 likely was not due to differences in beliefs about contagion, or on the effectiveness of our instructions in triggering such beliefs. One caveat to this conclusion is that the test of forward contagion (Study 2b) always came after that of backward contagion (Study 2), thus it could be argued that the notion of contagion had been made salient to the 5-year-olds by the time they participated in the former. This caveat notwithstanding, we believe that a more substantive account of the developmental difference has to do with the conceptual complexity of backward contagion compared to forward contagion, a theme that will be expanded in Section 5.
5. General discussion

A broad literature indicates that adults believe that objects constitute extensions of the self (e.g., Belk, 1988; James, 1890; Sartre, 1943/1956). This belief has been demonstrated in the context of attachment to personal possessions, consumer behavior, and emotional reactions to contact with objects. A variety of proposals have been raised to explain this phenomenon. The goal of the present studies was to question such explanations, by providing a systematic experimental assessment of this phenomenon in young children.

Using an experimental methodology previously used to assess the relation between self and objects in adults (Gao et al., 2009; Keefer et al., 2012; Morrison & Johnson, 2011), Study 1 found a similar relation in young children. Namely, having their self-worth harmed led children to resist parting with esteemed objects, and having their self-worth boosted increased their willingness to part with such objects. Noticeably, self-feedback only affected children’s attachment to objects they had indicated as significant for themselves. In other words, only such objects had the power to offset injuries to the self.

Study 2 also adapted experimental methodologies previously used on adults (Newman et al., 2011), and found that children’s – primarily 9-year-olds’ – willingness to give an esteemed object to someone morally aversive was affected by the extent to which the object contained remnants of their self. Thus, when told that an object no longer contained parts of their self, children were more tolerant of having someone aversive own it. In fact, a few children verbalized their belief in self-extension, explaining that once all their things had been removed from the object, then they cared less about what happened to it.

The above findings indicate that, like adults, children have a belief that selves get attached to objects via a process of contagion. Noticeably, the work on adults has focused on the effect of manipulations of contagiousness (e.g., via cleansing transformations) primarily with respect to avoidance or attraction toward objects owned by offensive vs. admired individuals. These are examples of forward contagion (Rozin & Nemeroff, 2002), by which the individual presumably could get contaminated – negatively or positively – via contact with a contagious source. Here we show that 9-year-olds manifest a further kind of belief in contagion, what Rozin and Nemeroff called backward contagion. Namely, 9-year-olds reacted to manipulations on the contagiousness of objects they were giving to, rather than receiving from, others. In other words, rather than the child touching the contagious source left by someone else, someone else was touching the contagious source left by the child.

We believe this provides an even stronger example of self extension, because it entails that even though the child does not – and will not – have any contact with the object any longer, the child still believes that another person’s contact with the object can somehow impinge on their self. It is as if some invisible link between the self and the object still exists, such that contamination at the object-extremity of the extended self can reverberate back to the core. Looking at these cases differently, whereas one’s avoidance of objects touched by aversive others is consistent with conventional principles of biological contamination, backward contagion is not.

Two further noticeable findings are that this reaction to backward contagion was evinced primarily among 9-year-olds. In fact, whereas 5-year-olds did not show systematic sensitivity to backward contagion, Study 2b revealed that they do have sensitivity to forward contagion. One possible explanation for 5-year-olds’ difficulty with backward contagion is that it requires further conceptual understandings that are feeble at this age. For instance, as noted above, backward contagion violates standard principles of biological contamination (Kalish, 1996), and it also involves expectations about the temporal continuity of the self (Suddendorf, 2010). It will be interesting for future studies to examine which of these, or other factors, hamper 5-year-olds’ understanding of backward contagion.

A second noteworthy finding from Studies 2 and 2b, is that children were more sensitive to contagion in the context of negative than positive sources. For instance, in Study 2, we could have expected that just as removing the self from a shirt increased children’s willingness to give it to an aversive recipient, such a transformation could have also decreased children’s willingness to give it to a congenial recipient. In this latter case, the reasoning would have been that children would have wanted their self to be in the shirt, so that the positive qualities of the congenial recipient would reverberate back to them. A similar prediction could have been made regarding Study 2b, in terms of children’s willingness to receive a shirt from a congenial giver. As noted, however, the cleaning transformation had no discernible effect on children’s willingness to give their shirt to a good recipient, or wear one from a good giver.

