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Investigating children's valuation of authentic and inauthentic objects: Visible object properties vs.
Invisible ownership history.

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Abstract

In human culture, an object's value is influenced by tangible properties (e.g. visual desirability and constituent materials) *and* intangible ownership history (e.g. authentic objects owned by celebrities are often worth more than similar inauthentic objects). Children are sensitive to both of these factors as independent determinants of value, but research has yet to elucidate how they interact. Here, we investigate whether children aged 5-11 years consider object properties or authentic ownership history to be the greater determinant of value and examine how their object valuations are influenced by owners' characteristics. In Study 1, visually desirable and undesirable items belonging to 'famously good' owners received higher valuations than similar items belonging to non-famous owners, whereas desirable items belonging to 'famously bad' owners received significantly lower values. In Study 2, children considered items made from cheap materials belonging to famously good owners, but not famously bad owners, to be as valuable as similar items made from expensive materials belonging to non-famous owners. In Study 3, physical contact with a famously bad owner had a detrimental impact on value, but worn and unworn objects belonging to famously good owners did not significantly differ in value. Across studies, we documented evidence that children's sensitivity to authentic ownership history and physical contact as determinants of value increases with age. Together, these findings demonstrate that children's valuation of ownership history relative to object properties depends on the owner's 'essence', and their sensitivity to owner contact as a mediator of value indicates awareness of 'magical contagion'.

Keywords:

Children; Authenticity; Object valuation; Ownership history; Object properties

1. Introduction

In human culture, an object's value is determined by both visible and invisible properties. On one hand, new and functional items are typically more valuable than used and broken items, and some materials command significantly higher values than others. These properties are often evident in an item's appearance – objects of the same type look different depending on what they are made from (e.g. a gold watch vs. a plastic watch) and their condition (e.g. a muddy pair of used wellington boots vs. a clean pair of new wellington boots). On the other hand, an object's value is also influenced by its ownership history – an invisible quality that cannot be perceived (e.g. Kurt Cobain's Martin D-18E guitar looks like guitars of the same make and model that belong to other owners). Despite its abstract nature, "authentic" ownership history can have an astounding impact on object valuation; collectors of celebrity memorabilia are willing to pay exorbitant sums for items previously used or owned by famous people (e.g. a pair of basketball trainers worn by Michael Jordan sold for £1.7m at auction; British Broadcasting Corporation (BBC), 2023). By the time they reach primary school, children are sensitive to both object properties *and* ownership history as independent determinants of value (Frazier & Gelman, 2009; Gelman et al., 2015; Hartley et al., 2020; Pesowski & Friedman, 2019). However, it is currently unknown whether children's object valuations are more strongly influenced by visible properties *or* invisible ownership history. Moreover, research has yet to elucidate children's understanding of *how* authentic objects acquire value from famous owners. The purpose of this research was to examine the conditions under which children prioritise ownership history or object qualities to be the more privileged determinant of value.

Authenticity is a multi-faceted social construct that influences how people evaluate myriad aspects of their environment (Newman, 2019; Newman & Smith, 2016). Whether an object is regarded as authentic may be determined by cultural expectations and beliefs concerning genuineness (e.g. if a pizza served at a restaurant is regarded as authentically Italian; 'categorical authenticity') or the motives of its creator (e.g. if a piece of artistic media is judged to be a labour of love or purely an effort to make money; 'values authenticity'). Crucially, objects formerly used or owned by famous celebrities are considered valuable due to '*historical authenticity*' – their "special" status is conferred by a spatiotemporal link to a person of cultural significance or reverence (also known as 'indexical

authenticity'; see Grayson & Martinec, 2004). Historical authenticity does not increase an object's value through functional or material enhancement; rather, the perceived worth of an object with authentic ownership history is enhanced by an intangible relationship between person and property (Newman et al., 2011).

For adults, heightened valuation of authentic ownership history is a norm of Western economic culture (Belk, 1988; Frazier et al., 2009; Newman et al., 2011; for evidence that this behaviour may be reduced in collectivist cultures, see Gjersoe et al., 2014). Yet, the emergence and manifestation of this behaviour in children has received relatively little attention in psychological research. Studying how children value authentic objects is necessary to understand the cognitive origins/precursors of adults' appreciation for celebrity possessions and provide insight into whether related preferences differ when cultural and financial experience are reduced (Noles & Keil, 2011).

Given the imperceptible nature of authentic ownership history, one may expect that children's object valuations would be principally influenced by an object's outward appearance and function – salient qualities that can be directly perceived (Raskison & Oakes, 2003). However, owing to its cultural salience, sensitivity to ownership history emerges surprisingly early in childhood. Children use possessive pronouns (e.g. "mine", "yours") to identify objects at 12 months and are able to infer ownership history from multiple cues (e.g. first possession, verbal testimony) by 4 years (Nancekivell et al., 2013; Saylor et al., 2011). At 4 years, children also consider objects with authentic ownership histories to be of special value. In Frazier and Gelman (2009), preschool and young school children believed that objects associated with famous celebrities (e.g. Cookie Monster's cookie) should be displayed in museums. Gelman and colleagues (2015) found that children aged 5-12 years consistently believe that people would pay significantly more money to acquire objects belonging to celebrity owners (e.g. Harry Potter's wand) than similar objects belonging to non-famous owners (e.g. an experimenter's wand). School children even consider objects owned by celebrities to be significantly more valuable than exact replicas that are visibly and functionally identical (Hood & Bloom, 2008). Together, these findings clearly demonstrate children's awareness that imperceptible historical associations with famous owners can substantially increase the value of objects.

Given children's relatively limited experience and understanding associated with economics (Webley, 2005), what factors might drive their awareness that authentic ownership history increases the value of objects? One possibility concerns resource scarcity. According to Brock's (1968) commodity theory, people consider items that are rare and difficult to obtain to be more valuable and desirable than items that are plentiful. Evolutionary theorists propose that these preferences for unique objects may be an innate adaptive strategy designed to motivate the acquisition of resources that enhance social status and signal wealth (Cummins, 2005; Miller, 2009; Saad, 2007). In support of this hypothesis, Hartley et al. (2020) found that children aged 5-6 years consider limited items (e.g. a rare comic book) to be significantly more valuable than very similar copious items (e.g. a common comic book), indicating their sensitivity to scarcity as a mediator of value. Hence, children may consider objects with authentic ownership history to be valuable due to their uniqueness.

Alternatively, children may value objects with authentic ownership histories due to them being imbued with the "essence" of their owners through 'magical contagion' (Huang et al., 2017; Newman & Bloom, 2014; Newman, 2016). From this perspective, ownership forges a connection between a person and an object, transferring an intangible trace of the owner to the item which then serves as a marker of their identity (Belk, 1988; Hood et al., 2016; Newman et al., 2011). Therefore, objects used or owned by celebrated actors, musicians, and sports stars may be highly valued because they contain traces of these individuals' achievements, skills, or personal qualities (e.g. Gelman et al., 2015; Gelman & Hirschfeld, 1999; Marchak & Hall, 2017). Conversely, the transfer of culturally undesirable traits to objects owned by ill-famed individuals can decrease their perceived value and desirability (e.g. Fedotova & Rozin, 2018; Nemeroff & Rozin, 1994; Rozin et al., 1989).

Whether humans' appreciation of objects with authentic ownership history originates from sensitivity to resource scarcity or the essences they contain can be teased apart by asking children to appraise items belonging to famously good and famously bad owners. If children consider authentic objects to be valuable because they are unique, then we would expect them to perceive Harry Potter's glasses and Voldemort's cloak to be of similar value because these owners are comparably famous (*why* they are famous should have no bearing on the value of their property). However, if children value authentic items because they contain the essence of their owners, then we would expect them to

perceive glasses belonging to Harry Potter (a virtuous hero) to be significantly more valuable than a cloak belonging to Voldemort (a notorious villain). These predictions were tested by Hartley et al. (2020) who asked children aged 5-8 years to compare similar objects belonging to famous owners and non-famous owners. Their participants considered items belonging to famously good and famously bad owners to both be significantly more valuable than similar items belonging to non-famous owners. This finding suggests that authentic ownership history is sufficient to increase an object's value, regardless of why the owner is famous, lending support to the scarcity hypothesis. However, when similar objects belonging to famously good and bad owners were directly compared, children assigned significantly higher values to items belonging to good owners. Thus, in accord with the transfer of essence hypothesis, children's object valuations were also influenced by the personal qualities of their owners.

If children's object valuations are mediated by the assimilated essence of their owners, how do they think the transfer of essence from owner to object actually occurs? Evidence from adults indicates a belief that *physical contact* is a crucial mechanism through which authentic objects acquire their value from celebrity owners. Newman and Bloom (2014) reported that auction prices for celebrity memorabilia are predicted by likelihood of physical contact with former owners; prices increased if former owners were regarded favourably, but decreased if owners were regarded negatively. Adults think that items used by well-liked celebrities decrease in value if they are sterilised, reflecting the belief that traces of the owner – which confer value to the object – are removed by the cleaning process (Newman et al., 2011; also see Levene et al., 2019). Ayton et al. (2022) recently found that, following the installation of a 'Blue Plaque' commemorating previous occupancy by a famous celebrity, London real estate prices increased by £128,500 (27%) more than neighbouring properties that had not been inhabited by a celebrity. While these studies clearly demonstrate that adults' object valuations are influenced by physical contact with a celebrity, to our knowledge, no prior research has examined whether children's heightened valuations of authentic objects are driven by owner contact. If children's valuations of authentic objects are mediated by owner contact, this may implicate early-emerging conceptual understanding of biological contamination principles as a crucial underlying mechanism (Nemeroff & Rozin, 1994).

In contrast to ownership history, relatively few studies have investigated how children's object valuations are influenced by tangible properties. Hartley et al. (2020) found that children aged 5-6 years considered objects made from expensive materials (e.g. a diamond ring) to be significantly more valuable than similar items made from cheap materials (e.g. a rubber ring). Children also prefer to own items that are new, and consider them to be more valuable, than similar items that look old and worn (Frazier & Gelman, 2009; Hartley et al., 2020). However, no research to date has investigated how object properties interact with famous ownership history to influence children's valuations. It may be that children believe that authentic ownership history only increases the value of items that are visually desirable. This would represent a developmentally immature perspective as, in adult consumer culture, physical contact with a famous celebrity irrationally enhances the value of even visually undesirable items (e.g. Scarlett Johansson's used tissue; BBC, 2008). Evidence of this nature would demonstrate that children's sensitivity to authentic ownership history is not an "all-or-nothing" phenomenon and refines with social-cultural experience.

It is also currently unknown whether children prioritise visible material qualities *or* invisible authentic ownership history as the primary determinant of value when these factors are pitted in direct competition. Given the norms of adult consumer culture, one may expect that children who are sensitive to authentic ownership history would prioritise this factor over constituent materials, despite the disparity in outward desirability. Yet, it is well-documented that children's perceptions and evaluations of objects are often determined (sometimes inaccurately) by physical appearances (Gutheil et al., 2004; Rakison & Oakes, 2003; Piaget, 1970), meaning that objects made from visibly desirable materials may trump objects made from visibly undesirable materials regardless of ownership history. A third possibility is that the winner of this competition is dependent on *who* the famous owner is – and whether their essence is considered "positive" or "negative".

This research is the first to investigate how famous ownership history and object properties interact to influence children's object valuations. In Study 1, we examined whether children believe that authentic ownership history increases the value of visually desirable and undesirable objects. Based on Hartley et al. (2020), we predicted that children would consider visually desirable items belonging to famously good and bad owners to be more valuable than similar items belonging to non-

famous owners. However, we tentatively expected the effect of ownership history to be much weaker, and potentially absent, for items that are visually unappealing. In Study 2, we investigated whether authentic ownership history or constituent materials has the greater influence on children's object valuation when in direct competition (e.g. objects belonging to famously good and bad owners made from cheap materials vs. objects belonging to non-famous owners made from expensive materials). We predicted that ownership history may trump constituent materials when valuing objects belonging to famously good owners, but objects belonging to famously bad owners would receive lower valuations than their comparators. Finally, in Study 3, we discovered whether children believe that the value of authentic objects is moderated by physical contact with their famous owners, and whether this effect differs depending on the owner's nature. In line with the transfer of essence hypothesis (Gelman, 2013; Newman & Bloom, 2014; Newman, 2016), we predicted that physical contact with a famously good owner would increase an authentic object's value whereas physical contact with a famously bad owner would decrease value. The results of these studies advance theoretical understanding of how children value objects, their sensitivity to authentic ownership history, and their beliefs regarding how value transfers from famous owners to their property.

