Dead Ringer? Visitors' Understanding of Taxidermy as Authentic and Educational Museum Exhibits

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About the Author

Dr Louise Bunce is a Chartered Psychologist and works as a Senior Lecturer in Human Development. Her research explores children's developing concept of what is 'real' and the effect of engaging in fantasy on cognitive development. She would be delighted to hear from museum professionals regarding their experiences that relate to this research to learn more about ways to help visitors understand authenticity.

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Abstract

Museum professionals value authentic museum specimens because they are believed to promote inspirational and educational experiences for visitors; however, limited research has tested whether visitors value museum specimens in these ways. In this study, 4- to 10-year-olds and adults (n = 228), who were visiting the Oxford University Museum of Natural History, were asked to explain whether a taxidermied rabbit belonged in a museum and could help museum visitors learn about rabbits. Participants responded about a taxidermied rabbit that was presented either as a touchable object, inside an exhibition case, or alongside a realistic soft toy rabbit. As expected, the number of visitors who thought that the taxidermied rabbit belonged in a museum and could help visitors learn about rabbits increased with age and was greater when it was presented alongside the toy rabbit. Visitors explained their decisions by referring to the stillness of a taxidermied animal that permitted detailed study, its authentic features, and its previous status as a living animal. Implications for promoting visitors' understanding of museum taxidermy are discussed.

Keywords: authenticity, living/non-living distinction, museums, informal learning environments, taxidermy

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Museum professionals believe that physical encounters with real, authentic specimens foster awe-inspiring reactions among visitors that promote curiosity, engagement, and critical reflection beyond that offered by replicas (Bunce, in press; Eberbach & Crowley, 2005; Evans, Mull, & Poling, 2002; Hampp & Schwan, 2014; Kirchberg & Tröndle, 2012; Leinhardt & Crowley, 2002; Roberts, 1997; Watson & Werb, 2013). Lack of appreciation of authenticity is thought to undermine not only the aesthetic value of a museum visit but interfere with potential educational gains. It is surprising, therefore, that almost no empirical research has investigated how visitors interpret collections in natural history institutions in relation to their value as authentic and educational biofacts (objects of natural history).

In a recent publication based on a series of seminars aimed at creating a learning research agenda for natural history institutions, museum practitioners and academics agreed that concerns about authenticity and how much it matters are increasingly important in a digital world (Dillon et al., 2016). The report also emphasised the need to know more about how visitors interpret and engage with natural history collections and how this influences their learning. The current study is an attempt to start to address some of these issues. The aim was to assess museum visitors' beliefs about the museum-worthy and educational value of animal taxidermy that was on display in a natural history museum.

One of the few empirical studies that has investigated adults' understanding of the museum worthy nature of authentic objects was conducted by Frazier, Gelman, Wilson, and Hood (2009). They asked 244 undergraduates whether a variety of objects that could be viewed as authentic by virtue of their uniqueness or historical or personal significance belonged in a museum. Participants judged historically significant objects (e.g., a dinosaur bone), unique or original creations (e.g., a Picasso painting), and objects with a famous association (e.g., Pierce Brosnan's tuxedo) as museum worthy. Personal associations (e.g., your favourite item of clothing) were judged as least museum worthy. These data reveal that

adults judge these types of authentic objects as appropriate for display in a museum and, by implication, they expect museums to display authentic objects (see also Leinhardt & Crowley, 2002). However, it is important to bear in mind that the reasons why particular objects could be seen as authentic are very different. Artefacts, such as celebrity possessions or works of art, are authentic by virtue of being original or unique, or they may also have an historic connection (Roberts, 1997). In contrast, biofacts, such as a dinosaur bone, are authentic because their origin is in nature as opposed to a deliberate manufacturing process (Evans, Mull, & Polling, 2002). In the study by Frazier et al. (2009), it is not clear whether participants' understanding of uniqueness, origin, or other factors led to participants' decisions because they were not asked to justify them.

Young children have a nascent understanding that museums contain special objects. In what seems to be the only study conducted on children's beliefs about museum worthiness, Frazier and Gelman (2009) asked 4- to 10-year-olds whether a variety of authentic and inauthentic objects (presented as pairs of photographs) belonged in a museum. Preschoolers correctly judged celebrity possessions (e.g., the US president's flag pin) as museum worthy, and inauthentic items (e.g., a brand new flag pin) as not museum worthy. Original creations (e.g., the very first teddy bear as opposed to a brand new teddy bear) were not judged as museum worthy until kindergarten age. Importantly, Frazier and Gelman (2009) made sure that these responses were not made on the basis of whether children would simply want to have the item. They also confirmed that children understood the purpose of a museum.