Interestingly, this asymmetry in contagion beliefs has also been found among adults (e.g., Rozin & Nemeroff, 2002). One of the main accounts brought there for this asymmetry is that beliefs in contagion may derive or be a by-product of a general disgust-triggering sensitivity to aversive and health-threatening stimuli (e.g., rotten foods, open injuries). A second, more nuanced account of this asymmetry is that people might hold different models of contagion for positive and negative sources. In particular, Rozin and Nemeroff found that whereas contagion by positive sources could be undone by what they called “symbolic” transformations (e.g., having a sweater worn by someone negative), contagion by negative sources could also be undone by “physical” transformations (e.g., having a sweater thoroughly washed). In other words, adults seemed to believe that although negative sources (e.g., Hitler) had a spiritual essence that needed to be avoided, that essence could in fact be physically transmitted. Thus, children in the present study responded like adults, believing that physical transformations could clean a negative, but less so a positive source. Overall, the present findings manifest a striking developmental continuity of the asymmetrical manifestation and nature of contagion beliefs.
The present findings also have important implications for explanations of the phenomenon of self-extension. Namely, the fact that already by age 5 children treat objects as extensions of their selves, requires a reconsideration of the kinds of factors that arguably account for such phenomenon. In particular, in the adult literature, this phenomenon is often associated with the salience – at an individual or cultural level – of values such as individualism, consumerism, materialism, and celebrity-glorification (Bauer et al., 2012; Gao et al., 2009; Morrison & Johnson, 2011; Newman et al., 2011). These findings would thus lead us to expect self-extension to objects to occur once such values become incorporated into a child’s belief system. There is a vast literature suggesting that, in some cultures, individualism is indeed ingrained into children’s world views from very early on in development (Rothbaum et al., 2000; Tamis-LeMonda et al., 2008). However, the cultural differentiation of cognitive systems often associated with individualism – i.e., analytic thinking – seems to be systematically manifest in children only by age 6–7 years (Imada, Carlson, & Itaku, 2013). Moreover, although there are known cross-cultural differences in the salience of materialism (Ger & Belk, 1996; Hocking, 2000), we know of no systematic work showing evidence of materialism, consumerism, or celebrity-glorification prior to school-entrance (Banerjee & Dittmar, 2008; Opree et al., 2011). The present findings thus encourage pursuing cultural investigations of the development of such values, in order to evaluate how these factors might combine to account for self-extension already prior to school-entrance (see Gjersoe, Newman, Chituc, & Hood, 2014, for work in this vein with adults).

A different perspective argues that the phenomenon of self-extension to objects might derive not solely from cultural factors, but from basic universal human needs. For instance, Sartre (1943/1956) argued that the extension of the self onto material objects derived from a basic need to substantiate the self; or as he put it, “possession [of material objects] is defined as the effort to apprehend ourselves as the foundation of a being” (p. 597). In Gardner’s (2009) rendition of Sartre’s contention, “owning of objects mirrors the having or owning of ‘psychological states’ which results from the degradation of consciousness to the Psyche; by possessing things, I become symbolically, a being which exists substantially, as its own foundation” (p. 188). According to this interpretation, the belief in objects as extensions of the self derives from a basic need for concrete certainty about the self. This need is perhaps even exacerbated by one’s awareness of the evanescence of psychological states. Thus, from a development perspective, self-extension beliefs may arise when children become aware that their inner self – i.e., their thoughts, emotions, and desires – is indeed immaterial. Arguably, this understanding of the nature of one’s psychological states is achieved by age 5, and perhaps even earlier. The self-extension evinced in the present studies could be a manifestation of such realization. Future studies could examine directly, both developmentally and in adults, the relation between an understanding of the evanescence of inner states, and one’s need for concrete instantiations of the self.

**References**