2. Study 1: How does ownership history influence children's valuation of visually desirable and undesirable objects?

2.1. Method

2.1.1. Participants

Recognising that understanding of economic concepts and cultural experience – factors that may influence authentic object valuation – differ markedly over the course of childhood (e.g. Webley, 2005), we recruited participants across the primary school age range rather than drawing comparisons between narrow age groups. This approach allowed us to examine chronological age as a predictor of individual differences between children and identify general developmental trends. Our sample consisted of 67 neurotypical children (35 females, 31 males, 1 gender not disclosed) aged 5-11 years (M age = 8.45 years, SD = 1.91 years) recruited via mainstream primary schools in Ormskirk, UK. The sample included 18 children in years 1-2 (aged 5-6 years), 30 children in years 3-4 (aged 7-8 years), and 19 children in years 5-6 (aged 9-11 years). The same children participated in all three

studies, with the exception of one child (aged 94 months) who did not take part in Studies 2 and 3 due to unavailability. All participants were native English speakers and none had any diagnosed learning difficulties. No children were excluded. All procedures performed in this research involving human participants were in accordance with the ethical standards of the institutional and national research committees. Informed consent was obtained from parents/caregivers prior to children's participation.

2.1.2. Materials

Stimuli for the warm-up game consisted of 12 colour photographs of objects arranged into six pairs and divided into three sets: (1) one desirable object (e.g. a colourful toy bike) vs. one undesirable object (e.g. a toilet roll), (2) two equally desirable objects (e.g. an orange scooter and a green scooter), and (3) two equally undesirable objects (e.g. a flat football and a flat balloon).

Stimuli for the ownership history game included 32 colour photographs of objects, plus images of their owners, arranged into 16 pairs. Authentic objects owned by famous characters were paired with functionally similar inauthentic objects owned by non-famous characters (see Table 1). Pairs were organised into four sets (four pairs in each) which differed in terms of owners' personalities (good vs. bad) and the relative desirability of objects (high vs. low): (1) famously "good" owners' high desirability objects vs. non-famous owners' high desirability objects (e.g. Iron Man's mask vs. my neighbour's mask), (2) famously "bad" owners' high desirability objects vs. non-famous owners' high desirability objects (e.g. Ursula's necklace vs. my sister's necklace), (3) famously "good" owners' low desirability objects vs. non-famous owners' low desirability objects (e.g. Harry Potter's broken glasses vs. my dad's broken glasses), and (4) famously "bad" owners' low desirability objects vs. non-famous owners' low desirability objects (e.g. Maleficent's empty sweet wrapper vs. my sister's empty sweet wrapper).

In each game, children indicated their object valuations by selecting one of two pictures depicting 1 gold star or 5 gold stars.

A questionnaire was designed to identify which famous characters the participants recognised.

Table 1*Sets of Object Pairs in the Ownership History Game in Study 1*

Sets	Object pairs
1. Famously good owners' high desirability possessions vs. non-famous owners' high desirability possessions	Captain America's shield vs. my brother's shield Dorothy's shoes vs. my best friend's shoes Elsa's dress vs. my auntie's dress Iron Man's mask vs. my neighbour's mask
2. Famously bad owners' high desirability possessions vs. non-famous owners' high desirability possessions	Evil Queen's mirror vs. my mum's mirror Cruella de Vil's coat vs. my auntie's coat Darth Vader's helmet vs. my dad's helmet Ursula's necklace vs. my sister's necklace
3. Famously good owners' low desirability possessions vs. non-famous owners' low desirability possessions	Harry Potter's broken glasses vs. my dad's broken glasses Peter Rabbit's chewed carrot vs. my horse's chewed carrot Minion's banana skin vs. my brother's banana skin Peppa Pig's muddy wellies vs. my mum's muddy wellies
4. Famously bad owners' low desirability possessions vs. non-famous owners' low desirability possessions	Captain Hook's empty box vs. my uncle's empty box Scar's bone vs. my dog's bone Maleficent's empty sweet wrapper vs. my sister's empty sweet wrapper Wicked Witch of the West's broken stick vs. my grandma's broken stick

2.1.3. Procedure

Children were tested individually in their own schools by a member of the research team.

Children completed Studies 1-3 in a single session lasting ~15 minutes. The tasks were administered using Qualtrics software (Qualtrics, 2005) via a laptop computer in a fixed order: 1. Character questionnaire, 2. Warm-up game, 3. Ownership history game (Study 1), 4. Ownership history vs. material value game (Study 2), 5. Materials game (Study 2), 6. Contact game (Study 3).

2.1.3.1. Character questionnaire

The character questionnaire was designed to identify which famous characters in the games were recognised by each participant. Names of all the famous characters involved in the three studies

were presented in a list and children were asked whether they knew each one. If a character was known, children were asked if they were a “goodie” or a “baddie”.

2.1.3.2. Warm-up game

The warm-up game was designed to familiarise participants with valuing objects and teach them that objects within pairs could be high or low value. As in previous studies (e.g. Hartley et al., 2020; Hood et al., 2016), desirability ratings (1 or 5 stars) were used as a proxy for financial valuations because the younger children in our sample may not have reliably understood monetary value (Berti & Bombi, 1981; Webley, 2005) and we anticipated that experience using money would be enormously varied between participants. As requesting monetary values would have resulted in extraordinary heterogeneity due to these confounding factors, a binomial star rating system represents a more accessible and effective means of addressing our key question: whether children of varying ages consistently rate objects with certain properties as comparatively “more valuable” or “less valuable”.

The warm-up game began by presenting children with two pictures – one depicting a desirable object (e.g. a toy bike) and one depicting an undesirable object (e.g. an empty toilet roll) above 5 gold stars and 1 gold star respectively. A written text description explaining how the star ratings represented value/desirability was provided (e.g. “The [desirable picture] is given 5 stars as children really like these but the [undesirable picture] gets 1 star as children don’t like these”). Participants were then presented with another pair of pictures depicting a desirable object (e.g. a toy helicopter) and an undesirable object (e.g. an old leaf), and were asked to indicate whether each object was worth 1 star or 5 stars. If children assigned the desirable object 5 stars and the undesirable object 1 star, the warm-up game proceeded to the next trial. If children responded differently, they were provided with corrective feedback and asked to try again (e.g. if the undesirable object was allocated 5 stars: “Hmmm, children don’t like these. Maybe it should get 1 star? Have another go”; if the desirable object was allocated 1 star: “Hmmm, children really like these! Maybe it should get 5 stars? Have another go.”). Next, children were presented with pictures of two similarly desirable objects (e.g. an orange scooter and a green scooter), both positioned above 5 gold stars. A text description explained that both objects are given 5 stars because “children really like both of these”. Children

then assigned star ratings to a new pair of similarly desirable objects (e.g. a blue toy car and a red toy car) and corrective feedback was provided if either object was assigned 1 star. Finally, children were presented with pictures of two similarly undesirable objects (e.g. a burst football and a burst balloon), both positioned above 1 gold star. Children then assigned star ratings to a new pair of similarly undesirable objects (e.g. an empty chocolate bar wrapper and an empty drinks can) and corrective feedback was provided if either object was assigned 5 stars. We inferred that children understood the valuation system after they had successfully allocated 5 stars to desirable items and 1 star to undesirable items, and were ready to proceed to the experimental tasks.









2.1.3.3. Ownership history game

On each trial, children were presented with two pictures of objects side-by-side. Each object was labelled and a description of the object's owner was provided (e.g. "On the left is a shield. This shield belongs to *Captain America*. On the right is another shield. This shield belongs to *my brother*."). In addition, a cartoon image of the object's owner was provided to facilitate children's recognition of famous characters. As in the warm-up game, participants were then asked to value each object as either 1 star or 5 stars (e.g. "How many stars would you give *Captain America's shield*?"; see Figure 1). Unlike in the warm-up game, no feedback was provided following children's responses.

In total, children valued 16 pairs of pictures. Four pairs belonged to each of four sets detailed in Table 1. These sets were designed to assess how children's object valuations are influenced by invisible owner characteristics in combination with visible object qualities. Object pairs belonging to the same set were presented in a block of consecutive trials – the order of blocks and order of pairs within a block were randomised across participants. The description and rating order of objects within pairs (e.g. famous owner first or non-famous owner first) were both counterbalanced.

Figure 1

Example Trial from the Ownership History Game in Study 1

 Captain America's Shield	 My Brother's Shield
<hr/>	
<p>On the left is a shield. This shield belongs to Captain America. On the right is another shield. This shield belongs to my brother.</p> <hr/>	
<p>How many stars would you give my brother's shield?</p> 	
	
<hr/>	
<p>How many stars would you give Captain America's shield?</p> 	
	

2.2. Results

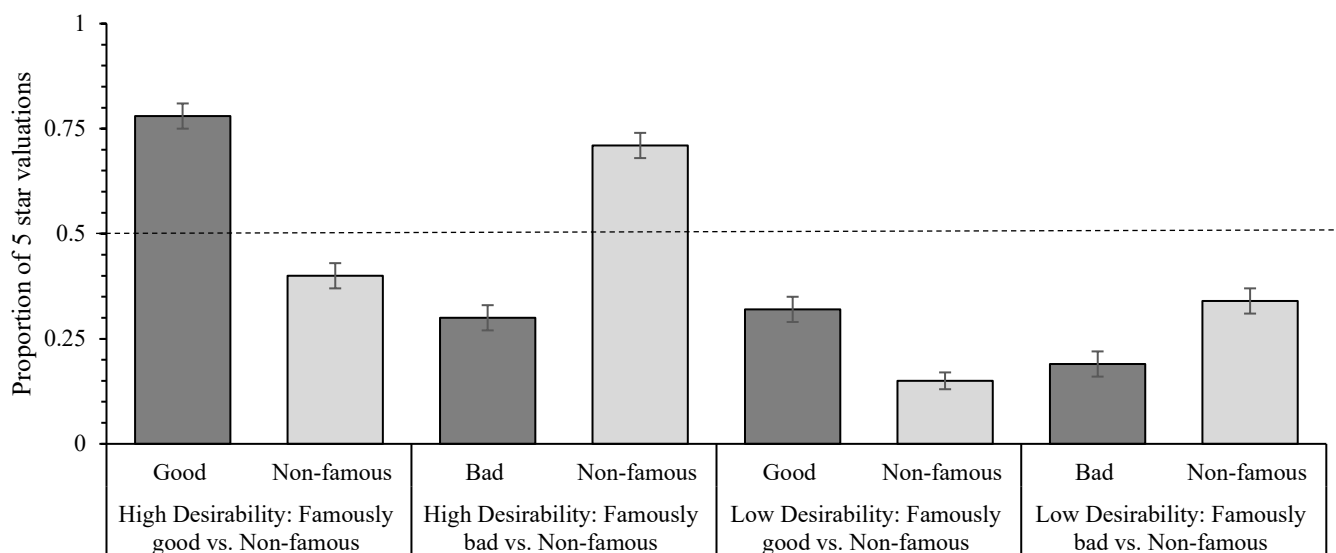
In all three studies, data were analysed via generalised linear mixed effects models using the `glmer` function from the `lme4` package in R (Bates et al., 2015). All models contained by-subject and by-item random intercepts to account for variation across participants and stimuli. Children's object valuations were coded as 0 (1 star) or 1 (5 stars). 'Owner' was contrast coded as -0.5 (non-famous owner) and 0.5 (famously "good" or famously "bad" owner). Age was coded as the participant's chronological age in months. For each analysis, we started with a baseline model containing only the random effects. Fixed effects were added individually and we tested whether their inclusion significantly improved predictive fit. Please refer to Supplementary Materials for full details of our

model building sequences for all analyses (only final models are reported). Visualizations of non-significant interactions are also included in Supplementary Materials.