When interpreting the results of both of the studies by Frazier et al., it is also important to bear in mind that they investigated participants' perceptions of objects in a laboratory setting; therefore, it is not clear to what extent these responses will be made by actual museum visitors. Also, they did not ask participants to justify their decisions, meaning that we do not know to what extent perceptions of authenticity may have been important in making those judgments. This is an important issue because the yes/no nature of the question

meant that there was a 50% probability that children answered correctly by chance. Furthermore, the studies focused primarily on artefacts, not natural specimens. As explained above, natural specimens are authentic by virtue of their origin in nature as opposed to being manufactured.[1] Finally, these studies asked participants about relatively unfamiliar objects whereas animals are familiar to children (Inagaki & Hatano, 1996) and it is likely that their understanding is more sophisticated when reasoning about familiar objects. Therefore, we still know little about visitors' perception of the authenticity of natural specimens (animals) that are viewed during a natural history museum visit, nor how these are affected by age and context.

Theoretically, there are two ways in which visitors may reason about taxidermied animals in terms of their museum-worthiness and educational value. The first is related to its authentic nature. The origins of a taxidermied animal are in nature, not from a manufacturing process. A taxidermied animal provides a realistic and authentic presentation of a particular animal's skin (Poliquin, 2008) with many authentic features (usually with the exception of the eyes, which are replaced with glass). In other words, a taxidermied animal has authentic properties owing to its natural origins. This can be contrasted with models of animals that are made from materials, such as wooden carvings, porcelain statues, or toys, which can be considered inauthentic because they were manufactured.[2] The second concept that can be used to reason about the value of taxidermy, which makes it distinct from museum artefacts, relates to the ontological distinction between the living and the non-living: A taxidermied animal used to be alive. As noted by Poliquin (2008, p. 127) the "lifelike appearance" and "innate stillness" of taxidermy enables intimate inspection of physiological details of the

[1] Although being of natural origin does not necessarily make something museum worthy, natural specimens are authentic in the sense that they are not manufactured.

[2] Arguably, some features of manufactured animals could be considered authentic, such as their shape or the relationship between particular features, but manufactured animals tend not to be made of organic matter from the living animal and cannot be judged as authentic on the basis of their unnatural origins. Conversely, it could be argued that a taxidermied animal has been fashioned through a manufacturing process of a kind; however, this does not change its status as authentic in light of its natural origins.

living animal that would be difficult (if not impossible for the lay person) if the animal was still alive.

The ability to reason about the presence or absence of authentic properties is fairly well established by the preschool years (Bunce & Harris, 2008; 2013; Flavell, Flavell, & Green, 1987; Harris & Kavanaugh, 1993; Moll & Tomasello, 2012; Woolley & Wellman, 1990). In Bunce and Harris (2013), 3- to 5-year-olds understood that toy Lego animals, such as a toy sheep, are not authentic because they are "only made of blocks" and they have "not got the right wool." In a second experiment, children's understanding improved when the Lego animals and real animals were presented together as a pair of photographs (e.g., a Lego sheep was presented alongside a real sheep). This manipulation dramatically increased the number of children who referred to the presence of authentic properties of the real sheep and the absence of authentic properties of the Lego sheep. Taken together, these findings suggest that preschoolers have a good understanding of authenticity in relation to real animals and toys, but this improves when judgments of authentic and inauthentic items are made relative to one another.

The ability to reason about the distinction between the living and the dead is also present by the preschool years. Preschoolers attribute biological properties including growing and breathing to animate entities, such as animals, but not to inanimate entities, such as chairs (Grief et al., 2006). They also know that internal parts, such as bones and a brain, are suitable for animals but not machines (Gottfried & Gelman, 2005; Scaife & Van Duuren, 1995). From around the age of 6 years, children develop an understanding that life is supported by the presence of internal organs. Jaakkola and Slaughter (2002) found that 92% of 6-year-olds, but only 33% of 4-year-olds, made spontaneous reference to life or staying alive when asked about the purpose of a heart. Around the age of 6 years, children also begin to understand that death is irreversible and leads to the cessation of bodily functions (Bering & Bjorklund, 2004). Taken together, these studies demonstrate that even quite young children have some

understanding of the living/non-living distinction and this evidence suggests that this may contribute to their understanding of the museum-worthiness and educational value of taxidermy.

