Could sensitivity to object authenticity be developmentally delayed in autism?

8182 words (excluding abstract, tables, figures, and references)

Abstract

Autism spectrum disorder may reduce children's sensitivity to authenticity when valuing objects. Here, we investigate how autistic adults value authentic objects and how their judgements are influenced by 'need to belong' (NTB). Autistic adults (N = 41) and neurotypical adults (N = 89) answered questions about pairs of objects that differed on various authentic qualities. The groups did not differ in their awareness that authenticity mediates monetary worth and others' perceptions of an object's owner. However, the influence of authenticity was somewhat suppressed in autistic adults, who were generally less happy to own objects. Across populations, higher NTB was associated with increased desire to own objects and increased happiness associated with owning authentic objects specifically. These findings suggest that sensitivity to the value of authenticity could be developmentally delayed in autism, but differences in subjective appraisals of authentic objects may be a lifelong characteristic.

Keywords:

Autism Spectrum Disorder; Authenticity; Ownership; Need to Belong; Developmental Delay

Could sensitivity to object authenticity be developmentally delayed in autism?

In the neurotypical population, objects considered to be *authentic* are judged to be more valuable and desirable than inauthentic objects of the same type (Gelman et al., 2015). Conversely, recent research shows that autism spectrum disorder (ASD), a neurodevelopmental condition characterized by differences in social-cognition and interaction (APA, 2013), may reduce children's sensitivity to authenticity when valuing objects (Hartley & Fisher, 2018a; Hartley et al., 2020). However, it is currently unknown whether differences in sensitivity to authenticity are a lifelong attribute of ASD, or the result of a developmental delay that may eventually disappear as autistic individuals grow older. The present study begins to address this question by investigating whether diminished sensitivity to object authenticity is a feature of ASD in adulthood.

In Western cultures, neurotypical children and adults feel deeply connected to their property (Belk, 1985, 2000), which they consider to be of higher value than similar non-owned property. This phenomenon is explained by the 'extended self hypothesis', which posits that material belongings serve as physical markers of psychological identity and are integrated into one's self-concept (Belk, 1988; Diesendruck & Perez, 2015; Dittmar, 1992). The resulting relationship between property and sense of self may motivate people's desire to own a variety of authentic objects that are perceived as "special" in some way. Neurotypical children and adults reliably consider items associated with famous owners to be more valuable and desirable than similar items belonging to non-famous owners (Frazier et al., 2009; Gelman et al., 2015). Items belonging to cherished family members – symbols of personal lineage and important social relationships – also command significant sentimental value and may serve as objects of attachment (Curasi et al., 2004; Csikszentmihalyi, 1993). Valuation studies have shown that neurotypical children and adults are more likely to keep and prefer such items in comparison to similar objects that lack family history, although they

are not necessarily considered to be of greater monetary value (Frazier et al., 2009; Gelman et al., 2015). It has been theorized that the emotional and/or monetary worth of items with special ownership histories may be elevated due to them being imbued with the "essence" of their owners (Newman & Bloom, 2012) or because they are unique commodities that are difficult to obtain through conventional means, distinguishing them from regular exemplars (Brock, 1968; Jang et al., 2015).

Ownership is not the only factor that confers authenticity to objects. Neurotypical individuals judge artefacts that are associated with significant historical events (e.g. a chair retrieved from the Titanic wreckage) to be of higher value and more appropriate for display in a museum than similar items with ordinary histories (e.g. a regular kitchen chair; Frazier et al., 2009). Neurotypical individuals also prefer and assign higher values to items associated with designer brands in comparison to similar items with less prestigious labels (Workman, 1988). The fact that such judgements are made despite beliefs that designer products are not necessarily higher quality (Forsythe, 1991) indicates that their value is inflated by factors external to the object – they are symbols of socio-economic capital (Van Kempen, 2004). Claims that conspicuous consumption of luxury products may be an evolutionary strategy (e.g. Cummins, 2005; Miller, 2009; Saad, 2007) are supported by evidence that owners of such goods are treated more favorably by their peers (Doob & Gross, 1968; Nelissen & Meijers, 2011; Van Kempen, 2004). Hence, positive evaluations of some authentic items may be strongly motivated by their capacity to influence how people regard their owners.

It has been proposed that sensitivity to authenticity is mediated by 'need to belong' (NTB) – an intrinsic desire to form social relationships with others (Newman & Smith, 2016a, 2016b; Newman, 2019) – and that individuals with greater NTB are more likely to desire and own authentic items. The mechanism through which items satisfy NTB may differ depending on why they are authentic. For example, possessing objects previously owned by a

cherished family relative or famous celebrity may serve as a psychological substitute for having a direct social relationship with that person (Newman & Smith, 2016b). Similarly, owners of items associated with significant historical events may feel a connection to those events, or the people involved, without having experienced them directly. By contrast, ownership of designer-branded goods may be motivated by a drive to form or maintain in-person social relationships, as people use such items to symbolize their identity and membership of prestigious social groups, eliciting a sense of belonging (Bian & Forsythe, 2012). In support of this theory, Newman and Smith (2016a) found that inducing feelings of social exclusion increased neurotypical adults' valuation of, and desire to own, authentic items belonging to their favorite musician, actor, and athlete in comparison to inauthentic replicas. In addition, adults with greater NTB considered items worn by a famous celebrity to be more valuable than adults with lower NTB. In another study, Newman (2019) reported that neurotypical adults' NTB positively correlated with emotional sensitivity to various kinds of authenticity. Together, these findings suggest that NTB may motivate neurotypical adults' heightened valuation, and desire to acquire, authentic objects.

If preferences for authentic items are driven by NTB, then we may expect to observe differences in a population characterized by differences in social-cognitive development, such as ASD. Many autistic children spend less time interacting with others (McConnell, 2002), experience lower quality relationships with peers (Calder et al., 2013), and show reduced social motivation (Deckers et al., 2017; Deckers et al., 2014; Chevallier et al., 2012). Despite these factors, autistic children do not necessarily experience elevated levels of loneliness in comparison to neurotypical children or children with other developmental disorders (Chamberlain et al., 2007; Deckers et al., 2017). Collectively, these features of ASD may be indicative of reduced NTB early in life.

As ownership is a cultural convention (Kanngiesser et al., 2015), low NTB during childhood may reduce the frequency and quality of opportunities through which autistic children acquire ownership norms, including those concerned with authenticity (Hartley et al., 2020; Hartley et al., 2021). Furthermore, differences in self-other understanding (Lind, 2010) may influence the development of the extended self, suppressing the psychological importance of ownership to autistic children and diminishing sensitivity to abstract authentic qualities as meaningful determinants of value. In support of these hypotheses, Hartley and Fisher (2018a) showed that autistic children did not prefer or assign higher values to randomly endowed toys in comparison to non-owned identical copies or other toys. By comparison, mere ownership elicited heightened valuation of randomly endowed objects in neurotypical children. Hartley et al. (2020) recently examined how ASD affects valuation of authentic items belonging to famous fictional owners. In Studies 1 and 2, neurotypical children considered items belonging to famous owners to be significantly more valuable than similar items belonging to non-famous owners. Conversely, autistic children did not assign higher values to items with special ownership histories, but their valuations were moderated by object features unrelated to ownership (e.g. material value). Thus, autistic children appear to value objects based primarily on tangible properties rather than abstract authentic qualities (Hartley & Fisher, 2018a; Hartley et al., 2020).

In a third explorative study, Hartley and colleagues (2020) examined the effect of ASD on sensitivity to authentic ownership history in adulthood. They discovered that autistic university students and neurotypical controls matched on chronological age both assigned higher monetary values to objects belonging to famous fictional owners than non-famous owners, and both groups reported that other people would be impressed by their ownership of items associated with famous people. These findings hint that awareness of ownership history as a determinant of object value may be developmentally delayed in ASD. Nonetheless,

Hartley et al. (2020) identified subtle signs that ASD may continue to influence adults' consideration of authentic ownership history in similar ways to autistic children; autistic adults consistently rated inauthentic items more favorably than neurotypical adults, and they were significantly more like to keep objects associated with non-famous owners. These differences may reflect an enduring appreciation for functional and material object properties observed in younger autistic samples, perhaps indicating a more rational perspective of authenticity.

While clear differences have been identified between neurotypical and autistic children regarding sensitivity to authenticity and ownership-related cognition, further research is required to elucidate whether developmental differences persist into adulthood and uncover the role of NTB. One possibility is that autistic adults evidence concerns for object ownership and authenticity due to a significant increase in NTB that often occurs during adolescence (Deckers et al., 2017; Lasgaard et al., 2010). However, an important limitation of Hartley et al.'s (2020) preliminary adult study is the use of items belonging to fictional owners from popular television series and films. As participants' responses may have been influenced by preferential biases for the media that characters were associated with, it is unclear whether the observed results would generalize to objects belonging to "real life" owners.

Moreover, no studies to date have explored how autistic adults value other kinds of authentic objects, such as their own possessions, objects belonging to relatives, objects associated with historical events, or designer-branded products. Asking participants to evaluate various objects on multiple dimensions will reveal what kinds of objects autistic individuals consider to be authentic and whether different authentic qualities enhance value in contrasting ways (see Gelman et al., 2015). It is also unknown to what extent autistic individuals desire to own different kinds of authentic objects and whether their appreciation for authenticity is mediated by NTB. Crucially, the present research addresses each of these

issues that are central to understanding how sensitivity to authenticity contrasts between childhood and adulthood in autism.

The objective of this study was to discover whether developmental differences in sensitivity to object authenticity endure into adulthood for autistic individuals, and to reveal the influence of NTB. Autistic and neurotypical adults were presented with pairs of objects that differed in authenticity and answered a series of questions about each object. In line with previous research (e.g. Frazier et al., 2009; Newman et al., 2011), we asked questions that probed various indices of object valuation: 1) the object's monetary worth, 2) likelihood of purchasing the object, 3) whether the object is worth keeping, 4) whether participants would like to own the object, 5) whether others would be impressed by ownership of the object, and 6) whether owning the object would make participants happy. Pairs of objects contrasted on one of five types of authenticity: association with the self, a beloved relative, a famous celebrity, a significant historical event, or a designer brand. Based on limited existing evidence (Hartley et al., 2020), we tentatively predicted that both populations would broadly evaluate authentic objects more favorably than inauthentic objects across conditions and questions, with a few exceptions (e.g. we did not anticipate either population would indicate that others would be impressed by ownership of objects associated with themselves or their relatives). If differences in sensitivity to authenticity persist into adulthood for autistic individuals, we expected that this would manifest as increased appreciation for inauthentic objects. We also predicted that, across populations and conditions, participants with higher NTB scores would regard authentic objects more favorably than those with lower NTB scores. Importantly, our findings will advance theoretical understanding by indicating whether differences in sensitivity to object authenticity documented in autistic children are indicative of a developmental delay that may alleviate by adulthood.