The ownership history game consisted of 2,144 object valuations in total and each participant contributed 32 valuations (16 for objects with famous owners, 16 for objects with non-famous owners) divided evenly across four sets. We used the character questionnaire to identify which famous characters were recognised by each participant and only included those trials in our analyses. Proportions of 5-star valuations for authentic and inauthentic objects on trials involving recognised owners are displayed in Figure 2. Following Hartley et al. (2020), we modelled children's object valuations in each of the four sets separately. An additional analysis drawing direct comparisons between low and high desirability objects belonging to recognised famously good and bad owners was also conducted.

Figure 2

Proportions of 5-star Valuations for Items in the Ownership History Game in Study 1. Error Bars Show ± 1 SE. Dotted Line Indicates Chance-level Responding



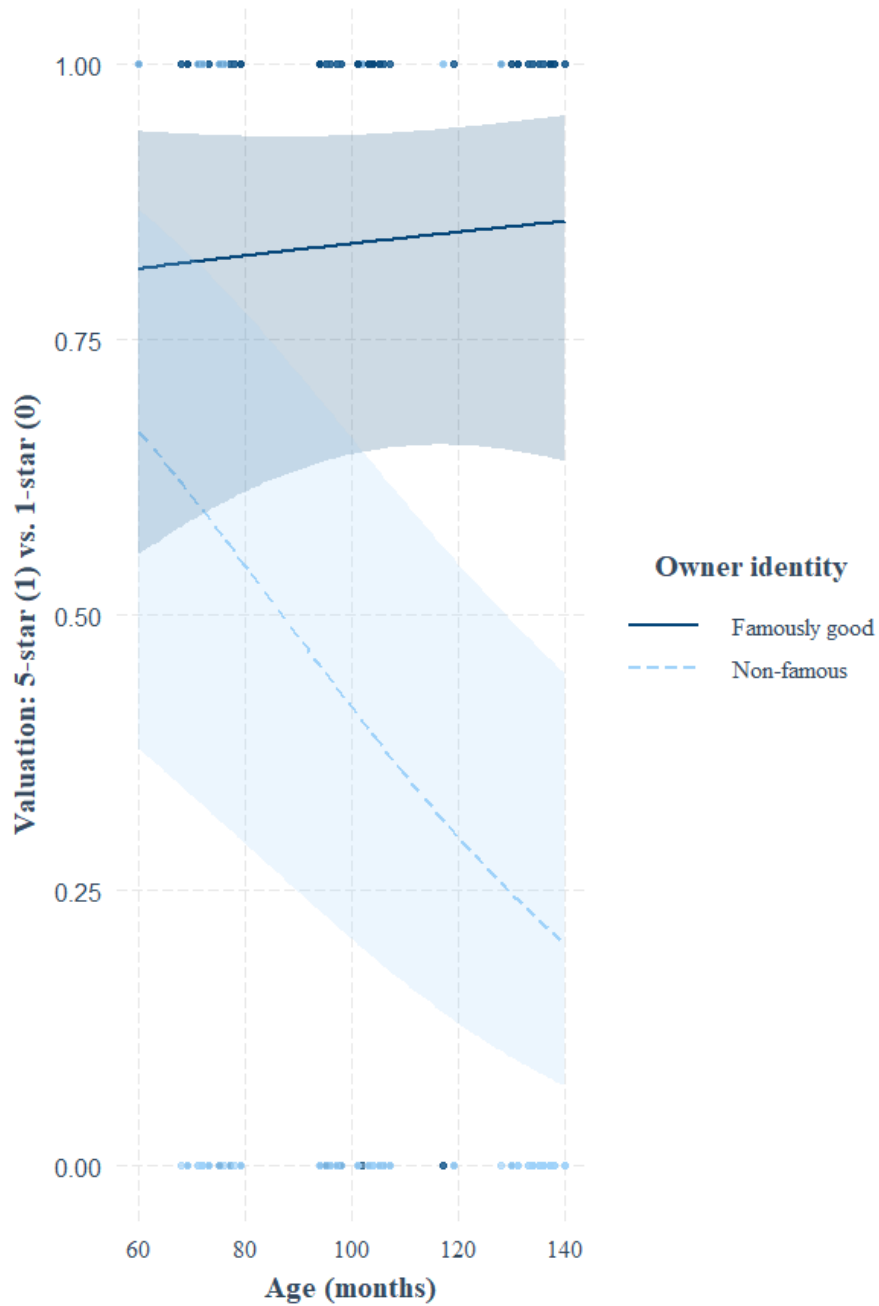
2.2.1. Famously good owners' high desirability objects vs. Non-famous owners' high desirability objects

Participants failed to value two items belonging to famously good owners and three items belonging to non-famous owners. Famously good owners of high desirability objects were recognised by participants on 87.69% of trials and 99.57% of recognised owners were considered by children to be “goodies”. As only trials involving recognised owners were included in our analyses, the models for this set included 468 data points (234 authentic object valuations, 234 inauthentic object valuations).

A model containing an owner x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 2; the interaction effect is displayed in Figure 3). The interaction was deconstructed by examining the effect of age on valuations for objects belonging to famously good and non-famous owners separately. The likelihood of children allocating 5-star valuations to objects belonging to non-famous owners significantly decreased as age increased ($Z = -3.92, p < .001$), but age did not significantly influence children's valuation of objects belonging to famously good owners ($Z = 0.59, p = .56$). We also investigated the effect of owner on the object valuations of ‘younger’ and ‘older’ children in our sample. The sample was divided into two sub-groups by conducting a median split based on age, yielding a ‘younger’ group (M age = 82.98 months, $SD = 11.84$; 234 object valuations) and an ‘older’ group (M age = 121.64 months, $SD = 14.81$; 236 object valuations). The older group ($Z = 3.53, p < .001$) were significantly more likely to assign 5-star valuations to objects belonging to famously good owners than non-famous owners, but the younger group were not ($Z = 1.61, p = .11$).

Figure 3

Visualization of the Owner x Age Interaction for Famously Good Owners' High Desirability Objects vs. Non-famous Owners' High Desirability Objects. This Interaction Was Included in the Final Best-fitting Model



2.2.2. Famously bad owners' high desirability objects vs. Non-famous owners' high desirability objects

Famously bad owners of high desirability objects were recognised by participants on 83.21% of trials and 90.58% of recognised owners were considered by children to be “baddies”. Models for this set included 446 data points (223 authentic object valuations, 223 inauthentic object valuations).

A model containing only owner as a fixed effect provided the best fit to the observed data (see Table 2). Objects belonging to non-famous owners were significantly more likely to receive 5-star valuations than objects belonging to famously bad owners ($Z = -3.10, p = .002$). There were no significant effects involving age.

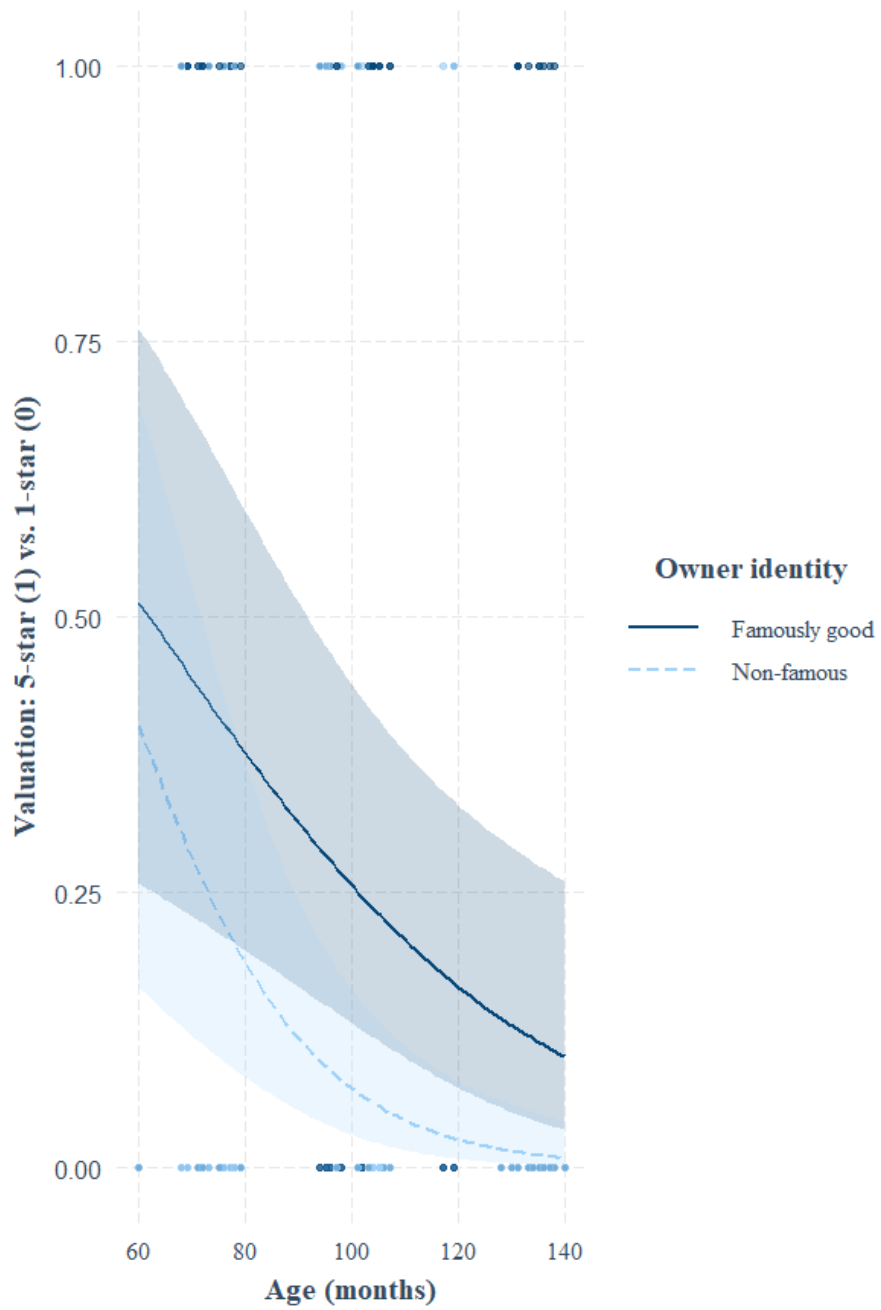
2.2.3. Famously good owners' low desirability objects vs. Non-famous owners' low desirability objects

Participants failed to value two items belonging to non-famous owners. Famously good owners of low desirability objects were recognised by participants on 98.88% of trials and 97.74% of recognised owners were considered by children to be “goodies”. Models for this set included 528 data points (264 authentic object valuations, 264 inauthentic object valuations).

A model containing an owner x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 2; the interaction effect is displayed in Figure 4). The interaction was deconstructed as described above. The likelihood of children allocating 5-star valuations to objects belonging to famously good owners ($Z = -2.82, p = .005$) and non-famous owners ($Z = -3.31, p < .001$) significantly decreased as age increased. When splitting the sample on age, the younger age group had 234 object valuations and the older age group had 236 object valuations. The older group were significantly more likely to assign 5-star valuations to objects belonging to famously good owners than non-famous owners ($Z = 3.45, p < .001$), but the younger group were not ($Z = 1.38, p = .17$).

Figure 4

Visualization of the Owner x Age Interaction for Famously Good Owners' Low Desirability Objects vs. Non-famous Owners' Low Desirability Objects. This Interaction Was Included in the Final Best-fitting Model



2.2.4. *Famously bad owners' low desirability objects vs. Non-famous owners' low desirability objects*

Participants failed to value two items belonging to famously bad owners and two items belonging to non-famous owners. Famously bad owners of low desirability objects were recognised by participants on 87.31% of trials and 91.88% of recognised owners were considered by children to be “baddies”. Models for this set included 464 data points (232 authentic object valuations, 232 inauthentic object valuations).