In summary, the current study assessed the extent to which 4- to 10-year-olds and adults understood the value of museum taxidermy in terms of whether it belongs in a museum and can help visitors learn about animals. Specifically, visitors were asked whether and why a taxidermied rabbit belongs in a museum and could help visitors learn about rabbits. In line with previous research, the first hypothesis was that there would be an increase with age in the number of visitors who judged the taxidermied rabbit as museum worthy and educationally valuable. It was also expected that visitors would explain their decisions on the basis of the presence or absence of authentic properties or on the basis of the living/non-living distinction.

In the current study, the taxidermied rabbit was presented in one of three independent conditions. The first two conditions reflected the way in which taxidermy is curated in museums, either as a touchable object or inside an exhibition case. In a third experimental condition visitors were presented with a taxidermied rabbit alongside a realistic soft toy rabbit following the pair presentation method used in Bunce and Harris (2013; see Exp. 2). This condition was included to test the second hypothesis that the presence of the toy rabbit would serve to increase the number of visitors who judged the taxidermied rabbit as museum worthy and educational on the basis of authenticity.

Method

Participants

In total, 228 visitors participated. Table 1 shows the number of participants in each condition, and their mean ages and gender. Across all conditions the majority of participants were White (n = 201, 88%), living in the UK (n = 202, 89%), were educated to degree level or above (n = 134, 59%) (in the case of the children this was measured with respect to their

main caregiver), and had previously visited a natural history museum in the past two years (*n* = 176, 77%). All participants were fluent in English. Six additional children were tested but not included in the analyses owing to difficulty maintaining attention, the presence of a developmental disorder, or interference from another person during testing.

Materials

A small brown taxidermied rabbit, *Oryctolagus cuniculus*, was donated from the Oxford University Museum of Natural History. This specimen was chosen because rabbits are common animals in Britain, both in the wild and as domestic pets, and it was likely to be familiar to visitors. Figure 1 depicts the taxidermied rabbit in the touchable and encased conditions and the toy rabbit used in the experimental condition. In the touchable condition the rabbit was presented on its own and could be touched. In the encased condition the same rabbit was enclosed in a transparent plastic case and could not be touched. In the toy condition, the taxidermied rabbit (touchable) was presented next to a similar looking soft toy rabbit (also touchable).

Procedure

A researcher was seated at a table in the main gallery at the Oxford University Museum of Natural History. A sign on the table invited visitors to take part in research. The taxidermied rabbit (touchable, encased, or with toy) was already on the table. Testing each condition took place on separate days. Visitors who approached the table were informed about the study by another researcher. If they were willing for their child to take part, or to take part themselves, written consent was obtained and they completed a short demographic questionnaire. Next the participant was invited to sit down at the table to answer some questions. Verbal assent was also sought from children before taking part.

Table 1

Demographic characteristics of participants in each condition (N = 228)

Age group and characteristics	Condition		
	Touchable (N = 78)	Encased (N = 79)	Toy (N = 71)
4- to 7-year-olds (n = 133)			
N (per condition)	47	46	40
Mean age (years;months)	5;9	6;0	6;0
Age range(years;months)	4;1 – 7;10	4;0 – 7;11	4;2 – 7;9
N females (%)	26 (55)	25 (54)	22 (55)
8- to 10-year-olds (n = 61)			
N	20	21	20
Mean age (years;months)	9;0	8;8	9;0
Age range (years;months)	8;1 – 10;2	8;1 – 10;11	8;2 – 10;8
N females	9 (45)	11 (52)	11 (55)
Adults (n = 34)			
N	11	12	11
Mean age (years)	35	49	43
Age range (years)	19 – 68	23 – 73	20 – 75
N females	6 (55)	4 (33)	7 (64)

Figure 1. The taxidermied rabbit in the touchable (far left) and encased (center) conditions; the toy rabbit that was presented next to the touchable taxidermy in the experimental condition (far right).