Material and methods

Participants

Participants were 89 neurotypical adults (21 males, 67 females, 1 undisclosed; *M* age = 25.43 years, *SD* = 8.53; range = 18-62) and 41 autistic adults (14 males, 21 females, 6 undisclosed; *M* age = 23.66, *SD* = 6.11; range = 19-42) recruited through social media and University services. Participants were asked whether they had received a formal clinical autism diagnosis from a qualified professional and those who responded affirmatively were allocated to the ASD group. Neurotypical participants confirmed that they had not been diagnosed with any other psychological conditions. Autism symptoms were measured via the Adult Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001), which was completed by each participant. The autistic adults scored significantly higher on the AQ ($M = 34.49$, $SD = 9.36$) than the neurotypical adults ($M = 16.12$, $SD = 6.87$), $t(128) = 12.55$, $p < .001$, $d = 2.24$. The groups did not significantly differ on chronological age, $t(128) = 1.19$, $p = .23$. As this study was conducted during the covid-19 pandemic when face-to-face data collection was prohibited in the UK, it was not feasible to conduct further standardized tests of participants' intellectual abilities or directly assess autism symptomology through observation (e.g. administration of the ADOS-2 adult module; Lord et al., 2012). These conditions also prevented us from collecting comparable data from a sample of autistic children. The disruptions caused by special school closures made this period very challenging for many autistic children and their families (Manning et al., 2021) and the lack of in-person testing prevented us from administering adequate standardized assessments to facilitate control group matching. For these reasons, we address developmental questions by situating our findings in relation to those from previous studies employing comparable tasks with autistic children, but recommend that follow-up studies employ longitudinal designs when feasible. All procedures performed in this research involving human participants were in accordance

with the ethical standards of the institutional and national research committee. Informed consent was obtained directly from participants prior to starting the study.

Materials

Stimuli for our object valuation task included 30 photographs of objects organized into 15 pairs. Three pairs belonged to each of five sets (see Table 1), and each pair included one "authentic" object and one "inauthentic" object. The images of objects in each pair were identical, with the exception of being mirror images of one another, and were therefore matched on visual and functional properties. The sets differed in terms of why one object was authentic: (1) the object hypothetically belonged to the participant, (2) the object was owned by someone who is personally important to the participant, (3) the object was owned by the participant's favorite celebrity, (4) the object was involved in a famous event, (5) the object was produced by an expensive designer brand. As adults usually prefer new items to preowned items (Campbell, 1992), the inauthentic objects in sets 1-3 were said to belong to an "unknown person" to prevent this potential bias.

Table 1

Sets of item pairs in the object valuation task.

Set	Object pair
1. Owned by the self vs. Unknown owner	Your mug vs. Unknown person's mug
	Your t-shirt vs. Unknown person's t-shirt
	Your watch vs. Unknown person's watch
2. Personally important owner vs. Unknown owner	Beloved family member's ring vs. Unknown person's ring
	Best friend's ornament vs. Unknown person's ornament
	Romantic partner's scarf vs. Unknown person's scarf
3. Celebrity owner vs. Unknown owner	Favorite actor's hat vs. Unknown person's hat
	Favorite musician's jumper vs. Unknown person's jumper
	Favorite sport star's sunglasses vs. Unknown person's sunglasses
4. Object associated with historical event vs. Replica	Torch used in the 2012 Olympic Games vs. Replica torch
	Veil used in the Royal Wedding vs. Replica veil
	Lightsaber prop used in the filming of Star Wars vs. Replica lightsaber
5. Designer-branded object vs. Replica	Exclusive designer-branded bag vs. Replica bag
	Exclusive designer-branded trainers vs. Replica trainers
	Exclusive designer-branded water bottle vs. Replica water bottle

Procedure

Our experimental task was very similar to that reported in Study 3 of Hartley et al. (2020). Individuals who responded to the study's advert were sent a hyperlink directing them to computer-based experimental resources. After providing their informed consent, participants progressed to the valuation task.

Participants were told that they would be presented with pictures of various objects and asked questions about their value. There were 15 trials evenly divided across five conditions (see Table 1), which were presented in a random order. For each trial, participants were shown photographs of two objects with textual information below them (see Figure 1). The textual information for trials investigating ownership history in sets 1-3 was similarly worded: “On the left is a [object]. Imagine this [object] belongs to [you/a person who is important to you/your favorite celebrity]. On the right is an identical [object]. You don’t know who this [object] belongs to.” For trials involving objects associated with famous events, the textual information read: “On the left is a [object]. This [object] was used in the [description of famous event]. On the right is an identical replica [object]. This [object] was NOT used in the [description of famous event].” For trials involving objects associated with designer brands, the textual information read: “On the left is an [object]. This [object] was made by a high-end designer brand. On the right is an identical replica [object]. This [object] was made by a high-street discount brand.” Positioning of authentic and inauthentic objects to the left and right was counterbalanced across trials, as was their order of introduction in the text descriptions. One of the object photographs was then highlighted by a red border and participants answered a series of questions about that object in a fixed order.

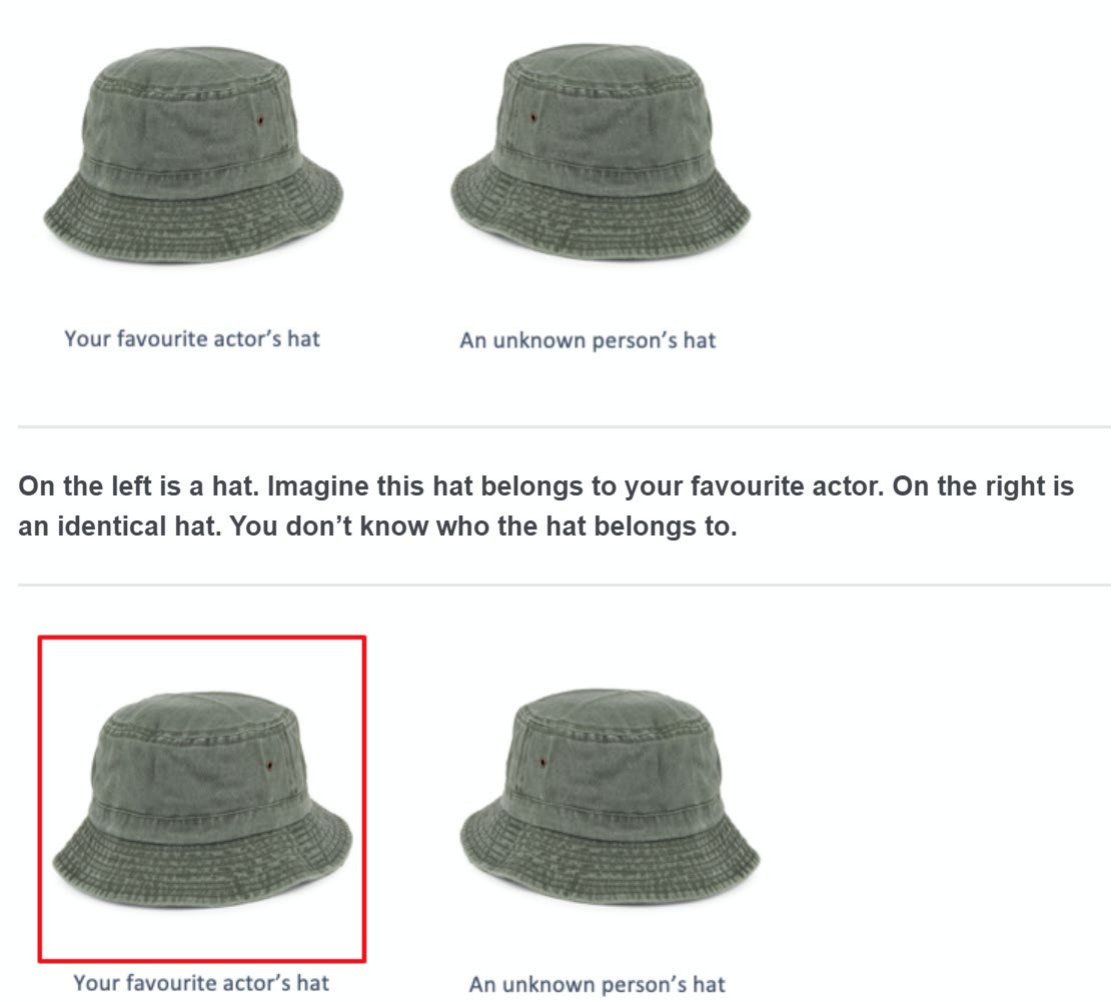

Figure 1. Example stimuli from a trial in Set 3, 'celebrity owner vs. unknown owner' (the first set of questions would concern the celebrity's hat highlighted in the red box).

First, participants were asked to estimate the monetary value of the object (e.g. "How much do you think your favorite musician's jumper is worth? (Estimate in pounds, £)."). Second, they were asked "How likely would you be to buy this item with your own money given the opportunity?" (response options were 'extremely unlikely', 'somewhat unlikely', 'neither likely nor unlikely', 'somewhat likely', and 'extremely likely'). This question was excluded from trials in set 1 (self vs. unknown owner) as participants were asked to imagine that they already owned the authentic items. Third, they were asked "Is the item worth keeping or would you throw it out?" (response options were 'keep' or 'throw out'). Fourth,

they were asked, “How much would you like to own this item?” (response options ranged from ‘1 - not at all’ to ’10 – extremely’). Fifth, they were asked “would other people be impressed if they knew that you owned this item?” (response options were ‘yes’ or ‘no’). Finally, participants were asked “would owning this item make you feel happy?” (response options were ‘extremely unhappy’, ‘somewhat unhappy’, ‘neither happy nor unhappy’, ‘somewhat happy’, ‘extremely happy’). The photographs were then presented again with the other object highlighted by a red border. The same series of questions were then asked about the second object.

After completing the object valuation task, participants completed the Need for Belonging Scale (Leary et al., 2013). Participants indicated to what extent 10 statements concerning ‘need to belong’ applied to them (response options ranged from ‘1 – not at all’ to ‘5 – extremely’). Example statements included “I want other people to accept me” and “I try hard not to do things that will make other people avoid or reject me”.

Finally, participants completed the AQ (Baron-Cohen et al., 2001) before indicating their age, gender, and whether they had been formally diagnosed with an autism spectrum condition.

Results

The data that support the findings of this study are openly available at: https://doi.org/10.17635/lancaster/researchdata/471

An independent-samples *t*-test showed that neurotypical adults ($M = 31.85$) and autistic adults ($M = 33.17$) did not significantly differ on NTB score, $t(128) = -1.02$, $p = .31$.

Responses to the six questions in the object valuation task were analyzed separately for each of the five stimuli sets. As the groups were not matched on cognitive ability, we investigated the influence of Population, Authenticity, and NTB score on participants' responses via mixed-effects models. All models contained by-subject and by-item random

intercepts to account for variation across participants and stimuli. All models were conducted using the glmer and lmer functions from the lme4 package in R (Bates et al., 2015). Population was contrast coded as -0.5 (typical development) and 0.5 (ASD). Authenticity was contrast coded as -0.5 (inauthentic object) and 0.5 (authentic object). NTB was coded as the participant's raw score on the Need for Belonging Scale (Leary et al., 2013).

For each set of analyses, 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. Each model included 780 data points.

How much is the object worth?

There was tremendous variation in object valuations between stimuli items and across participants (from £0 to £8 trillion). As we were primarily interested in whether autistic and neurotypical participants consistently regarded objects with authentic qualities as more financially valuable than similar inauthentic objects, we followed Hartley et al.'s (2020) approach of comparing the values of items in each pair. The item with the higher value scored 1 and the item with the lower value scored 0. If items in a pair were judged to be of identical value, they both scored 1 (see Figure 2). These data were analyzed via binomial generalized linear mixed-effects models.