A model containing only age as a fixed effect provided the best fit to the observed data (see Table 2). As children's age increased, their likelihood of valuing objects 5-stars significantly decreased ($Z = -3.82, p < .001$). There were no significant effects involving owner.

Table 2

Summaries of the Final Generalized Linear Mixed-effects Models (Log Odds) Predicting Children's Object Valuations in the Ownership History Game in Study 1

	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
High desirability: Famously good vs. non-famous	Intercept	1.74	0.75	2.31	.021
	Age	-0.01	0.01	-1.70	.089
	Owner	-1.00	1.26	-0.79	.43
	Age x Owner	0.03	0.01	2.93	.003
		AIC	BIC	logLik	deviance
		508.0	532.9	-248.0	496.0
High desirability: Famously bad vs. non-famous	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
	Intercept	-0.02	0.32	-0.08	.94
	Owner	-1.97	0.63	-3.10	.002
		AIC	BIC	logLik	deviance
			503.6	520.0	-247.8
Low desirability: Famously good vs. non-famous	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
	Intercept	2.28	0.99	2.30	.021
	Age	-0.04	0.01	-4.16	< .001
	Owner	-1.10	1.37	-0.80	.42
	Age x Owner	0.03	0.01	1.89	.059
	AIC	BIC	logLik	deviance	
		489.8	515.4	-238.9	477.8
Low desirability: Famously bad vs. non-famous	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
	Intercept	1.11	0.75	1.48	.14
	Age	-0.02	0.01	-3.82	< .001
		AIC	BIC	logLik	deviance
			470.6	487.1	-231.3

2.2.5. Good owners' high and low desirability objects vs. Bad owners' high and low desirability objects

To directly compare star valuations for low and high desirability objects belonging to recognised famously good and famously bad owners, we entered children's mean scores for each of the four stimuli sets into a 2(personality: famously good, famously bad) x 2(desirability: low, high) repeated measures ANOVA. The analysis revealed significant main effects of personality, $F(1, 64) = 56.69, p < .001, \eta^2 = 0.47$, and desirability, $F(1, 64) = 88.32, p < .001, \eta^2 = 0.58$. Objects belonging to famously good owners received significantly higher valuations than objects belonging to famously bad owners, and high desirability objects received significantly higher valuations than low desirability objects. The personality x desirability interaction was also significant, $F(1, 64) = 36.48, p < .001, \eta^2 = 0.36$, and was explored via a series of Bonferroni adjusted pairwise comparisons. High desirability objects ($t = 9.49, p < .001, d = 1.18$) and low desirability objects ($t = 2.75, p = .008, d = 0.34$) belonging to famously good owners received significantly higher star valuations than those belonging to famously bad owners. High desirability objects belonging to famously good owners ($t = 11.02, p < .001, d = 1.36$) and famously bad owners ($t = 3.35, p = .001, d = 0.41$) received significantly higher valuations than low desirability objects. The interaction is caused by differences in effect sizes; the effect of desirability is much smaller for objects belonging to bad owners relative to good owners, and the effect of personality is much smaller for low desirability objects relative to high desirability objects (see Figure 2).

2.3. Discussion

Study 1 investigated whether children believe that authentic ownership history enhances the value of visually desirable *and* undesirable objects. Our findings revealed that, as children get older, they are more likely to believe that both relatively desirable and undesirable items belonging to famously good owners are significantly more valuable than similar items belonging to non-famous owners. By contrast, children assigned significantly lower valuations to desirable items belonging to famously bad owners in comparison with similar items belonging to non-famous owners. Both desirable and undesirable items belonging to famously bad owners were considered to be significantly less valuable than items of similar desirability belonging to famously good owners. Together, these

findings suggest that children's valuations of authentic objects are strongly influenced by *who* their owners are and, specifically, whether they have positive or negative characteristics.

Children's response profile across the four stimuli conditions broadly supports the theory that objects with famous owners are valuable due to transfer of essence, rather than scarcity (Gelman, 2013; Newman & Bloom, 2014; Newman, 2016). Clearly, authentic ownership history does not increase the value of objects in a uniform manner – the owner's identity is extremely important to children. Our data show that an historical ownership association with a famously good owner enhances an object's value, potentially reflecting children's belief that virtuous qualities are imbued by their property. On the other hand, desirable objects belonging to famously bad owners decrease in value as they are tainted by their negative attributes (for evidence illustrating children's similar distaste for money with negative moral history, see Tasimi & Gelman, 2021). Interestingly, these data also indicate that children's valuations were moderated by object qualities. When valuing the property of famous owners, visually desirable items received significantly higher star ratings than visually undesirable items, demonstrating children's belief that objects with authentic ownership histories can vary in value depending on their tangible properties.

Our observation that older children were more sensitive to authentic ownership history when valuing desirable objects belonging to famously good owners likely reflects their increased social-cultural experience. Children's understanding that an item's value can be enhanced by invisible associations with revered celebrity owners may emerge over time as they acquire knowledge about authenticity as a determinant of desirability and form mentalistic connections with famous personalities (Gelman et al., 2015). Conversely, regardless of age, children considered visually appealing items belonging to famously bad owners to be significantly less valuable than similar objects with inauthentic ownership histories. This finding contrasts with Hartley et al. (2020), where children believed that relatively desirable items belonging to both famously good and bad owners were significantly more valuable than similar items belonging to non-famous owners. This difference may be explained by the ages of participants in these two studies; while the mean age of participants in Hartley et al. (2020) was ~6.5 years, children in our sample were more developmentally advanced

aged ~8.5 years on average. Thus, as children get older, mere association with a famous owner may not be sufficient to increase an object's value.

While the visually desirable items were comparable to stimuli employed in previous research (e.g. Gelman et al., 2015; Hartley et al., 2020), this is the first study to ask children to value relatively undesirable items belonging to famous owners. These stimuli were included to test whether children – like adult collectors of celebrity memorabilia – believe that authentic ownership history influences the value of items that are unappealing. Across conditions, children were more likely to assign undesirable objects 1-star valuations as age increased, demonstrating their developing sensitivity to object properties as a determinant of worth. However, older children were also more likely to consider undesirable items belonging to famously good owners to be significantly more valuable than comparable inauthentic objects, mirroring the effect observed with desirable objects. Yet, valuations for undesirable objects belonging to famously bad owners and non-famous owners did not significantly differ. These findings suggest that authentic ownership history must be positive in order to enhance children's valuations of undesirable objects.

Although the data obtained through Study 1 reflect children's sensitivity to both authentic ownership history and object properties as determinants of value, they do not clearly indicate which factor has the stronger influence. The objective of Study 2 was to identify whether children prioritise visible material qualities *or* invisible authentic ownership history when these factors are pitted in direct competition. Participants also completed a control task measuring their sensitivity to constituent materials as an influence on object value, independent of ownership history.

3. Study 2: Does ownership history or material value have a greater influence on children's object valuation?

3.1. Method

3.1.1. Participants

Please refer to the Participants section for Study 1.

3.1.2. Materials

Stimuli for the ownership history vs. material value game included 16 photographs of objects, plus images of their owners, organised into 8 pairs. Objects made from low value materials owned by

famous characters were paired with functionally similar objects made from high value materials belonging to non-famous owners. Object pairs were organised into two sets (four pairs in each; see Table 3), which differed in terms of owners' personalities (good vs. bad): (1) famously "good" owner's cheap material item vs. non-famous owner's expensive material item (e.g. Spider-man's rubber mask vs. my cousin's gold mask), and (2) famously "bad" owner's cheap material item vs. non-famous owner's expensive material item (e.g. Cruella De Vil's fabric earrings vs. my friend's diamond earrings). Similar cheap and expensive materials were included in both sets.

Stimuli for the material value game included 8 colour photographs of objects arranged into four pairs. One object in each pair was made from an expensive material and the other was made from a cheap material (see Table 3).

Table 3

Sets of Object Pairs in the Ownership History vs. Material Value Game and Material Value Game in Study 2

Ownership History vs. Material Value Game	
Sets	Object pairs
1. Famously good owners' cheap material possessions vs. non-famous owners' expensive material possessions	Spider-man's rubber mask vs. my cousin's gold mask Aladdin's wooden bracelet vs. my dad's silver bracelet Minnie Mouse's plastic bow vs. my sister's diamond bow Anna's fabric hat vs. my auntie's leather hat
2. Famously bad owners' cheap material possessions vs. non-famous owners' expensive material possessions	Thanos's rubber boots vs. my neighbour's leather boots Joker's plastic telescope vs. my dad's gold telescope Bellatrix Lestrange's wooden cane vs. my grandma's silver cane Cruella De Vil's fabric earrings vs. my friend's diamond earrings
Material Value Game	
Set	Object pairs
Expensive material vs. cheap material	Gold bracelet vs. plastic bracelet Diamond necklace vs. fabric necklace Silver spoon vs. wooden spoon Leather gloves vs. rubber gloves

3.1.3. Procedure

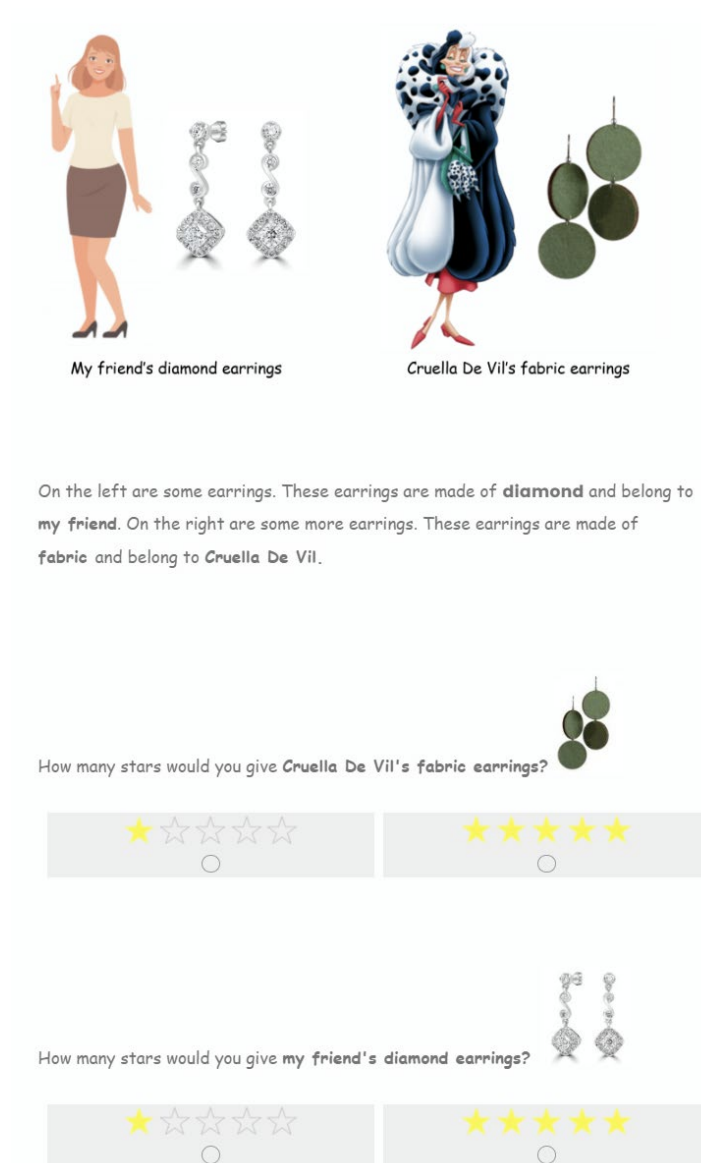
The ownership history vs. material value game followed the same format as the ownership history game described in Study 1. However, the text explanation for each object referred to both the owner and its material value (e.g. “On the left are some earrings. These earrings are made of *fabric* and belong to *Cruella De Vil*. On the right are some more earrings. These earrings are made of *diamond* and belong to *my friend*.”). Participants were then asked to value each object as either 1 star or 5 stars (e.g. “How many stars would you give *Cruella De Vil’s fabric* earrings?”; see Figure 5). No feedback was provided following children’s responses.

In total, children valued 8 pairs of pictures. Four pairs belonged to each of two sets detailed in Table 3. These sets were designed to determine whether ownership history or material value has the greater influence on children’s object valuations, and whether this relationship is mediated by owner identity. Object pairs belonging to the same set were presented in a block of consecutive trials – order of blocks and order of pairs within a block were randomised across participants. The description and rating order of objects within pairs (e.g. famous owner first or non-famous owner first) were both counterbalanced.

The material value game followed the same format as the previously described games with the exception that text descriptions of objects referenced the materials that objects were made from, rather than ownership history (e.g. “On the left is a spoon. This spoon is made from *silver*. On the right is another spoon. This spoon is made from *wood*.”). The purpose of this game was to confirm that children in this study were sensitive to differences in material value. Children valued eight pairs of objects in total, in a randomised order. The description and rating order of objects within pairs (e.g. high value material first or low value material first) were both counterbalanced.

Figure 5

Example Trial from the Ownership History vs. Material Value Game in Study 2



My friend's diamond earrings

Cruella De Vil's fabric earrings

On the left are some earrings. These earrings are made of **diamond** and belong to **my friend**. On the right are some more earrings. These earrings are made of **fabric** and belong to **Cruella De Vil**.

How many stars would you give Cruella De Vil's fabric earrings?

How many stars would you give my friend's diamond earrings?

3.2. Results

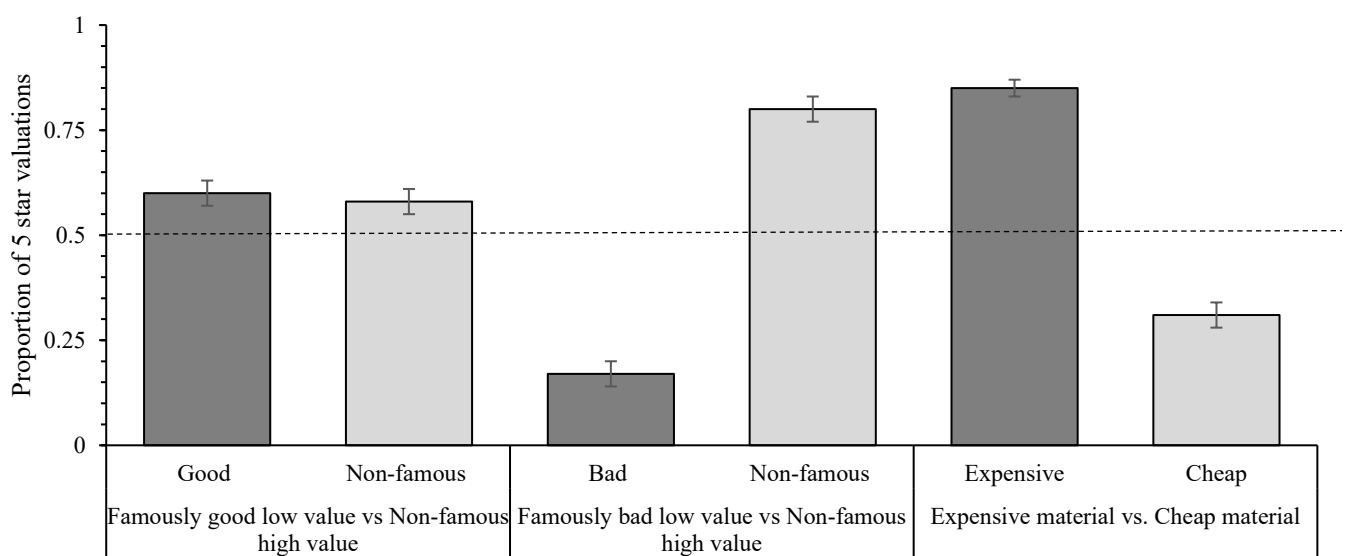
In both games, children's object valuations were coded as 0 (1 star) or 1 (5 stars). In the ownership history vs. material value game, 'owner' was contrast coded as -0.5 (non-famous owner) and 0.5 (famously "good" or famously "bad" owner). In the material value game, 'material' was contrast coded as -0.5 (cheap) and 0.5 (expensive). Age was coded as the participant's chronological age in months.

3.2.1. Ownership history vs. Material value game

The Ownership History Game consisted of 1056 object valuations in total and each participant contributed 16 valuations (8 for objects with famous owners, 8 for objects with non-famous owners) divided evenly across two sets. As in Study 1, we only analysed trials involving characters that participants recognised. Proportions of 5-star valuations for authentic and inauthentic objects on trials involving recognised owners are displayed in Figure 6. Children’s object valuations in the two sets were analysed separately.

Figure 6

Proportions of 5-star Valuations for Items in Sets of the Ownership History vs. Material Value Game and Material Value Game in Study 2. Error Bars Show ± 1 SE. Dotted Line Indicates Chance-level Responding



3.2.1.1. Famously good owners’ cheap material objects vs. Non-famous owners’ expensive material objects

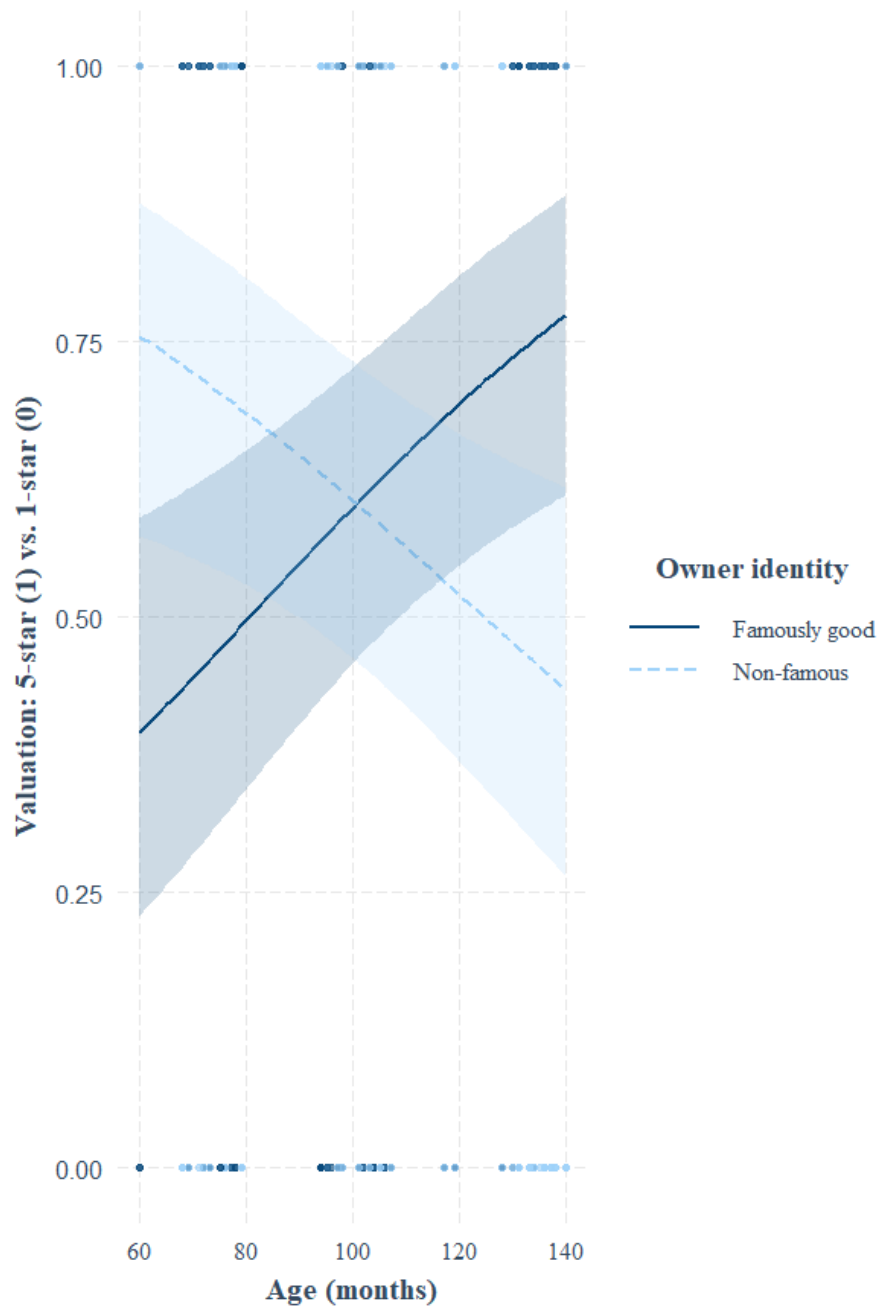
Famously good owners of low value objects were recognised by participants on 89.02% of trials and 100% of recognised owners were considered by children to be “goodies”. As only trials

involving recognised owners were included in our analyses, the models for this set included 470 data points (235 authentic object valuations, 235 inauthentic object valuations).

A model containing an owner x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 4; the interaction effect is displayed in Figure 7). As children's age increased, the likelihood of them allocating 5-star valuations increased for cheap material items belonging to famously good owners ($Z = 2.87, p = .020$), but decreased for expensive material items belonging to non-famous owners ($Z = -2.68, p = .007$). When splitting the sample on age, the younger age group had 222 object valuations and the older age group had 248 object valuations. The likelihood of allocating 5-star allocations to cheap material items belonging famously good owners and expensive material items belonging to non-famous owners did not significantly differ for younger ($Z = -1.63, p = .10$) or older ($Z = 1.68, p = .09$) children.

Figure 7

Visualization of the Owner x Age Interaction for Famously Good Owners' Cheap Material Objects vs. Non-famous Owners' Expensive Material Objects. This Interaction Was Included in the Final Best-fitting Model



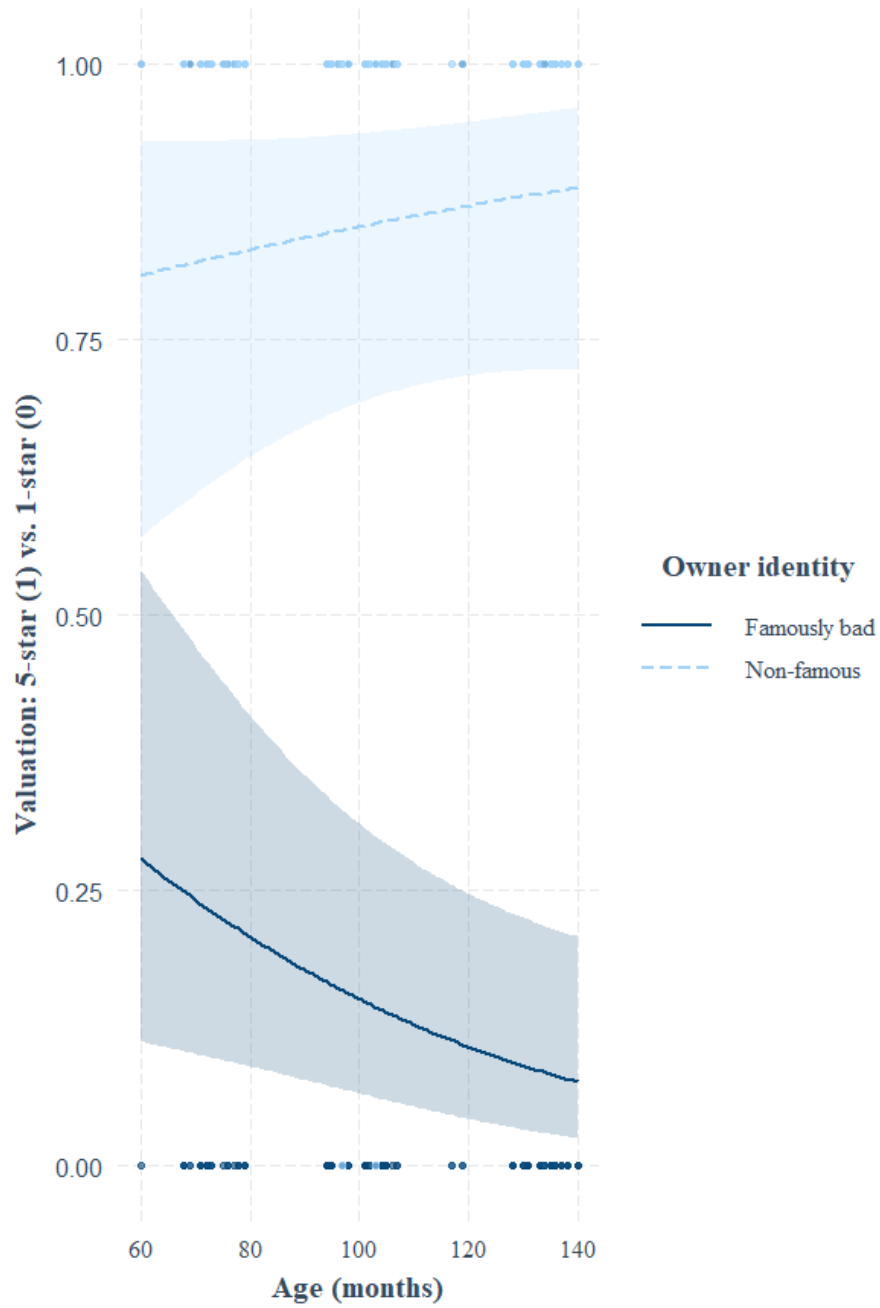
3.2.1.2. Famously bad owners' cheap material objects vs. Non-famous owners' expensive material objects

Famously bad owners of low value objects were recognised by participants on 84.62% of trials and 98.48% of recognised owners were considered by children to be “baddies”. Therefore, the models for this set included 392 data points (196 authentic object valuations, 196 inauthentic object valuations).