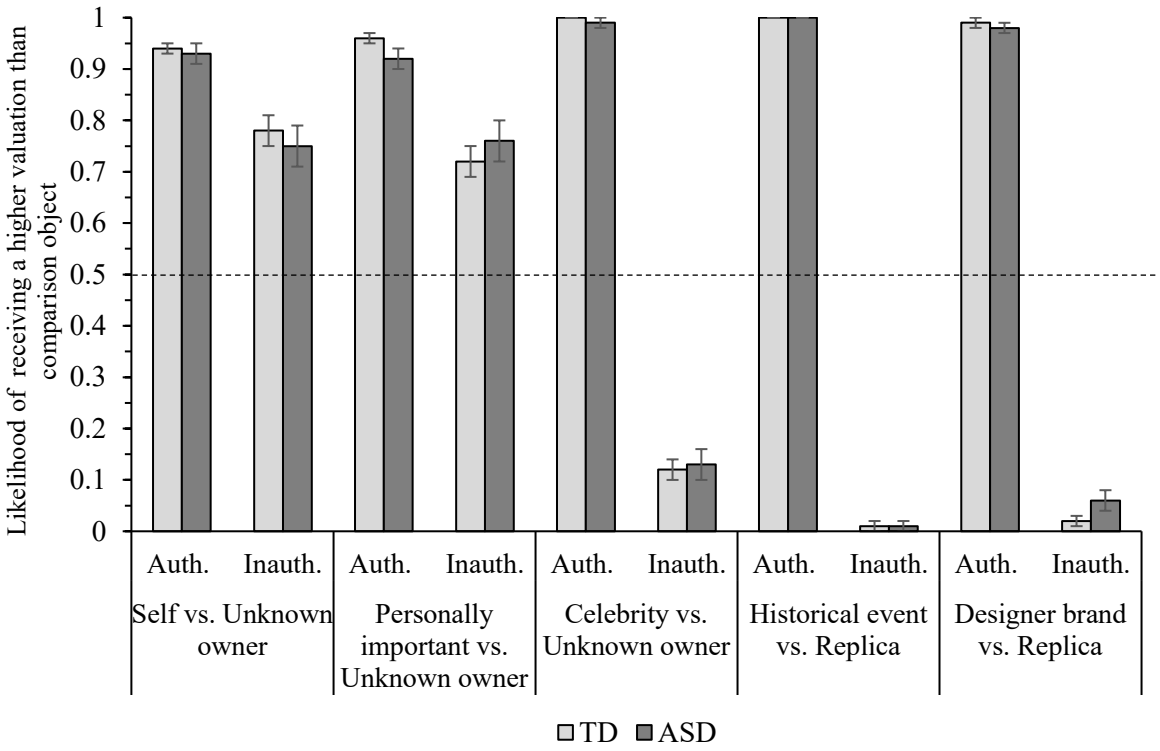

Figure 2. Likelihood of an object receiving a valuation that was higher or equal to that of its comparator in each stimuli set for adults with typical development (TD) and autistic adults (ASD). Error bars show ±1 SE. Dotted line indicates chance level responding.

For all five stimuli sets, models containing only Authenticity as a fixed effect provided the best fit to the observed data. Authentic objects were rated as significantly higher value than inauthentic items by both groups (see Table 2).

Table 2

Summaries of the final binomial generalized linear mixed-effects models (log odds) predicting the likelihood of objects receiving a higher value than their comparators for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	**Z**	**Pr(> |z|)**
Self vs. Unknown owner	Intercept	2.21	0.17	13.19	< .001
	Authenticity	1.54	0.29	5.30	< .001
		AIC	**BIC**	**logLik**	**deviance**
		607.1	625.8	-299.6	599.1
	Fixed effects	**Estimated coefficient**	**Std. error**	**Z**	**Pr(> |z|)**
Personally important vs. Unknown owner	Intercept	2.21	0.16	13.44	< .001
	Authenticity	1.99	0.28	7.12	< .001
		AIC	**BIC**	**logLik**	**deviance**
		616.9	635.5	-304.4	608.9
	Fixed effects	**Estimated coefficient**	**Std. error**	**Z**	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	1.48	0.77	1.91	.056
	Authenticity	10.60	1.49	7.09	< .001
		AIC	**BIC**	**logLik**	**deviance**
		286.2	304.9	-139.1	278.2
	Fixed effects	**Estimated coefficient**	**Std. error**	**Z**	**Pr(> |z|)**
Historical event vs. Replica	Intercept	0.55	0.58	0.95	.34
	Authenticity	10.82	1.16	9.36	< .001
		AIC	**BIC**	**logLik**	**deviance**
		57.1	75.7	-24.6	49.1
	Fixed effects	**Estimated coefficient**	**Std. error**	**Z**	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	0.25	0.43	0.59	.56
	Authenticity	9.80	0.81	12.14	< .001
		AIC	**BIC**	**logLik**	**deviance**
		170.0	188.6	-81.0	162.0

How likely would you be to buy this item with your own money given the opportunity?

Participants' responses were coded as follows: 'extremely unlikely' = 1, 'somewhat unlikely' = 2, 'neither likely nor unlikely' = 3, 'somewhat likely' = 4, and 'extremely likely' = 5. These data were analyzed using linear mixed-effects models (see Figure 3).

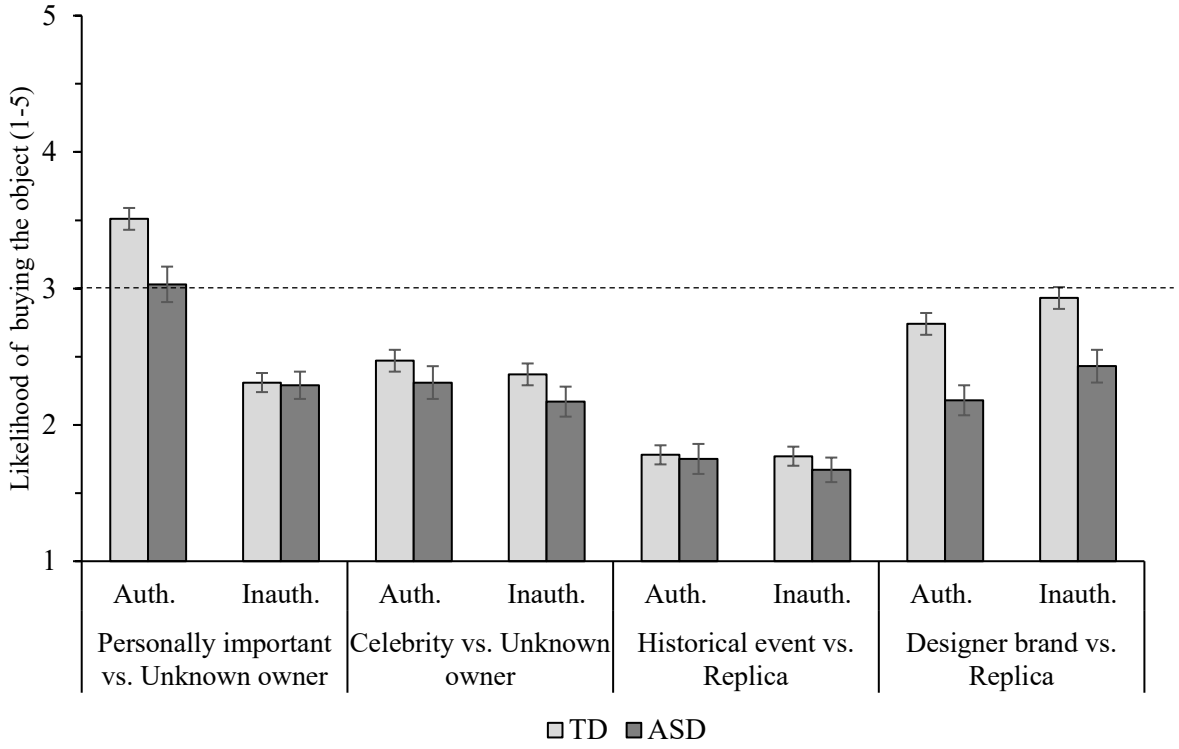

Figure 3. Likelihood of buying authentic and inauthentic items in each stimuli set for adults with typical development (TD) and autistic adults (ASD). Error bars show±1 SE. Dotted line indicates chance level responding.

For the 'personally important owner' set, a model containing the Population x Authenticity interaction provided the best fit to the observed data (see Table 3). The interaction was deconstructed by testing the effect of Population on responses for authentic objects and inauthentic objects separately, and exploring the effect of Authenticity on each population separately. These models had the same random effects structure as the initial model containing all data. Neurotypical adults (t = 5.84, p = .001) and autistic adults (t = 3.72, p = .011) were both significantly more likely to buy authentic objects than inauthentic objects. While neurotypical adults and autistic adults did not differ in their likelihood of buying inauthentic objects (p = .93), autistic adults were less likely to buy authentic objects than neurotypical adults (t = -2.44, p = .016).

For the 'celebrity owner' set, a model containing only NTB as a fixed effect provided the best fit to the observed data (see Table 3). Participants with higher NTB scores were more likely to buy items in this set.

For the 'historical event set, including fixed effects did not significantly improve fit. Participants' likelihood of buying items in this set was not influenced by Population, Authenticity, or NTB.

For the 'designer-branded' set, a model containing Population and NTB as fixed effects provided the best fit to the observed data (see Table 3). Autistic adults were significantly less likely to buy items in this set than neurotypical adults. The effect of NTB was borderline significant ($t = 1.92$, $p = .058$) – there was a trend that participants with higher NTB scores were more likely to buy items in this set.

Table 3

Summaries of the final linear mixed-effects models (log odds) predicting the likelihood of buying objects for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Personally important vs. Unknown owner	Intercept	2.78	0.11	25.40	< .001
	Authenticity	0.97	0.18	5.32	.002
	Population	-0.24	0.15	-1.67	.10
	Authenticity x Population	-0.46	0.16	-2.88	.004
		AIC	**BIC**	**logLik**	**deviance**
		2445.1	2477.7	-1215.6	2431.1
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	1.76	0.33	5.33	< .001
	NTB	0.02	0.009	2.06	.042
		AIC	**BIC**	**logLik**	**deviance**
		2506.2	2529.5	-1248.1	2496.2
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	1.97	0.34	5.83	< .001
	Population	-0.55	0.14	-3.88	< .001
	NTB	0.02	0.01	1.92	.057
		AIC	**BIC**	**logLik**	**deviance**
		2578.6	2606.6	-1283.3	2566.6

Is the item worth keeping or would you throw it out?

'Keep' was coded as 1 and 'throw out' was coded as 0. These data were analyzed using binomial generalized linear mixed effects models (see Figure 4).

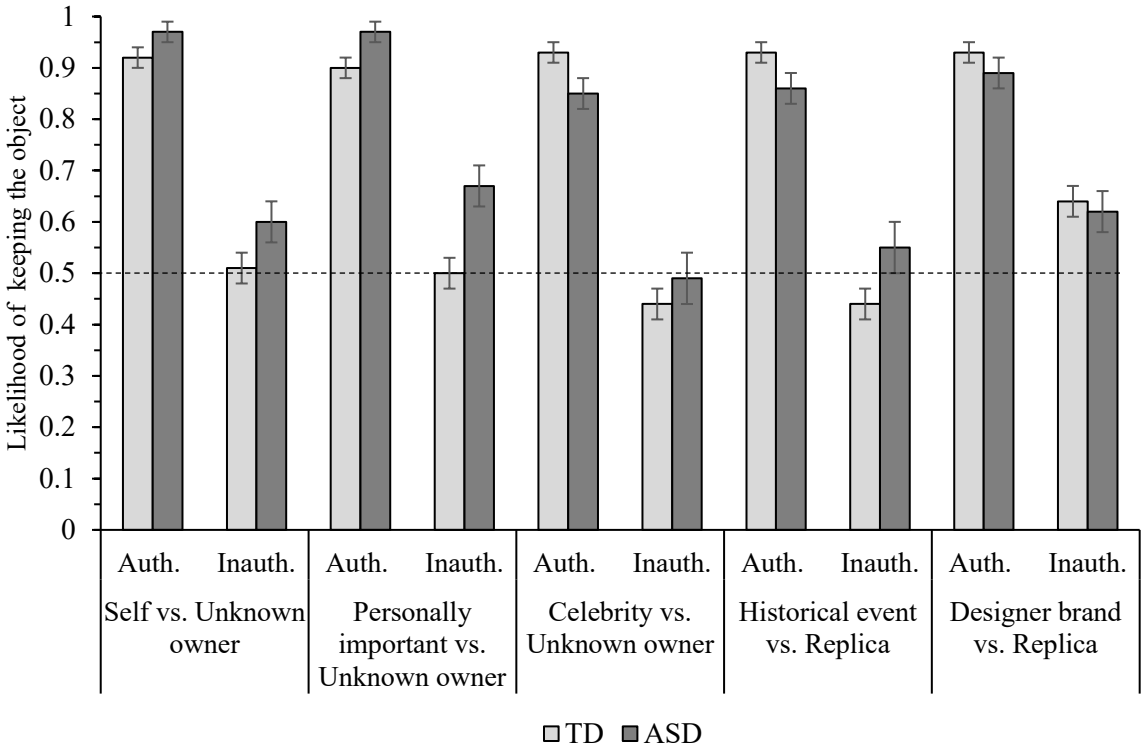

Figure 4. Likelihood of keeping authentic and inauthentic items in each stimuli set for adults with typical development (TD) and autistic adults (ASD). Error bars show ±1 SE. Dotted line indicates chance level responding.

For the 'self-owned' set, a model containing only Authenticity as a fixed effect provided the best fit to the observed data (see Table 4). Participants in both groups were significantly more likely to keep authentic items than inauthentic items.

For the 'personally important owner' set, a model containing Population and Authenticity as fixed effects provided the best fit to the observed data (see Table 4). Participants in both groups were significantly more likely to keep authentic items than inauthentic items, and autistic adults were more likely to keep items regardless of authenticity than neurotypical adults.

For the ‘celebrity owner’ set, a model containing the Population x Authenticity x NTB interaction provided the best fit to the observed data (see Table 4 and Figure 5 for a vizualisation). This three-way interaction was deconstructed by examining the Authenticity x NTB interaction separately for neurotypical adults and autistic adults. The total sample was divided into sub-groups by conducting a median split based on NTB, yielding a ‘low NTB’ group (*M* NTB score = 26.44, *SD* = 3.83) and a ‘high NTB’ group (*M* NTB score = 37.92, *SD* = 3.61). The low NTB group included 47 neurotypical adults and 17 autistic adults. The high NTB group included 42 neurotypical adults and 24 autistic adults. Neurotypical adults with low NTB ($Z = 5.69$, $p < .001$) and high NTB ($Z = 5.52$, $p < .001$) were both more likely to keep authentic objects than inauthentic objects. Autistic adults with low NTB ($Z = 4.63$, $p < .001$) and high NTB ($Z = 4.47$, $p < .001$) were also more likely to keep authentic objects than inauthentic objects. However, the influence of NTB on likelihood of keeping inauthentic objects differed in direction for the two groups. Neurotypical adults with higher NTB scores tended to be less likely to keep inauthentic objects ($Z = -0.90$), whereas autistic adults with higher NTB scores tended to be more likely to keep inauthentic objects ($Z = 1.38$).

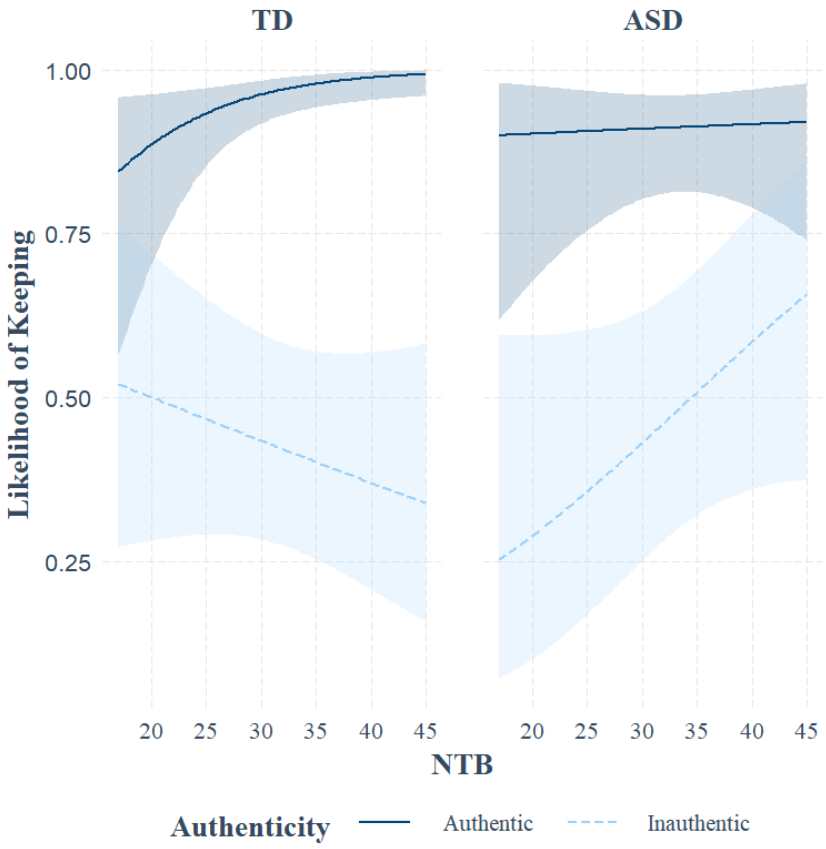

Figure 5. Visualization of the Population x Authenticity x NTB interaction included in the final model predicting likelihood of keeping authentic and inauthentic objects in the 'celebrity owner vs. unknown owner' set.

For the 'historical event' set, a model containing the Population x Authenticity interaction provided the best fit to the observed data (see Table 4). The interaction was deconstructed as described above. Neurotypical adults ($Z = 9.95$, $p < .001$) and autistic adults ($Z = 4.40$, $p < .001$) were both significantly more likely to keep authentic objects than inauthentic objects, with the effect being notably larger for neurotypical adults. While neurotypical adults and autistic adults did not differ in their likelihood of keeping authentic objects ($p = .87$), autistic adults tended to be more likely to keep inauthentic objects ($Z = 1.72$, $p = .08$).

For the ‘designer-branded’ set, a model containing the Population x NTB interaction, plus Authenticity, provided the best fit to the observed data (see Table 4). Both neurotypical adults and autistic adults were significantly more likely to keep authentic items than inauthentic items. The interaction was deconstructed by testing the effect of Population on responses from participants with low and high NTB separately (as described above) and exploring the effect of NTB for each population separately. Whereas neurotypical adults were more likely to keep items as their NTB increased ($Z = 2.28$, $p = .023$), NTB did not significantly influence autistic adults ($p = .53$). Autistic adults with high NTB scores tended to be less likely to keep items than neurotypical adults with high NTB scores ($Z = -1.85$, $p = .064$). Neurotypical adults and autistic adults with low NTB scores did not differ in their likelihood of keeping items ($p = .84$).

Table 4

Summaries of the final binomial generalized linear mixed-effects models (log odds) predicting the likelihood of keeping objects for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Self vs. Unknown owner	Intercept	2.14	0.39	5.54	< .001
	Authenticity	3.65	0.70	5.22	< .001
	AIC	**BIC**	**logLik**	**deviance**	
	637.9	656.6	-315.0	629.9	
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Personally important vs. Unknown owner	Intercept	1.99	0.40	4.92	< .001
	Population	1.02	0.31	3.33	< .001
	Authenticity	2.99	0.77	3.87	< .001
	AIC	**BIC**	**logLik**	**deviance**	
	692.4	715.7	-341.2	682.4	
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	0.01	0.81	0.01	.99
	Population	-0.08	1.57	-0.05	.96
	Authenticity	1.64	1.20	1.37	.17
	NTB	0.04	0.02	1.72	.09
	Population x Authenticity	5.11	2.26	2.26	.024
	Population x NTB	-0.01	0.05	-0.27	.79
	Authenticity x NTB	0.05	0.04	1.32	.19
	Population x Authenticity x NTB	-0.20	0.07	-2.81	.005
	AIC	**BIC**	**logLik**	**deviance**	
	734.4	781.0	-357.2	714.4	
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Historical event vs. Replica	Intercept	1.61	0.22	7.30	< .001
	Population	-0.002	0.44	-0.005	1.00
	Authenticity	3.96	0.35	11.18	< .001
	Population x Authenticity	-1.33	0.57	-2.35	.019
	AIC	**BIC**	**logLik**	**deviance**	
	700	728	-344	688	
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	1.16	0.89	1.30	.19
	Population	2.88	1.75	1.65	.10
	Authenticity	2.51	0.44	5.77	< .001
	NTB	0.03	0.03	1.06	.29
	Population x NTB	-0.10	0.05	-1.93	.054
	AIC	**BIC**	**logLik**	**deviance**	
	674	706.6	-330	660	

How much would you like to own this item?

Participants' responses were coded from 1 ('not at all') to 10 ('extremely'). These data were analyzed using linear mixed-effects models (see Figure 6).