A model containing an owner x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 4; the interaction effect is displayed in Figure 8). As children's age increased, the likelihood of them allocating 5-star valuations to cheap material items belonging to famously bad owners decreased ($Z = -2.30, p = .021$). Age did not significantly influence children's valuation of expensive material items belonging to non-famous owners ($Z = 0.96, p = .34$). When splitting the sample on age, the younger age group had 172 object valuations and the older age group had 220 object valuations. Both younger ($Z = -3.65, p < .001$) and older ($Z = -5.97, p < .001$) children were significantly more likely to allocate 5-star valuations to expensive material items belonging to non-famous owners than cheap material items belonging to non-famous owners.

Figure 8

Visualization of the Owner x Age Interaction for Famously Bad Owners' Cheap Material Objects vs. Non-famous Owners' Expensive Material Objects. This Interaction Was Included in the Final Best-fitting Model



3.2.2. Material value game

The material value game consisted of 528 object valuations (264 for objects made from expensive materials, 264 for objects made from cheap materials). Participants each contributed 8 object valuations. Mean valuations for expensive material and cheap material objects are displayed in Figure 4.

A model containing a material x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 4; the interaction effect is displayed in Figure 9). As children's age increased, likelihood of allocating 5-star valuations increased for expensive material items ($Z = 2.25$, $p = .25$) but decreased for cheap material items ($Z = -2.01$, $p = .044$). When splitting the sample on age, the younger age group had 264 object valuations and the older age group had 269 object valuations. Both younger ($Z = 3.79$, $p < .001$) and older ($Z = 6.58$, $p < .001$) children were significantly more likely allocate 5-star valuations to objects made from expensive materials than objects made from cheap materials.

Figure 9

Visualization of the Material Value x Age Interaction. This Interaction Was Included in the Final Best-fitting Model

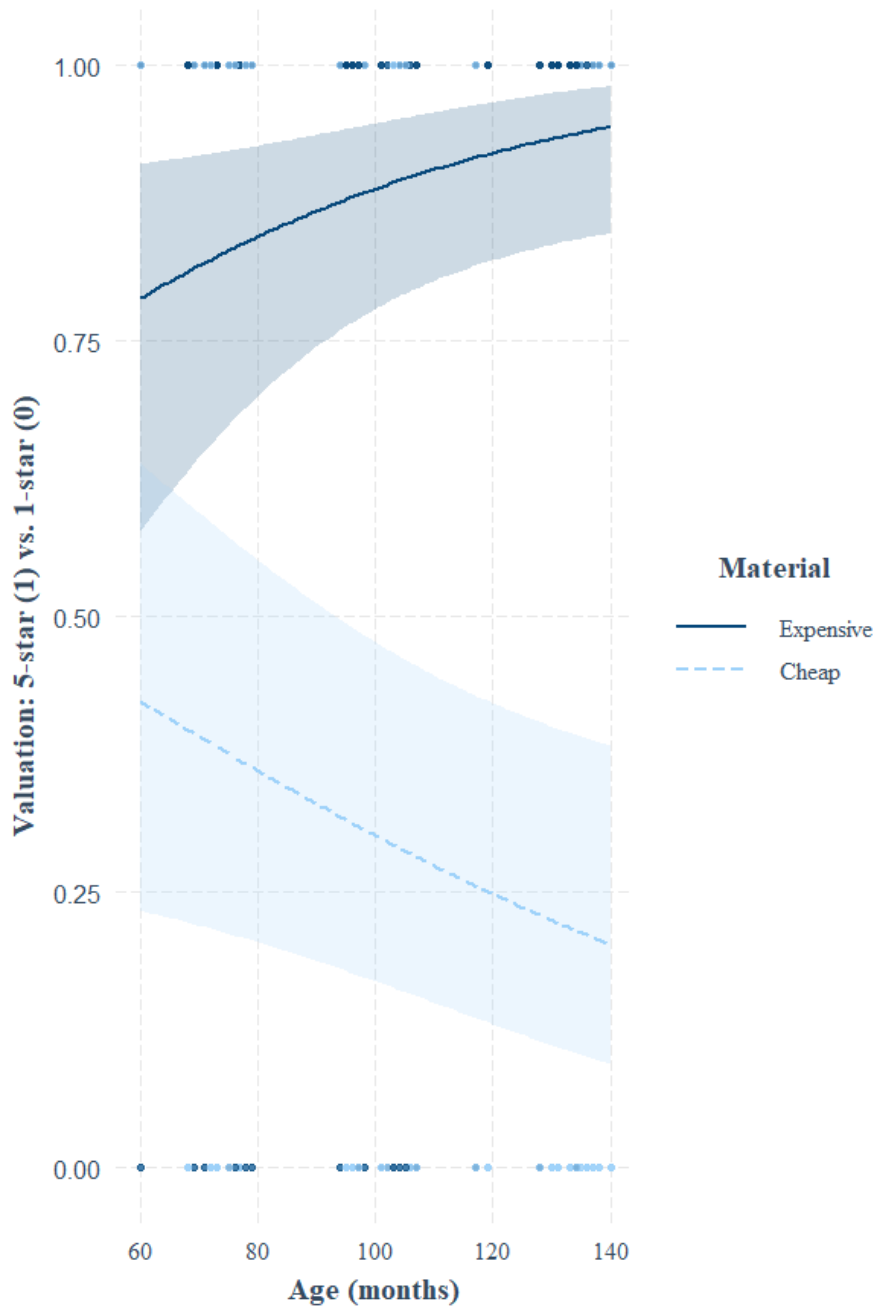


Table 4

Summaries of the Final Generalized Linear Mixed-effects Models (Log Odds) Predicting Children's Object Valuations in the Ownership History vs. Material Value Game and Material Value Game in Study 2

	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
Famously good low value vs. non-famous high value	Intercept	0.26	0.58	0.44	.66
	Owner	-3.84	0.98	-3.91	< .001
	Age	0.002	0.005	0.30	.76
	Owner x Age	0.04	0.009	4.36	< .001
	AIC	BIC	logLik	deviance	
		615.3	640.2	-301.6	603.3
Famously bad low value vs. non-famous high value	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
	Intercept	0.59	0.67	0.87	.38
	Owner	-0.76	1.34	-0.56	.57
	Age	-0.006	0.006	-0.98	.33
	Owner x Age	-0.03	0.01	-2.34	.019
	AIC	BIC	logLik	deviance	
		352.7	376.6	-170.4	340.7
Expensive material vs. cheap material	Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
	Intercept	0.33	0.58	0.58	.56
	Material	-0.31	1.16	-0.27	.79
	Age	0.003	0.005	0.53	.60
	Material x Age	0.03	0.01	3.05	.002
	AIC	BIC	logLik	deviance	
		524.3	549.9	-256.1	512.3

3.3. Discussion

Study 2 investigated whether children prioritise invisible authentic ownership history or visible constituent materials when valuing objects. Children considered items made from cheap materials belonging to famously good owners to be as valuable as similar items made from expensive materials belonging to non-famous owners. As age increased, children's valuations for such authentic and inauthentic items increased and decreased respectively, indicating developing awareness that mundane objects with special ownership histories can be worth at least as much as objects with superior material properties. By contrast, children across our sample assigned significantly higher valuations to inauthentic items made from expensive materials than similar items made from cheap materials belonging to famously bad owners. The material value control game clearly demonstrated our participants' sensitivity to constituent materials as a determinant of object value independent of

ownership history. These findings provide further evidence that children's object valuations are heavily influenced by who their owners are and whether they are regarded favourably.

In Study 1, visually appealing and unappealing objects belonging to famously good owners received higher valuations than inauthentic objects with similar levels of appeal. Here, we showed that relatively unappealing objects made from cheap materials are considered by children to be just as valuable as appealing objects made from expensive materials *if* they belong to famously good owners. Children's responding in this manner resembles the norm in adult consumer culture whereby mundane items associated with revered celebrity owners often command irrationally high costs to acquire. Although primary school children's thinking about objects is often influenced by physical appearances (Gutheil et al., 2004; Rakison & Oakes, 2003; Piaget, 1970), our data align with previous evidence indicating their acute sensitivity to invisible properties when valuing objects. For example, studies have shown that children consider *their* objects to be significantly more valuable than similar non-owned objects and exact replicas, even if they were recently assigned to the child at random (e.g. Gelman et al., 2012; Harbaugh et al., 2001; Hartley & Fisher, 2018). To our knowledge, the present findings are the first to demonstrate children's belief that ownership history can enhance the value of materially cheap items to match (and, for older children, potentially exceed) that of materially expensive items, emphasising the importance of ownership to developmental cognition.

However, authentic ownership history is not sufficient to increase children's valuations for all cheaply-made items. As predicted, children considered items made from cheap materials belonging to famously bad owners to be significantly less valuable than objects made from expensive materials belonging to non-famous owners. Although children's valuations of these objects appeared to be informed by visible properties, it is possible that they still reflected on ownership history. As learned from Study 1, an ownership association with a famously bad character can diminish an authentic item's value. Thus, it may be that valuations of objects in this condition were still principally determined by ownership history – the invisible properties associated with the authentic objects' owners reduced their perceived value irrespective of the difference in visible constituent materials.

Overall, the results of Study 2 provide additional support for the transfer of essence hypothesis – the value of an authentic object is influenced by the characteristics it assimilates from its

owner (Gelman, 2013; Newman & Bloom, 2014; Newman, 2016). These data do not, however, provide insight into the mechanism through which invisible properties are transferred from owner to object. Studies involving adult participants implicate physical contact as this mechanism; auction prices for celebrity memorabilia are predicted by the likelihood of physical contact with owners (Newman & Bloom, 2014), objects used by celebrity owners are perceived to decrease in value if they are sterilised (Newman et al., 2011), and houses formerly occupied by famous owners increase in value more rapidly than similar neighbouring properties (Ayton et al., 2022). Study 3 investigated whether children believe that the value of authentic objects is moderated by physical contact with their famous owners and examined whether this effect differs depending on the owner's nature.

4. Study 3: Are children's valuations of authentic objects influenced by physical owner contact?

4.1. Method

4.1.1 Participants

Please refer to the Participants section for Study 1.