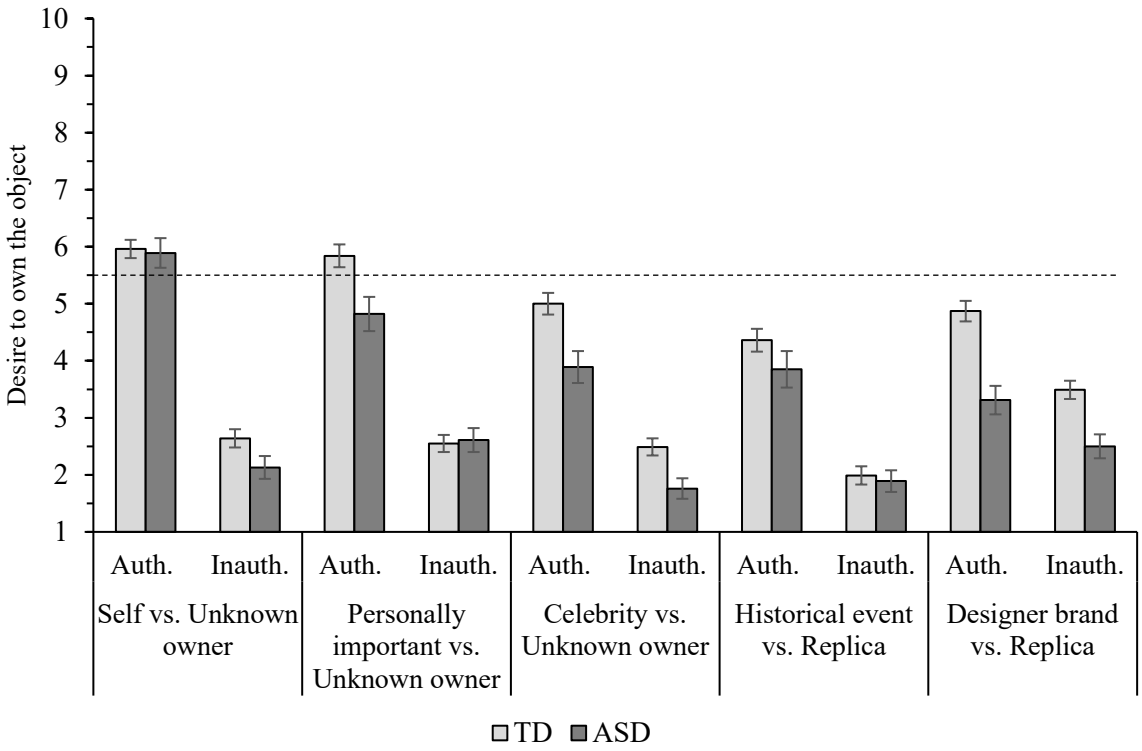

Figure 6. Desire to own authentic and inauthentic items in each stimuli set for adults with typical development (TD) and autistic adults (ASD). Error bars show ±1 SE. Dotted line indicates chance level responding.

For the 'self-owned' set, a model containing Authenticity and NTB as fixed effects provided the best fit to the observed data (see Table 5). Participants in both groups showed greater desire to own authentic items than inauthentic items. As participants' NTB score increased, so too did their desire to own items in this set.

For the 'personally important owner' set, a model containing the Population x Authenticity interaction, plus NTB, provided the best fit to the observed data (see Table 5). Both neurotypical adults and autistic adults showed greater desire to own items in this set as their NTB increased. Both neurotypical adults (t = 5.98, p = .006) and autistic adults (t =

3.64, $p = .011$) showed significantly greater desire to own authentic items than inauthentic items. While the groups did not differ in their desire to own inauthentic items ($p = .86$), neurotypical adults showed significantly greater desire to own authentic items than autistic adults ($t = -2.26$, $p = .026$).

For the 'celebrity owner' set, a model containing Population, Authenticity, and NTB provided the best fit to the observed data (see Table 5). Neurotypical adults showed significantly greater desire to own items than autistic adults. Participants in both groups showed greater desire to own authentic items than inauthentic items. As participants' NTB score increased, so too did their desire to own items in this set.

For the 'historical event' set, a model containing the Authenticity x NTB interaction provided the best fit to the observed data (see Table 5 and Figure 7 for a visualization). Participants with high ($t = 6.41$, $p < .001$) and low ($t = 6.81$, $p < .001$) NTB scores both showed significantly greater desire to own authentic items than inauthentic items. Higher NTB scores were associated with greater desire to own both authentic items ($t = 3.72$, $p < .001$) and inauthentic items ($t = 2.31$, $p = .023$), however, the effect of NTB was larger for authentic items.

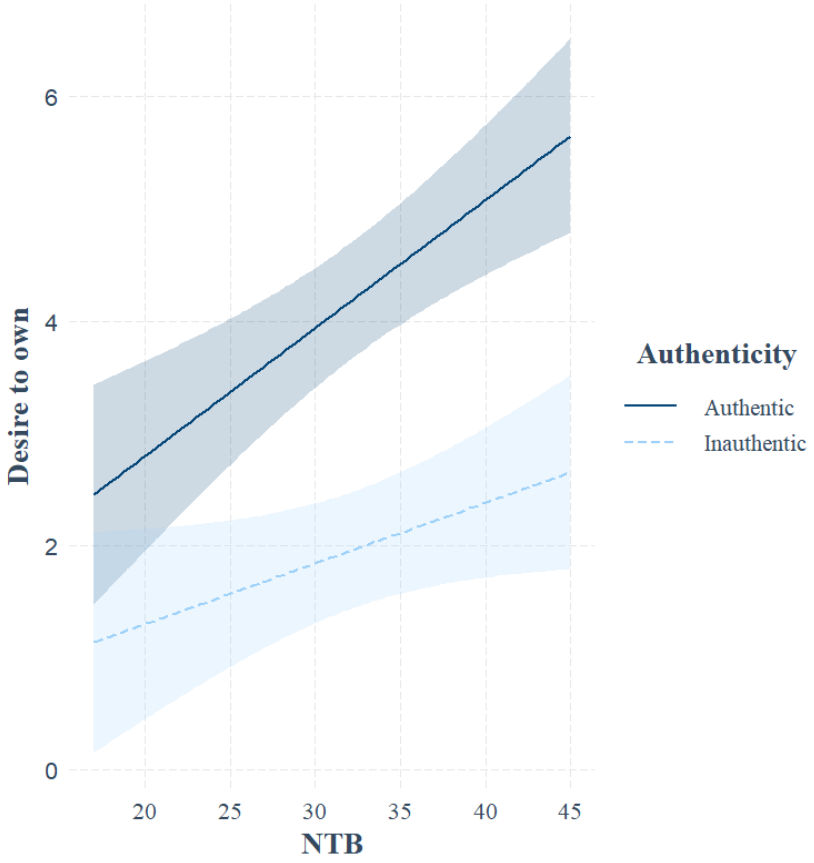

Figure 7. Visualization of the Authenticity x NTB interaction included in the final model predicting desire to own authentic and inauthentic objects in the 'object associated with historical event vs. replica' set.

For the 'designer-branded' set, a model containing Population, Authenticity, and NTB provided the best fit to the observed data (see Table 5). Neurotypical adults showed significantly greater desire to own items than autistic adults. Participants in both groups showed greater desire to own authentic items than inauthentic items. As participants' NTB score increased, so too did their desire to own items in this set.

Table 5

Summaries of the final linear mixed-effects models (log odds) predicting desire to own objects for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Self vs. Unknown owner	Intercept	2.88	0.66	4.35	< .001
	Authenticity	3.46	0.37	9.25	< .001
	NTB	0.04	0.02	2.13	.036
	AIC	**BIC**	**logLik**		**deviance**
	3636.5	3664.4	-1812.2		3624.5
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Personally important vs. Unknown owner	Intercept	1.95	0.81	2.42	.018
	Population	-0.56	0.32	-1.75	.08
	Authenticity	2.75	0.73	3.77	.009
	NTB	0.06	0.02	2.82	.006
	Population x Authenticity	-1.07	0.35	-3.10	.002
	AIC	**BIC**	**logLik**		**deviance**
	3666.6	3703.8	-1825.3		3650.6
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	0.96	0.78	1.23	.22
	Population	-1.01	0.33	-3.10	.002
	Authenticity	2.39	0.50	4.77	.003
	NTB	0.07	0.02	3.22	.002
	AIC	**BIC**	**logLik**		**deviance**
	3574.9	3607.5	-1780.4		3560.9
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Historical event vs. Replica	Intercept	0.36	0.83	0.44	.66
	Authenticity	0.30	0.85	0.35	.73
	NTB	0.08	0.02	3.38	< .001
	Authenticity x NTB	0.06	0.02	2.46	.014
	AIC	**BIC**	**logLik**		**deviance**
	3741.8	3774.4	-1863.9		3727.8
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	0.79	0.80	0.99	.32
	Population	-1.39	0.35	-4.01	< .001
	Authenticity	1.20	0.32	3.72	.011
	NTB	0.08	0.02	3.59	< .001
	AIC	**BIC**	**logLik**		**deviance**
	3568.1	3600.7	-1777.0		3554.1

Would other people be impressed if they knew that you owned this item?

'Yes' was coded as 1 and 'no' was coded as 0. These data were analyzed using binomial generalized linear mixed effects models (see Figure 8).

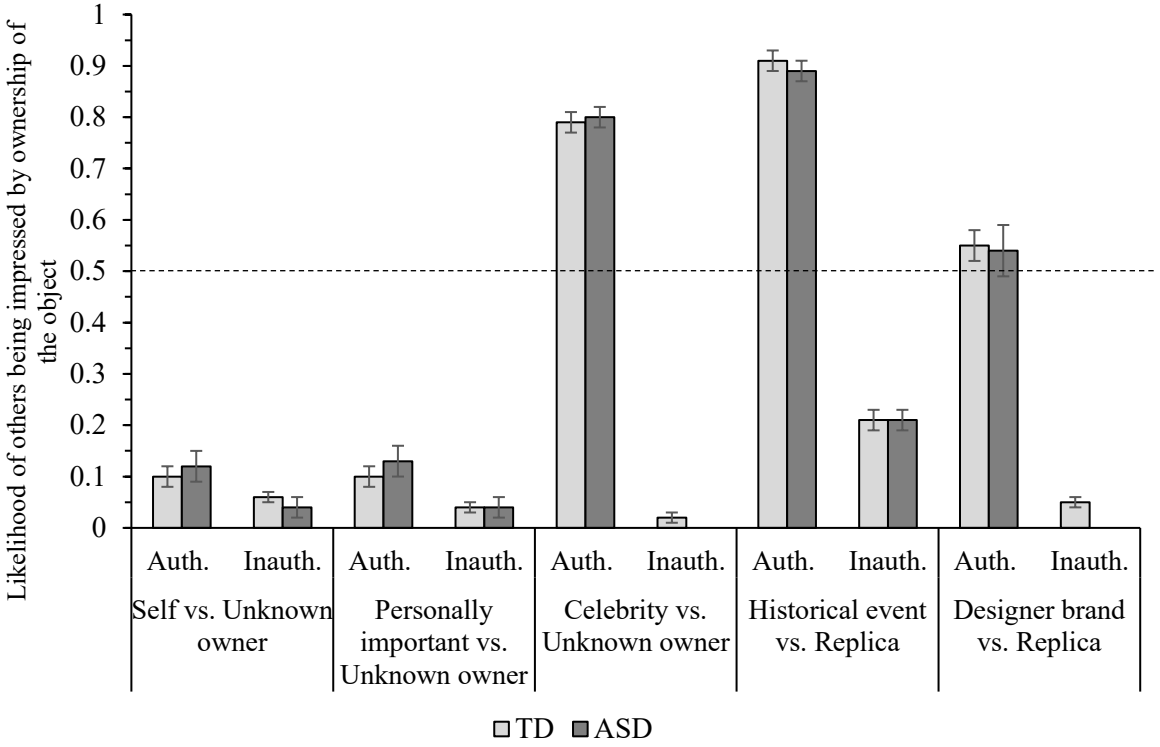

Figure 8. Likelihood of others being impressed by owning authentic and inauthentic items in each stimuli set for adults with typical development (TD) and autistic adults (ASD). Error bars show±1 SE. Dotted line indicates chance level responding.

For the 'self-owned' and 'personally important owner' sets, including fixed effects did not significantly improve fit.

For the 'celebrity owner' set, a model containing effects of Authenticity and NTB provided the best fit to the observed data (see Table 6). Participants in both groups indicated that others would be more impressed by their ownership of authentic items than inauthentic items. As participants' NTB score increased, so too did their belief that others would be impressed by their ownership of items in this set.

For the 'historical event' set, a model containing only Authenticity as a fixed effect provided the best fit to the observed data (see Table 6). Participants in both groups indicated that others would be more impressed by their ownership of authentic items than inauthentic items.

For the 'designer-branded' set, a model containing only Authenticity as a fixed effect provided the best fit to the observed data (see Table 6). Participants in both groups indicated that others would be more impressed by their ownership of authentic items than inauthentic items.

Table 6

Summaries of the final binomial generalized linear mixed-effects models (log odds) predicting the likelihood of others being impressed by owning objects for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	-4.85	1.60	-3.03	.002
	Authenticity	9.03	0.91	9.93	< .001
	NTB	0.10	0.05	2.07	.038
		AIC	**BIC**	**logLik**	**deviance**
		401.4	424.7	-195.7	391.4
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Historical event vs. Replica	Intercept	0.67	0.25	2.66	.008
	Authenticity	5.99	0.38	15.96	< .001
		AIC	**BIC**	**logLik**	**deviance**
		572.9	591.6	-282.5	564.9
	Fixed effects	**Estimated coefficient**	**Std. error**	***Z***	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	-2.49	0.41	-6.08	< .001
	Authenticity	5.70	0.73	7.78	< .001
		AIC	**BIC**	**logLik**	**deviance**
		561.8	580.5	-276.9	553.8

Would owning this item make you feel happy?

Participants' responses were coded as follows: 'extremely unhappy = 1, 'somewhat unhappy = 2, 'neither happy nor unhappy = 3, 'somewhat happy = 4, and 'extremely happy = 5. These data were analyzed using linear mixed-effects models (see Figure 9).

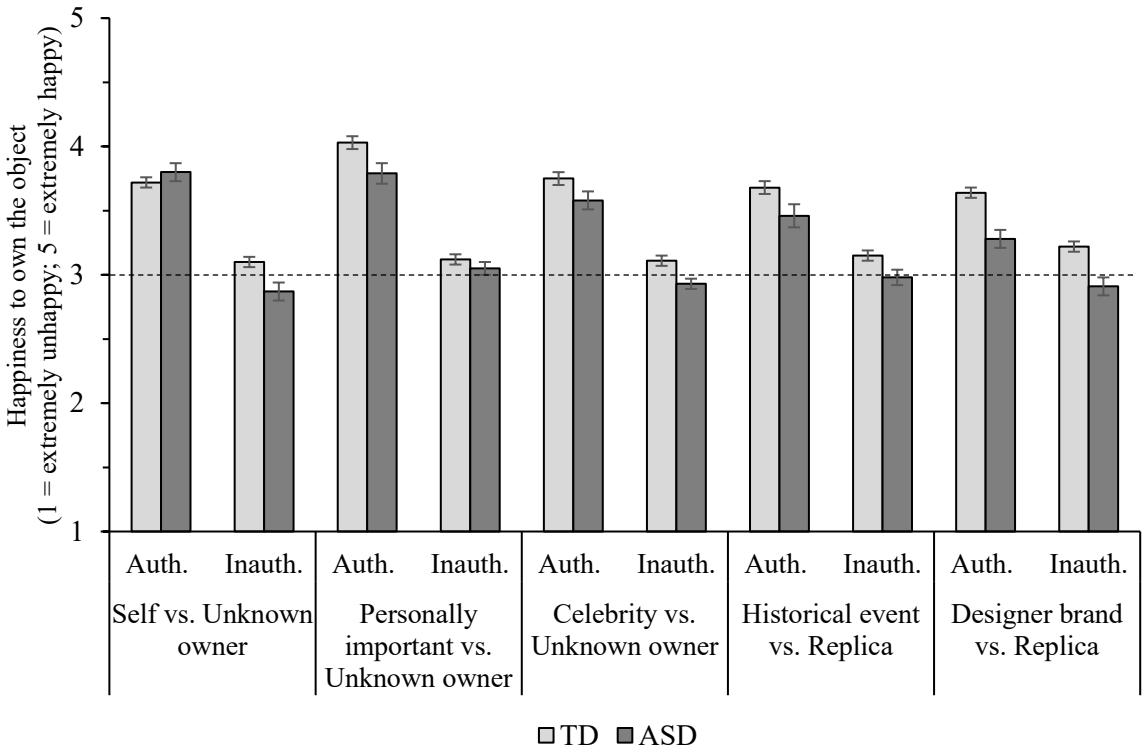

Figure 9. Happiness to own authentic and inauthentic items in each stimuli set for adults with typical development (TD) and adults with autism spectrum disorder (ASD). Error bars show±1 SE. Dotted line indicates chance level responding.

For the 'self-owned' set, a model containing the Population x Authenticity and Authenticity x NTB interactions provided the best fit to the observed data (see Table 7). Both neurotypical adults ($t = 4.67$, $p = .004$) and autistic adults ($t = 10.21$, $p < .001$) indicated greater happiness to own authentic items than inauthentic items. While the groups did not significantly differ in their happiness to own authentic items ($p = .42$), autistic adults indicated that they would be significantly less happy to own inauthentic items than neurotypical adults ($t = -2.26$, $p = .026$).

Participants with high ($t = 7.35$, $p < .001$) and low ($t = 4.71$, $p = .003$) NTB scores both indicated greater happiness to own authentic items than inauthentic items. However, the influence of NTB on happiness to own objects differed in direction for authentic and inauthentic items; higher NTB scores tended to be associated with greater happiness to own authentic items ($t = 0.97$) and lower happiness to own inauthentic objects ($t = -1.67$).

For the 'personally important owner' set, a model containing Population and Authenticity provided the best fit to the observed data (see Table 7). Neurotypical adults indicated significantly greater happiness to own items in this set than autistic adults and participants across groups were happier to own authentic items than inauthentic items.

For the 'celebrity owner' set, a model containing the Authenticity x NTB interaction, plus Population, provided the best fit to the observed data (see Table 7). Neurotypical adults indicated significantly greater happiness to own items in this set than autistic adults. Participants with high ($t = 6.04$, $p < .001$) and low ($t = 4.26$, $p = .005$) NTB scores both indicated greater happiness to own authentic items than inauthentic items. For authentic items, there was a borderline significant effect of NTB – participants with higher scores indicated greater happiness to own ($t = 1.83$, $p = .069$). For inauthentic items, there was no effect of NTB ($p = .99$).

For the 'historical event' set, a model containing the Authenticity x NTB interaction, plus Population, provided the best fit to the observed data (see Table 7). Neurotypical adults indicated significantly greater happiness to own items in this set than autistic adults. Participants with high ($t = 4.67$, $p = .003$) and low ($t = 3.98$, $p = .008$) NTB scores both indicated greater happiness to own authentic items than inauthentic items. Participants with higher NTB scores indicated greater happiness to own authentic items than participants with lower scores ($t = 2.57$, $p = .011$). There was no effect of NTB for inauthentic items ($p = .36$).

For the ‘designer-branded’ set, a model containing Population, Authenticity, and NTB provided the best fit to the observed data (see Table 7). Neurotypical adults indicated significantly greater happiness to own items in this set than autistic adults. Participants indicated significantly greater happiness to own authentic items than inauthentic item. As participants’ NTB score increased, so too did their happiness to own items in this set.

Table 7

Summaries of the final linear mixed-effects models (log odds) predicting happiness to own objects for each stimuli set.

	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Self vs. Unknown owner	Intercept	3.44	0.17	19.88	< .001
	Population	-0.07	0.07	-0.99	.32
	Authenticity	0.23	0.24	0.98	.33
	NTB	-0.002	0.005	-0.43	.67
	Population x Authenticity	0.29	0.09	3.10	.002
	Authenticity x NTB	0.02	0.006	2.61	.009
		AIC	**BIC**	**logLik**	**deviance**
		1575.2	1617.2	-778.6	1557.2
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Personally important vs. Unknown owner	Intercept	3.50	0.09	38.83	< .001
	Population	-0.16	0.07	-2.17	.032
	Authenticity	0.86	0.17	5.03	.002
		AIC	**BIC**	**logLik**	**deviance**
		1658.8	1686.8	-823.4	1646.8
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Celebrity vs. Unknown owner	Intercept	3.08	0.16	18.94	< .001
	Population	-0.19	0.07	-2.86	.005
	Authenticity	0.20	0.23	0.85	.40
	NTB	0.008	0.005	1.80	.075
	Authenticity x NTB	0.01	0.006	2.29	.02
		AIC	**BIC**	**logLik**	**deviance**
		1493.9	1531.2	-738.9	1477.9
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Historical event vs. Replica	Intercept	2.88	0.20	14.38	< .001
	Population	-0.21	0.09	-2.49	.014
	Authenticity	0.08	0.24	0.35	.73
	NTB	0.01	0.006	2.34	.021
	Authenticity x NTB	0.01	0.007	2.05	.041
		AIC	**BIC**	**logLik**	**deviance**
		1649	1686.3	-816.5	1633
	Fixed effects	**Estimated coefficient**	**Std. error**	***t***	**Pr(> |z|)**
Designer brand vs. Replica	Intercept	2.90	0.18	16.03	< .001
	Population	-0.35	0.08	-4.47	< .001
	Authenticity	0.40	0.09	4.29	.005
	NTB	0.01	0.005	2.09	.038
		AIC	**BIC**	**logLik**	**deviance**
		1628.3	1661.0	-807.2	1614.3

Discussion

In childhood, ASD elicits differences in various facets of ownership-related cognition, including diminished sensitivity to immaterial authentic qualities when valuing objects (Hartley et al., 2020, 2021; Hartley & Bird, 2022; Hartley & Fisher, 2018a). This study investigated whether reduced concern for object authenticity could be a long-term characteristic of autistic development that endures into adulthood. Across conditions and questions, neurotypical and autistic adults consistently favored authentic over inauthentic objects. However, the effect of authenticity was often weaker for autistic adults, who tended to regard inauthentic objects more favorably than neurotypical adults (as previously observed in autistic children). For both populations, higher NTB scores were associated with stronger preferences for authentic objects in several conditions and, occasionally, inauthentic objects too. Population rarely interacted with NTB, with the exception that autistic adults with high NTB were less likely to keep items in the designer-branded condition and more likely to keep inauthentic items in the celebrity owner condition. However, multiple between-population differences were detected in conditions involving objects belonging to personally important owners, objects belonging to celebrities, and designer-branded objects. Moreover, neurotypical adults were consistently happier to own objects than autistic adults. Together, these results support the hypothesis that sensitivity to authenticity is developmentally delayed in ASD, but also suggest that some early differences in how autistic children value authentic objects may endure into adulthood.

Reviewing the two groups' responses across questions and conditions reveals a profile of similarities and differences that may elucidate the influence of ASD on sensitivity to object authenticity over the course of development. On one hand, autistic and neurotypical participants demonstrated equivalent understanding of how various authentic qualities mediate the economic value of objects, and how ownership of authentic objects can influence

the perceptions of others. These findings contrast with evidence from developmental studies showing that autistic children aged 6-13 years do not assign higher values to items with special ownership histories (Hartley et al., 2020), and suggest that sensitivity to abstract authentic qualities is developmentally delayed in ASD. For autistic children, the psychological importance of property ownership may be diminished by differences in developing an extended self, and differences in social skills may inhibit their ability to learn ownership norms through interactions with others (Hartley et al., 2021). As a result, autistic children might be relatively insensitive to abstract authentic qualities and instead value objects based on their tangible properties. However, it may be that autistic individuals catch up with neurotypical peers in terms of recognizing the value of authenticity as development in these domains gradually unfolds over time. It is possible that an emerging sensitivity to authenticity, and heightened interest in the social influence of property ownership, are linked to a significant increase in NTB that occurs for many autistic individuals during adolescence (Deckers et al., 2017). Indeed, our autistic and neurotypical samples did not differ on NTB score, and most significant NTB effects did not differ between samples (of fourteen significant NTB effects, just two involved an interaction with population). Thus, we recommend that future research directly investigates whether differences in sensitivity to authenticity between autistic children and adults can be attributed to development in NTB.