4.1.2. Materials

Stimuli included 16 photographs of clothing items, plus images of their owners, organised into eight pairs. Photographs of items in each pair were identical – only their text descriptions differed. Item pairs were organised into two sets (four pairs in each; see Table 5), which differed in terms of owners' personalities (good vs. bad): (1) item that has been worn once by its famously "good" owner vs. item that has not been worn by its famously "good" owner (e.g. glasses owned by Harry Potter that he has worn once vs. glasses owned by Harry Potter that he has never worn) and (2) item that has been worn once by its famously "bad" owner vs. item that has not been worn by its famously "bad" owner (e.g. cloak owned by Lord Voldemort that he has worn once vs. cloak owned by Lord Voldemort that he has never worn).

Table 5*Sets of Object Pairs in the Contact Game in Study 3*

Sets	Object pairs
1. Item worn by famously good owner vs. item never worn by famously good owner	Mask owned and worn once by Iron Man vs. mask owned by Iron Man, but never worn. Glasses owned and worn once by Harry Potter vs. glasses owned by Harry Potter, but never worn. Dress owned and worn once by Elsa vs. dress owned by Elsa, but never worn. Trousers owned and worn once by Jessie vs. trousers owned by Jessie, but never worn.
2. Item worn by famously bad owner vs. item never worn by famously bad owner	Cloak owned and worn once by Lord Voldemort vs. cloak owned by Lord Voldemort, but never worn. Scarf owned and worn once by the Evil Queen vs. scarf owned by the Evil Queen, but never worn. Hat owned and worn once by Captain Hook vs. hat owned by Captain Hook, but never worn Necklace owned and worn once by Ursula vs. necklace owned by Ursula, but never worn

4.1.3. Procedure

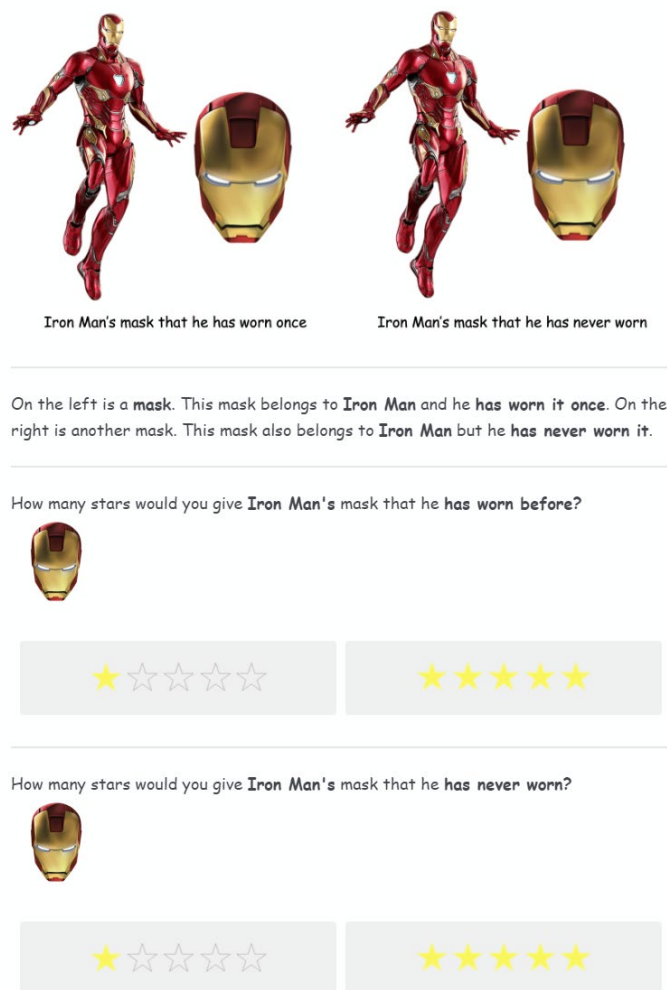
The contact game followed the same format as the tasks described in Study 1 and Study 2. Unlike in previous games, the objects in each pair were visually identical and they belonged to the same owner. The text accompanying the images explained that one item in each pair had been worn by its owner, while the other object had not been worn by its owner (e.g. “On the left is a mask. This mask belongs to *Iron Man* and he *has worn it once*. On the right is another mask. This mask also belongs to *Iron Man* but he has *never worn it*”). Contact items were described as having only been worn once to reduce the likelihood that children considered them to be of lower functional quality due to “wear and tear”. Participants were then asked to value each object as either 1 star or 5 stars (e.g. “How many stars would you give *Iron Man’s mask* that he *has worn once*?”; see Figure 10). No feedback was provided following children’s responses.

In total, children valued 8 pairs of pictures. Four pairs belonged to each of two sets detailed in Table 5. These sets were designed to determine whether physical contact with a famous owner increases children’s valuation of authentic objects and whether this effect is mediated by owner

characteristics. Trials were presented in a random order. The description and rating order of objects within pairs (e.g. worn item first or unworn item first) were both counterbalanced.

Figure 10

Example Trial from the Contact Game in Study 3



4.2. Results

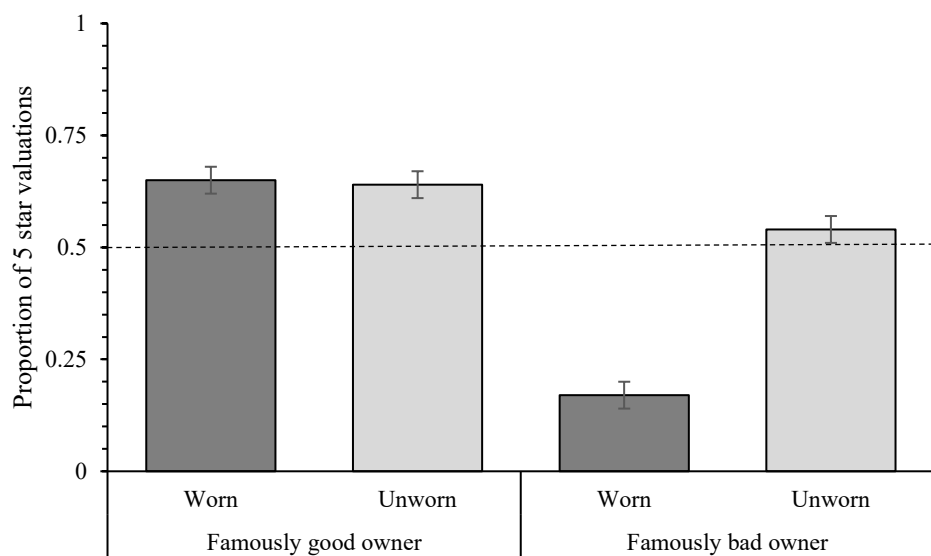
Children's object valuations were coded as 0 (1 star) or 1 (5 stars). Object contact with its owner was contrast coded as -0.5 (no contact) and 0.5 (contact). Owner was contrast coded as -0.5 (famously bad) and 0.5 (famously good). Age was coded as the participant's chronological age in months.

The contact game consisted of 1056 object valuations in total and each participant contributed 16 valuations (8 for objects worn by their famous owners, 8 for objects not worn by their famous

owners) divided evenly between the two personality conditions. Famously good owners were recognised by participants on 92.42% of trials (488 valuations) and 99.2% were considered by children to be “goodies”. Famously bad owners were recognised by participants on 85.61% of trials (452 valuations) and 86.28% were considered by children to be “baddies”. Mean valuations for authentic and inauthentic objects on trials involving recognised owners are displayed in Figure 11.

Figure 11

Proportions of 5-star Valuations for Worn and Unworn Items Belonging to Recognised Famous Owners in the Contact Game in Study 3. Error Bars Show ± 1 SE. Dotted Line Indicates Chance-level Responding



A model containing the owner x contact x age interaction, and its constituent effects, provided the best fit to the observed data (see Table 6; the interaction effect is displayed in Figure 12). The interaction was first deconstructed by examining owner x contact interactions for younger and older participants separately (participants were allocated to age groups via median split, as described previously). The younger group made 448 object valuations and the older group made 492 object valuations. Physical contact with a famously bad owner significantly decreased the value of authentic objects in the younger ($Z = -3.86, p < .001$) and older ($Z = -5.70, p < .001$) age groups. However,

physical contact did not significantly influence the value of objects belonging to famously good owners in either the younger ($Z = -0.85, p = .40$) or older ($Z = 0.72, p = .47$) age group. Both the younger ($Z = 5.97, p < .001$) and older ($Z = 9.22, p < .001$) age groups allocated significantly higher valuations to items worn by famously good owners than items worn by famously bad owners. While the younger groups also allocated significantly higher valuations to unworn items belonging to famously good owners than unworn items belonging to famously bad owners ($Z = 3.63, p < .001$), owner did not significantly influence valuations for unworn items in the older age group ($Z = 0.35, p = .72$). Next, we examined contact x age interactions for items belonging to famously good and bad owners separately. With increasing age, children's likelihood of allocating 5-star valuations to belongings of famously bad owners significantly increased for unworn items ($Z = 3.44, p < .001$) but decreased for worn items ($Z = -2.08, p = .037$). By contrast, likelihood of allocating 5-star valuations to belongings of famously good owners significantly increased for worn items as children got older ($Z = 3.32, p < .001$). Valuations of unworn items belonging to famously good owners were not significantly influenced by age ($Z = 0.32, p = .75$).

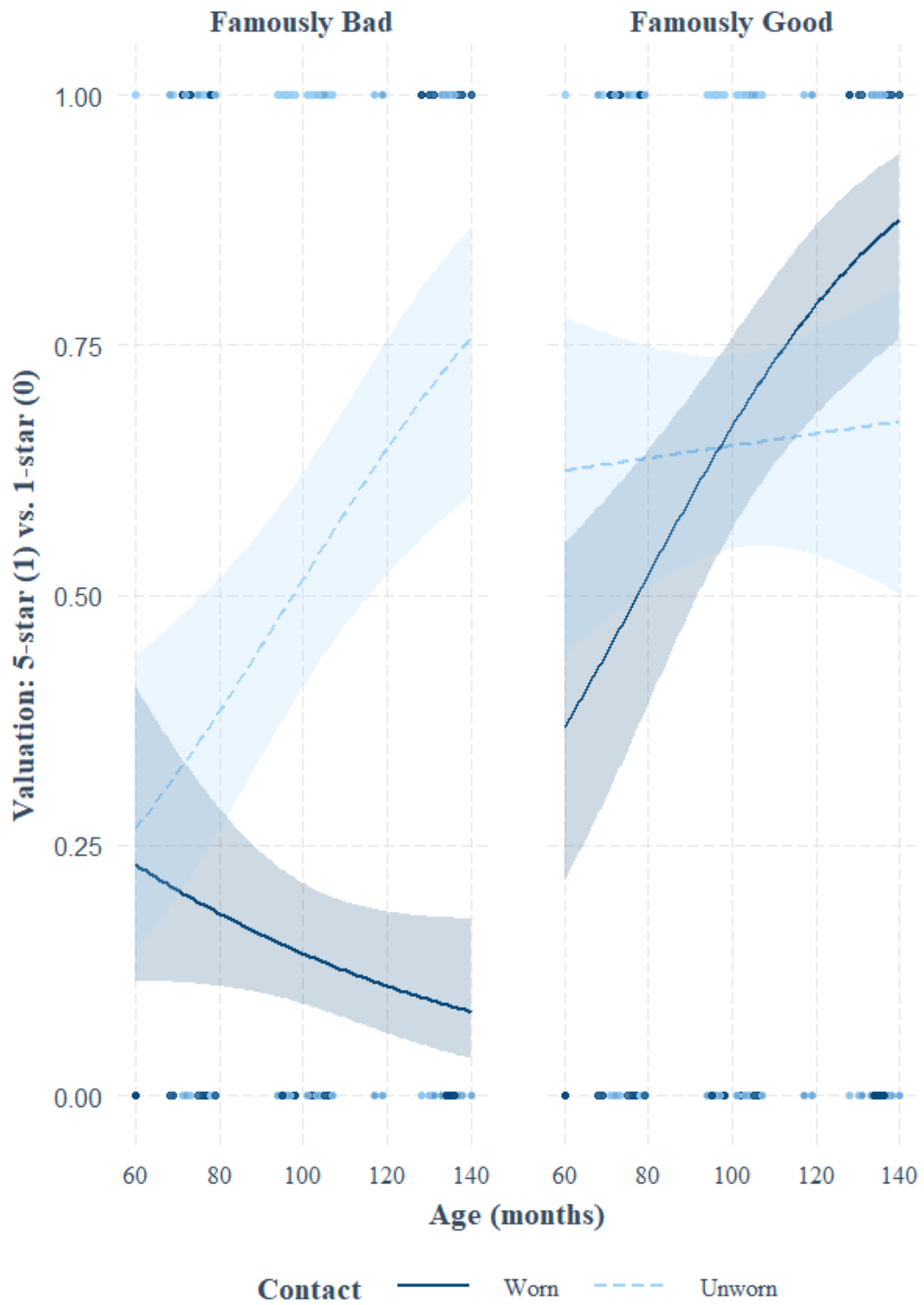
Table 6

Summary of the Fixed Effects in the Final Generalised Linear Mixed-effects Model (Log Odds) of Children's Object Valuation in the Contact Game in Study 3

Fixed effects	Estimated coefficient	Std. error	Z	Pr(> z)
Intercept	-1.25	0.57	-2.18	.029
Owner	0.44	0.71	0.61	.54
Contact	-0.22	0.71	-0.31	.75
Age	0.01	0.006	2.07	.038
Owner x Contact	-5.07	1.42	-3.57	< .001
Owner x Age	0.01	0.007	1.58	.11
Contact x Age	-0.007	0.007	-0.97	.33
Owner x Contact x Age	0.07	0.01	5.12	< .001
	AIC	BIC	logLik	deviance
	1093.0	1141.5	-536.5	1073.0

Figure 12

Visualization of the Owner x Contact x Age Interaction in Study 3 (Left Pane: Objects Belonging to Famously Bad Owners; Right Pane: Objects Belonging to Famously Good Owners). This Interaction Was Included in the Final Best-fitting Model



4.3. Discussion

Study 3 investigated whether children believe that the value of authentic objects is determined by physical contact with their owners. Our results revealed that physical contact with a famously bad owner had a detrimental impact on value, but worn and unworn objects belonging to famously good owners did not significantly differ in value. Objects worn by famously good owners received significantly higher valuations than objects worn by famously bad owners regardless of age, but only younger children showed the same effect for unworn items. We also observed that sensitivity to contact heightened with age; older children were more likely to assign higher valuations to items worn by famously good owners and unworn items belonging to famously bad owners, and lower valuations to items worn by famously bad owners. These findings suggest that children consider physical contact to be a mechanism through which objects acquire their owners' attributes, and this concept refines with age.

This study is the first to directly demonstrate children's belief that the value of authentic objects is mediated by an interaction between physical contact and owner identity that becomes more nuanced with developmental experience. The transfer of essence hypothesis (Huang et al., 2017; Newman & Bloom, 2014; Newman, 2016) is supported by our finding that, regardless of age, physical contact with a famously bad owner decreased the perceived value of their belongings. This result aligns with prior evidence for children's belief that an individual's essence can transfer between organic entities through physical contact (Meyer et al., 2013, 2017). While valuations for worn and unworn items belonging to famously good characters did not significantly differ in our sample, we detected evidence that children become increasingly aware over the primary school years that physical contact with virtuous celebrities enhances value. However, mere ownership may be sufficient to induce the transfer of positive attitudes associated with famously good celebrities to their property, irrespective of whether or not they have been used.

Overall, our findings broadly reflect those reported in studies investigating how physical contact influences adults' valuations of items belonging to celebrities with contrasting characteristics. For example, in Newman et al. (2011), adults preferred an item that had been worn multiple times by a well-regarded celebrity over an item they had not worn, but showed the opposite preference for

items associated with an ill-famed celebrity (also see Nemeroff & Rozin, 1994; Rozin et al, 1989). Therefore, our data suggest that primary school children – like adults – perceive authentic objects to be vessels for their owners’ attributes, which they assimilate through physical contact.

Importantly, data generated in Study 3 also indicate that our participants’ object valuations were not determined by low-level perceptual strategies or preferences (e.g. consistently rating all objects associated with famously bad owners as 1 star). If children were merely influenced by the appearance of objects or their owners’ identities, then valuations for visually identical objects belonging to the same owner would not significantly differ based on information concerning physical contact. Indeed, the observed interaction between owner identity and physical contact demonstrates that children reflected on abstract contextual information provided via text. These findings instill confidence that children’s responses in Study 1 and Study 2 were similarly rich.

5. General Discussion

This research investigated how primary school children aged 5-11 years are influenced by visible object properties and invisible ownership history when valuing objects, whether an interaction exists between these factors, and whether children believe that the value of authentic objects is mediated by physical contact with their owners. In Study 1, visually desirable and undesirable items belonging to famously good owners received higher valuations than similar items belonging to non-famous owners, whereas desirable items belonging to famously bad owners received significantly lower values. In Study 2, children considered items made from cheap materials belonging to famously good owners to be as valuable as similar items made from expensive materials belonging to non-famous owners. By contrast, items belonging to famously bad owners made from cheap materials received significantly lower valuations than inauthentic items made from expensive materials. In Study 3, physical contact with a famously bad owner had a detrimental impact on value, but worn and unworn objects belonging to famously good owners did not significantly differ in value. Across studies, we documented evidence that children’s sensitivity to authentic ownership history as a determinant of value increased with age. Older children were more likely to assign higher valuations to undesirable and cheaply made items belonging to famously good owners, items worn by famously good owners, and unworn items belonging to famously bad owners. Together, these findings indicate

that children's valuations of objects with authentic ownership history may be influenced by beliefs about transfer of essence that develop and refine over the primary school years (Gelman, 2013; Newman & Bloom, 2014; Newman, 2016).

The fact that children's authentic object appraisals were influenced so dramatically by *who* their owners are informs understanding of *why* they are considered valuable. At the outset, we presented two accounts for children's increased valuation of authentic ownership history. Commodity theory proposes that rare and difficult-to-obtain items are instinctively considered to be more desirable and economically valuable (Brock, 1968). Preferences for such items may represent an evolutionary strategy tailored to signal wealth and access to abundant resources (Cummins, 2005; Miller, 2009; Saad, 2007). Based on this account, one may predict that children would assign higher valuations to all objects with authentic ownership histories (regardless of owner characteristics) because they are scarce. However, significant differences between children's valuations of objects belonging to famously good and bad owners across all three studies contradict this hypothesis.

Our data support an alternative theory that children value authentic objects because they are imbued with the essence of their owners (Gelman, 2013; Newman & Bloom, 2014; Newman, 2016). This account posits that authentic items contain imperceptible traces of their owners' characteristics and accomplishments, meaning that object values can vary depending on why owners are famous. Our participants' high valuations of objects belonging to famously good characters reflects the norm in adult consumer culture that items used, or formerly owned, by revered celebrities are often more desirable and expensive to acquire than inauthentic equivalents. Appreciation of these items may be underpinned by the belief that they are vessels for their owners' socially-desirable qualities (e.g. a famous rock-star's guitar contains traces of their musical talent), and owning them may serve as a psychological substitute for having a direct relationship with the celebrity (Newman & Smith, 2016). Motivations to acquire former possessions of celebrated individuals may also be driven by the unconscious belief that establishing ownership elicits the transference of qualities between people (e.g. a famous rock-star's musical talent may "rub off" on whoever next acquires ownership of their guitar; Lee et al., 2011). These psychological factors may also explain why, like adults, children in

Studies 1 and 2 believed that objects with famously bad owners were less valuable than inauthentic comparators. Objects “tainted” by villainous attributes may activate negative mental states and emotions associated with their owners, and the prospect of ownership transforming such objects into markers of one’s personal identity (i.e. extensions of the self) would be undesirable (Nemeroff & Rozin, 1994).

Study 3 provided the first evidence for children’s belief that the value of authentic objects is influenced by physical contact with their owners. Children’s sensitivity to physical contact as a mediator of value may be underpinned by the concept of ‘magical contagion’, which proposes that objects can acquire invisible and intangible properties by touching people (Nemeroff & Rozin, 1994; Rozin & Fallon, 1987; Rozin et al., 1989). According to this principle, the merest contact – such as wearing an item just once – is sufficient to completely “contaminate” an object through the transfer of the owner or user’s characteristics (Rozin et al., 1986; Rozin & Nemeroff, 1990). Magical contagion beliefs are potentially a by-product of detection and defence systems that are naturally selected to protect against invisible bacterial and parasitic infection threats (Nemeroff & Rozin, 1994). Thus, children’s sensitivity to magical contagion may develop in parallel with their understanding of biological contamination, which begins to emerge within the first few years of life (Hejmadi et al., 2004). Through contamination, children aged 3 years understand that invisible germs can cause illness (Legare et al., 2009) and realise that ephemeral contact with an insect can spoil food that otherwise looks edible (Siegal & Share, 1990). From 5 years, children reject food that they believe has been contaminated by another person’s sneezing or licking (DeJesus et al., 2015). Associations with biological defence mechanisms may explain why negative appraisals of ownership and contact by famously bad owners were observed at younger ages across studies, while awareness of positive contagion may take longer to develop through acquiring social-cultural experience. Investigating the specific ages at which sensitivity to ‘positive’ and ‘negative’ object contagion develops, and whether cleaning or sterilising the property of famously good and famously bad owners influences children’s valuations, would be interesting objectives for future research.

Of course, these studies are not without limitations. As we examined broad developmental trends associated with age as a predictor of individual differences rather than drawing direct

comparisons between discrete age groups, our data do not speak to when the observed effects emerge in children's development or how they differ at specific ages. Informed by the present studies, subsequent developmental research can seek to profile how these phenomena unfold over time and identify critical age-related milestones. Relatedly, asking children to verbally justify their valuations could provide valuable insights into their reasoning and potentially signpost reasons for age effects. Regarding stimuli, our participants were asked to value pictures of objects belonging to fictional owners rather than pictures of actual objects belonging to real celebrities. This decision was motivated by our need to present children with owners that they were likely to be familiar with *and* considered to be categorically good or bad. Selecting sufficient numbers of real-life celebrities that met both of these criteria from the perspective of children would have been extremely challenging. While our methods and findings were consistent with prior research (e.g. Hartley et al., 2020; Gelman et al., 2015), it is conceivable that presenting realistic stimuli may have yielded different results. It is also unclear how the effects observed in this study would manifest if we asked children to value 3-D objects with the same properties. It is possible that physically being in the presence of objects, rather than merely considering depictions of them, would amplify differences in valuations for objects belonging to famously good and famously bad owners. Our predictions concerning commodity theory (Brock, 1968) were based on children's assumed understanding that items belonging to famous owners are rare in comparison with inauthentic comparators. However, children were not explicitly informed how scarce or abundant the objects were. Finally, we used desirability rating as a proxy for monetary valuations to account for large disparities in financial experience and understanding between participants (Webley, 2005). We recommend that future studies investigating authentic ownership history, involving specific age groups with similar understanding and experience of currency, should include measures of both desirability and monetary worth.

6. Conclusions

This research has advanced theoretical understanding of the conditions under which children perceive ownership history and object qualities to be determinants of value, and provided new insight into how children's valuation of authentic objects is influenced by owner contact. In Studies 1 and 2 we discovered an interaction between visible and invisible factors; children consider 'positive'

authentic ownership history to add significant value to objects of varying desirability, while ‘negative’ authentic ownership history appears to reduce an object’s value. These findings demonstrate that children’s valuation of ownership history relative to object properties depends on identity. In Study 3, we revealed that children’s valuations of authentic items were significantly influenced by degree of physical contact with famously bad owners, implicating early awareness of “negative contagion” that may potentially be linked to biological defence mechanisms (Nemeroff & Rozin, 1994). Sensitivity to “positive contagion” through physical contact with famously good owners increased with age, but was weaker in the overall sample, perhaps signalling a distinct developmental mechanism that is not associated with bodily defence. Together, these three studies suggest that children’s valuations of authentic objects are determined by the assimilated essence of their owners, rather than scarcity or visible item properties alone.

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8. References

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