Yet, despite their awareness of authenticity's cultural value, our data suggest that autistic adults nonetheless differ from neurotypical adults in their subjective evaluations of objects. In comparison to neurotypical adults, we observed that autistic adults rated authentic objects less favorably, rated inauthentic objects more favorably, and indicated less happiness associated with owning objects. Hence, our findings suggest that the psychological influence of ownership, and the drive to own authentic objects in particular, may be weaker across the lifetime of autistic individuals. Between-population differences were most apparent in the

'personally important owner', 'celebrity owner', and 'designer-branded' conditions. The less favorable evaluations for objects associated with special people may reflect a reduced need to form attachments to items that serve as psychological substitutes for in-person relationships, perhaps due to broader differences in social interaction that characterize ASD. However, our groups' NTB scores indicate that they were similarly socially-motivated, perhaps weakening this account.

Alternatively, a possibility that warrants further investigation is that autistic children and adults are less influenced by inauthenticity associated with ownership history and designer branding due to increased rationality. It has been proposed that autistic individuals are more likely than neurotypical individuals to engage in rational and bias-free decision making, analyzing all available information rather than being influenced by an intuitive heuristic (Rozenkrantz et al., 2021). For example, despite their explicit awareness and knowledge of common social stereotypes, autistic adults tend to demonstrate less stereotypical attitudes in Implicit Association Tests (e.g. Kirchner et al., 2012). Also, in the resource sharing Ultimatum Game, autistic individuals are significantly more likely than neurotypical peers to accept unfair offers from a partner – the economically-rational response that sees both parties receive at least some reward (whereas rejection based on fairness norms results in neither party receiving any reward; Hartley & Fisher, 2018b; Sally & Hill, 2006). In the present study, autistic adults clearly understood the value and social importance of various immaterial authentic qualities, but were less influenced by these factors when evaluating objects. For neurotypical adults, unless an object's previous owner has a special identity (i.e. they are a beloved relative or famous celebrity), the prospect of owning or keeping items that represent the identity of an unknown person may not be desirable. However, autistic adults may not have been as strongly biased by immaterial associations with unknown others when evaluating objects. Considering that the authentic and inauthentic

objects in each trial were identical (i.e. they appeared equivalent in terms of their newness, functionality, and material qualities), a weaker effect of authenticity on subjective metrics could be interpreted as evidence of more rational thinking in autism and a potential strength of this population.

Our data reveal the variety of objects that autistic adults consider to be authentic and how contrasting authentic qualities may differ in their influences. They also present a response profile for future studies involving autistic children to draw developmental comparisons with. Both groups almost always stated that authentic items associated with celebrities, historical events, and designer brands were more valuable than their comparators. These responses may have been influenced by factual knowledge that consumers often pay higher prices to acquire items with these culturally significant authentic qualities (Gelman et al., 2015). Our participants were much more likely to assign equivalent values to items associated with the self or personally important relations and their comparators, demonstrating awareness that these authentic qualities do not usually influence an object's market value. Nevertheless, authentic objects in these two conditions were still significantly more likely to receive higher values than identical objects belonging to unknown owners. Our participants' heightened valuation of objects associated with the self reflects the findings of many developmental behavioral studies documenting ownership effects (e.g. Harbaugh et al., 2001) and supports the extended-self hypothesis (Belk, 1988). Association with a beloved relative may also be sufficient to increase the perceived monetary value of an object, albeit to a lesser degree than association with a famous owner. Importantly, these results are the first to show that autistic adults are just as likely to assign higher values to realistic objects with immaterial authentic qualities as neurotypical adults.

Our participants' responses to the 'likelihood of buying' question indicate that ASD may influence perceptions of designer branding. Neither group was significantly more likely

to purchase authentic designer-branded items over identical replicas, but neurotypical participants were significantly more likely to buy both kinds of item than autistic participants. For neurotypical children and adults, the decision to purchase high-end designer goods – which serve as symbols for identity and group membership – may be principally motivated by a desire to boost their social status, facilitate relationship building, and influence the behavior of others (Nelissen & Meijers, 2011). However, as the costs of acquiring luxury designer-branded items can be prohibitively expensive, many consumers consciously purchase goods that bear an extremely close resemblance for much lower prices (Wilcox et al., 2009). By virtue of their appearance, purchasing items that resemble designer goods may represent a satisfactory route to fulfilling neurotypical individuals' self-presentational and social goals (particularly if others erroneously perceive them to be authentic). This hypothesis is supported by our finding that likelihood of buying designer-branded items and identical replicas increased with participants' NTB. As a similar effect was observed in the 'celebrity owner' condition, it may be that mere association with a famous owner or designer brand – rather than genuine authenticity – is sufficient to preferentially influence the purchasing decisions of individuals with high NTB. Conversely, our between-group comparisons provided the first evidence that autistic adults are less likely to purchase designer-branded goods and their lookalikes. It may be that autistic children and adults experience less desire to purchase products that serve as status symbols (despite their awareness that others would be impressed by their ownership of such items) due to heightened rationality or differences in their experience of the extended self, however, these hypotheses require validation in future research and examination in developmental populations.

Both neurotypical and autistic adults were significantly more likely to keep authentic items in all conditions, excluding designer-branded objects. Unlike inauthentic objects in the other conditions, items resembling designer products may be worth keeping because they are

perceived to serve similar social functions as their genuine counterparts (Wilcox et al., 2009). In line with Hartley et al. (2020), we observed that autistic adults were more likely to keep inauthentic objects than neurotypical adults (TD overall $M = 0.51$; ASD overall $M = 0.59$). These findings strengthen the theory that, like autistic children, autistic adults have greater and more economically rational appreciation for objects that lack authentic qualities.

Both populations indicated significantly greater desire to own items associated with the self, a celebrity, or a designer brand than inauthentic comparators. Neurotypical adults showed greater desire to own authentic items associated with cherished relatives than autistic adults, who also showed reduced liking of items in the 'celebrity owner' and 'designer-branded' conditions regardless of authenticity. In keeping with prior literature, these findings demonstrate that authenticity reliably influences ownership aspirations (Frazier et al., 2009). In every condition, participants with higher NTB indicated significantly greater desire to own both authentic and inauthentic objects, corroborating claims that a robust association exists between ownership aspirations and motivation to forge and maintain social relationships (Newman & Smith, 2016a). However, our results also suggest that autistic individuals generally experience less desire to own certain kinds of items that may be acquired with the intention of impressing others (e.g. objects directly or indirectly associated with celebrities or designer brands).

As participants' NTB score increased, so too did their happiness to own authentic items associated with the self, celebrity owners, and famous historical events, and both authentic and inauthentic items in the 'designer-branded' condition. Viewed alongside participants' responses to the 'like to own question', it appears that high NTB increases desire to own property in general, but amplifies the pleasure experienced from owning authentic objects specifically. It may be that people with high NTB feel more intimately attached to their property, increasing the influence of authentic object ownership on their

happiness and self-esteem. In addition, they may derive greater pleasure from the belief that owning authentic items (and inauthentic items that resemble designer goods) will influence how they are perceived by others. Independent of the NTB effect, in four out of five conditions, autistic participants were significantly less happy to own objects than neurotypical participants regardless of authenticity. This effect of ASD on ownership happiness represents the most consistent between-group difference observed across questions and suggests that the influence of ownership on emotional states is much weaker for autistic adults.

Both autistic and neurotypical adults indicated that other people would be impressed by their ownership of authentic objects associated with celebrities, famous historical events, and designer brands. These responses reflect the common belief that items with these authentic qualities are symbols of social status that can influence how their owners are perceived (Nelissen & Meijers, 2011). Conversely, participants did not think that others would be impressed by objects associated with themselves or their relatives. The absence of authenticity effects in these conditions demonstrates awareness that objects that hold special value on a personal level would not necessarily retain their privileged status in the eyes of others, particularly if the object's ownership history is not meaningful to them. In line with Hartley et al. (2020), we found that autistic adults were just as likely to believe that others would be impressed by their ownership of authentic objects as neurotypical adults. Therefore, by adulthood, many autistic individuals are clearly aware that people evaluate one another based on their property and that ownership of authentic items is a signal of social status (Belk, 1988).

We must reflect on the limitations of this research. Firstly, as this study was conducted online during the covid-19 pandemic, we were only able to collect limited information regarding our participants' characteristics and were unable to match our samples

on cognitive or linguistic ability. As such, it is possible that the observed between-group differences could be underpinned by differences in general intellectual functioning rather than autism. Secondly, we did not measure participants' socioeconomic status. As autistic adults are less likely to be employed and more likely to be living with their parents than neurotypical peers (Rogge & Janssen, 2019), it is possible that financial differences influenced the responding of the two groups. However, given that most of our participants were students currently attending the same University, we are confident that our autistic participants had the intellectual capacity to fully comprehend the task and differences in socioeconomic status may be somewhat lessened in comparison to entirely non-student samples. However, these factors ought to be accounted for in future research of this nature. Thirdly, participants were required to evaluate pictures of hypothetical objects with imaginary authentic qualities rather than actual objects with genuine authentic qualities. It is therefore conceivable that administering the study in person with real stimuli, or asking participants to evaluate genuine authentic objects, may yield a different profile of results. However, our methods were in keeping with many prior studies in the field and yielded effects that suggest our participants interpreted stimuli as intended. Fourthly, we acknowledge that autistic adults may have very strong preferences for certain authentic items (e.g. that relate to special interests); our theoretical proposals concerning the interaction between ASD and authenticity are intended to be general. Finally, it is possible that participants' evaluations of authentic objects in the 'historical events' condition were influenced by associations with famous individuals involved in those events. Although different significant effects were identified in the 'historical events' and 'celebrity owner' conditions for almost every question, we cannot tease apart which factors related to authenticity bestowed by history alone and which may have potentially related to celebrity association.

Conclusions

The present study suggests that reduced sensitivity to immaterial authentic qualities observed in autistic children may be due to a developmental delay that largely alleviates by adulthood, potentially due to increasing NTB (which seems to influence autistic and neurotypical adults in very similar ways). Our findings reveal that autistic and neurotypical adults do not differ in their awareness that authenticity determines the monetary worth of objects and others' perceptions of their owners. However, the influence of authenticity, and object ownership more broadly, appears to be somewhat suppressed in autistic adults (particularly for items associated with relatives, celebrities, and designer brands). Together, these findings suggest that while sensitivity to the value of authenticity may be developmentally delayed, differences in subjective evaluations of some authentic objects may be lifelong characteristics of ASD. Across both populations, higher NTB scores were associated with increased desire to own objects and increased happiness associated with owning authentic objects specifically, suggesting that decisions concerning property ownership and consumption of authentic items may be socially motivated in both neurotypical and autistic development. We recommend that future research examines changes in sensitivity to object authenticity between childhood, adolescence, and adulthood in autistic development using direct comparisons between age groups or longitudinal designs, and establishes the reliability of our findings through replication.

References

American Psychiatric Association. (APA, 2013). *Diagnostic and statistical manual of mental health disorders* (5th ed.). Washington, DC: APA.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of autism and developmental disorders*, *31*(1), 5–17.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). lme4: Linear mixed-effects models using Eigen and S4. R package version 1.1–7. 2014. *Institute for Statistics and Mathematics of WU website*. http://CRAN.R-project.org/package=lme4.

Belk, R. W. (1985). Materialism: Trait aspects of living in the material world. *Journal of Consumer Research, 12*, 265–280.

Belk, R. W. (1988). Possessions and the extended self. *Journal of Consumer Research, 15*, 139–168.

Belk, R. W. (2000). Are we what we own? In: Benson, A. (Ed.), *I shop therefore I am: Compulsive buying and the search for self* (pp. 76-104). London/New York: Jason Aronson.

Bian, Q., & Forsythe, S. (2012). Purchase intention for luxury brands: A cross cultural comparison. *Journal of Business Research*, *65*(10), 1443-1451. http://dx.doi.org/10.1016/j.jbusres.2011.10.010

Brock, T. C. (1968). Implications of commodity theory for value change. In A. G. Greenwald, T. C. Brock, & T. M. Ostrom (Eds.), *Psychology foundations of attitudes* (pp 243–275). New York: Academic Press.

Calder, L., Hill, V., & Pellicano, E. (2013). 'Sometimes I want to play by myself': Understanding what friendship means to children with autism in mainstream primary schools. *Autism*, *17*(3), 296-316. http://dx.doi.org/10.1177/1362361312467866

Chamberlain, B., Kasari, C., & Rotheram-Fuller, E. (2007). Involvement or isolation? The social networks of children with autism in regular classrooms. *Journal of autism and developmental disorders*, *37*(2), 230-242. http://dx.doi.org/10.1007/s10803-006-0164-4

Chevallier, C., Kohls, G., Troiani, V., Brodkin, E. S., & Schultz, R. T. (2012). The social motivation theory of autism. *Trends in Cognitive Science, 16*, 231–239. doi:https://doi.org/10.1016/j.tics.2012.02.007.

Csikszentmihalyi, M. (1993). "Why We Need Things." In: S. Lubar, & W. D. Kingery (Eds.), *History from Things: Essays on Material Culture* (pp. 20-29). Smithsonian Books.

Cummins, D. (2005). Dominance, status, and social hierarchies. In D. M. Buss (Ed.), *The handbook of evolutionary psychology* (pp. 676–697). John Wiley & Sons.

Curasi, C. F., Price, L. L., & Arnould, E. J. (2004). How individuals' cherished possessions become families' inalienable wealth. *Journal of consumer research*, *31*(3), 609-622. http://dx.doi.org/10.1086/425096

Deckers, A., Muris, P., & Roelofs, J. (2017). Being on your own or feeling lonely? Loneliness and other social variables in youths with autism spectrum disorders. *Child Psychiatry & Human Development*, *48*(5), 828-839. http://dx.doi.org/10.1007/s10578-016-0707-7

Deckers, A., Roelofs, J., Muris, P., & Rinck, M. (2014). Desire for social interaction in children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *8*(4), 449-453. http://dx.doi.org/10.1016/j.rasd.2013.12.019

Diesendruck, G., & Perez, R. (2015). Toys are me: Children's extension of self to objects. *Cognition, 134*, 11-20. doi:10.1016/j.cognition.2014.09.010.

Dittmar, H. (1992). *The social psychology of material possessions: To have is to be*. Hemel Hempstead, UK/New York: Harvester Wheatsheaf/St. Martin's Press

Doob, A. N., & Gross, A. E. (1968). Status of frustrator as an inhibitor of horn-honking responses. *The Journal of social psychology*, *76*(2), 213-218. http://dx.doi.org/10.1080/00224545.1968.9933615

Forsythe, S. M. (1991). Effect of private, designer, and national brand names on shoppers' perception of apparel quality and price. *Clothing and Textiles Research Journal*, *9*(2), 1-6. http://dx.doi.org/10.1177/0887302X9100900201

Frazier, B. N., Gelman, S. A., Wilson, A., & Hood, B. M. (2009). Picasso paintings, moon rocks, and hand-written Beatles lyrics: Adults' evaluations of authentic objects. *Journal of Cognition and Culture, 9(1)*, 1–14. doi:http://dx.doi.org/10.1016/j.cogdev.2009.06.003.

Gelman, S. A., Frazier, B. N., Noles, N. S., Manczak, E. M., & Stilwell, S. M. (2015). How much are Harry Potter's glasses worth? Children's monetary evaluation of authentic objects. *Journal of Cognition and Development*, *16*, 97-117. doi:http://dx.doi.org/10.1080/15248372.2013.815623.

Harbaugh, W. T., Krause, K., & Vesterlund, L. (2001). Are adults better behaved than children? Age, experience, and the endowment effect. *Economic Letters, 70*, 175–181. doi:10.1016/S0165-1765(00)00359-1.

Hartley, C. & L-A., Bird. (2022). Exploring the influence of object similarity and desirability on children's ownership identification and preferences in autism and typical development. *Journal of Autism and Developmental Disorders*. https://link.springer.com/article/10.1007/s10803-022-05489-z

Hartley, C., & Fisher, S. (2018a). Mine is better than yours: Investigating the ownership effect in children with autism spectrum disorder and typically developing children. *Cognition*, 26–36. doi:https://doi.org/10.1016/j.cognition.2017.11.009

Hartley, C., & Fisher, S. (2018b). Do children with autism spectrum disorder share fairly and reciprocally? *Journal of Autism and Developmental Disorders, 48,* 2714–2726. http://dx.doi.org/10.1007/s10803-018-3528-7

Hartley, C., Fisher, S., & Fletcher, N. (2020). Exploring the influence of ownership history on object valuation in typical development and autism. *Cognition*. doi:http://dx.doi.org/10.1016/j.cognition.2020.104187

Hartley, C., Harrison, N., & Shaw, J. J. (2021). Does autism affect children's identification of ownership and defence of ownership rights? Journal of Autism and Developmental Disorders, 1-12. https://doi.org/10.1007/s10803-021-04872-6

Jang, W. E., Ko, Y. J., Morris, J. D., & Chang, Y. (2015). Scarcity message effects on consumption behavior: Limited edition product considerations. *Psychology & Marketing*, *32*(10), 989-1001. doi:10.1002/mar.20836

Kanngiesser, P., Rossano, F., & Tomasello, M. (2015). Late emergence of the first possession heuristic: Evidence from a small-scale culture. *Child Development, 86*, 1282–1289. http://dx.doi.org/10.1111/cdev.12365.

Kirchner, J. C., Schmitz, F., & Dziobek, I. (2012). Brief report: stereotypes in autism revisited. *Journal of Autism and Developmental Disorders*, *42*(10), 2246-2251. http://dx.doi.org/10.1007/s10803-012-1460-9

Lasgaard, M., Nielsen, A., Eriksen, M. E., & Goossens, L. (2010). Loneliness and social support in adolescent boys with autism spectrum disorders. *Journal of autism and developmental disorders*, *40*(2), 218-226. http://dx.doi.org/10.1007/s10803-009-0851-z

Leary, M. R., Kelly, K. M., Cottrell, C. A., & Schreindorfer, L. S. (2013). Construct validity of the need to belong scale: Mapping the nomological network. *Journal of personality assessment*, *95*(6), 610-624. http://dx.doi.org/10.1080/00223891.2013.819511

Lind, S. E. (2010). Memory and the self in autism: A review and theoretical framework. *Autism, 14*, 430-456. doi:10.1177/1362361309358700.

Lord, C., Rutter, M., DiLavore, P. C., Risi, S., Gotham, K., Bishop, S. (2012). Autism diagnostic observation schedule, second edition. Torrance, CA: Western Psychological Services.

Manning, J., Billian, J., Matson, J., Allen, C., & Soares, N. (2021). Perceptions of families of individuals with autism spectrum disorder during the COVID-19 crisis. *Journal of autism and developmental disorders*, *51*(8), 2920-2928. http://dx.doi.org/10.1007/s10803-020-04760-5

McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Journal of autism and developmental disorders*, *32*(5), 351-372. https://doi.org/10.1023/A:1020537805154

Miller, G. (2009). *Spent: Sex, evolution, and consumer behavior*. Penguin.

Nelissen, R. M., & Meijers, M. H. (2011). Social benefits of luxury brands as costly signals of wealth and status. *Evolution and human behavior*, *32*(5), 343-355. http://dx.doi.org/10.1016/j.evol humbehav.2010.12.002

Newman, G. E. (2019). The psychology of authenticity. *Review of General Psychology*, *23*(1), 8-18. http://dx.doi.org/10.1037/gpr0000158

Newman, G. E., & Bloom, P. (2012). Art and authenticity: The importance of originals in judgments of value. *Journal of Experimental Psychology: General*, *141*(3), 558. http://dx.doi.org/10.1037/a0026035

Newman, G. E., Diesendruck, G., & Bloom, P. (2011). Celebrity contagion and the value of objects. *Journal of Consumer Research, 38(2)*, 215–228. doi:http://www.jstor.org/stable/10.1086/658999.

Newman, G. E., & Smith, R. K. (2016a). The need to belong motivates demand for authentic objects. *Cognition*, *156*, 129-134. http://dx.doi.org/10.1016/j.cognition.2016.08.006

Newman, G. E., & Smith, R. K. (2016b). Kinds of authenticity. *Philosophy Compass*, *11*(10), 609-618. http://dx.doi.org/10.1111/phc3.12343

Rogge, N., & Janssen, J. (2019). The economic costs of Autism Spectrum Disorder: A literature review. *Journal of Autism and Developmental Disorders, 49*(7), 1573- 3432. http://dx.doi.org/10.1007/s10803-019-04014-z

Rozenkrantz, L., D'Mello, A. M., & Gabrieli, J. D. (2021). Enhanced rationality in autism spectrum disorder. *Trends in cognitive sciences*, *25*(8), 685-696. http://dx.doi.org/10.1016/j.tics.2021.05.004

Saad, G. (2007). *The evolutionary bases of consumption*. Psychology Press.

Sally, D., & Hill, E. (2006). The development of interpersonal strategy: Autism, theory-of-mind, cooperation and fairness. *Journal of economic psychology*, *27*(1), 73-97. http://dx.doi.org/10.1016/j.joep.2005.06.015

Van Kempen, L. (2004). Are the poor willing to pay a premium for designer labels? A field experiment in Bolivia. *Oxford Development Studies*, *32*(2), 205-224. http://dx.doi.org/10.1080/1360081042000169957

Wilcox, K., Kim, H. M., & Sen, S. (2009). Why do consumers buy counterfeit luxury brands? *Journal of marketing research*, *46*(2), 247-259. http://dx.doi.org/10.1509/jmkr.46.2.247

Workman, J. E. (1988). Trait inferences based on perceived ownership of designer, brand name, or store brand jeans. *Clothing and Textiles Research Journal*, *6*(2), 23-29. http://dx.doi.org/10.1177/0887302X8800600204