The interview began with some warm up questions including: "Can you tell me what this is?" and "Do you like it?" The two test questions were: "Does it belong in a museum?" and "Does it help you learn about rabbits?" Visitors were also asked to explain their decisions for each question. The order in which the two test questions were asked was randomized. In the toy condition, each question was asked for both the toy and taxidermied rabbit in a random order. In the touchable and experimental toy conditions, the researcher touched the rabbits, as did the majority of participants. A number of additional questions were asked concerning the function and behavior of the taxidermied rabbit in its current and former state. These data are reported elsewhere (Bunce, 2016). The interview was recorded with a small dictaphone and lasted approximately 10 min.

Results

The analysis explored the effects of age and condition on visitors' decisions about the taxidermied rabbit and their reasons for their decisions. First, the data are presented to examine the effect of age on visitors' decisions, then the reasoning behind their decisions. The analyses are then repeated but to explore the effect of condition on visitors' decisions and reasoning. Finally, the analysis explored visitors' responses to the toy rabbit to confirm that it provided an appropriate comparison for the taxidermied rabbit.

Effect of Age

Does it belong in a museum? Data were missing for one child; thus data from 227 visitors were analyzed. The majority of visitors (76%) thought that the taxidermied rabbit was museum worthy although this increased with age from 69% of 4- to 7-year-olds to 91% of adults (see Table 2). The relationship between age and museum-worthy judgments was significant ($\chi^2(2, 227) = 10.743$, $p < .005$, $\phi = .21$), meaning that more visitors valued the taxidermied rabbit as museum worthy as age increased. This supports the first hypothesis.

Does it help you learn about rabbits? Data for four children were missing meaning that data from 224 visitors was analysed. The number of visitors who thought that the taxidermied rabbit was educational was similarly high among each age group (4- to 7-year-olds = 82%, 8- to 10-year-olds = 92%, adults = 84%) and was not significantly related with age ($\chi^2(2, 224) = 4.144$, $p = .13$, $\phi = .13$) (see Table 2).

Coding Visitors' Justifications

Visitors' justifications to both questions were allocated to one of two theoretical categories based on previous research, Authenticity or the Living/Non-living Distinction. In addition, a third category "Study" emerged from the data that involved factors that make the taxidermy suitable for study, such as the ability to look at it and touch it, and the fact that it is informative about the natural world. Finally, a fourth category, Uninformative was used to categorise irrelevant (e.g., "I have a rabbit at home") or "I don't know" responses. See Table 3 for example justifications.

Table 2

The percent (and number) of visitors in each age group who judged the taxidermied rabbit as museum worthy and educational, collapsed across condition

Question and response	Age group		
	4- to 7-yr-olds (n = 269)	8- to 10-yr-olds (n = 119)	Adults (n = 68)
Belong in a museum?			
Yes	69 (92)	83 (49)	91 (31)
No	31 (42)	17 (10)	9 (3)
Learn about rabbits?			
Yes	82 (106)	92 (55)	79 (27)
No	19 (24)	8 (5)	21 (7)

Given that the majority of visitors answered yes to both questions, only the justifications following those judgments are presented.[3] Most visitors only gave one justification but when they gave two, only the first was coded. The author coded all justifications and a second coder, blind to the hypothesis, separately coded 119 (33%) of the

[3] Reasons given following answers of "no" were as follows: The most common reason (n = 25) given for why the taxidermied rabbit did not belong in the museum was because it belongs elsewhere (e.g., "It should belong in the wild," "They don't live in museums"). The main reason why the taxidermied animal was seen as not educational (n = 11) related to prior knowledge of the visitor or lack of available information (e.g., "I already know about them," "Not without something giving you more information," "You can't see it in its natural habitat, it's not in motion, it's just sitting there"). The second most frequent reason (n = 7) was because it was not alive and/or that it would be preferable to learn from a live one (e.g., "It's not alive any more," "If you want to learn about rabbits then you study real ones, live ones"). The third most frequent type of reason (n = 6) was that it was not authentic (e.g., "It's a model," "It doesn't really feel like a rabbit"). The remaining responses were uninformative (n = 12).

justifications. Agreement was 87%, (Cohen's $\kappa = .82$). Disagreements were resolved through discussion.

Table 3

Categories of justifications with definitions and examples

Justification category	Museum-worthy justifications	Educational value justifications
Authenticity	It looks like it's actually the actual thing (5) It looks the same as a real one (5) It's stuffed and it looks realistic (7) To see the actual thing, not a fake and it's much more satisfying to look at (10) The toy is just an effigy but this is actually, it is what it is, it represents exactly what a rabbit looks like (Ad)	It's got real fur (4) The ears are tall like normal rabbit's ears are as tall as that (7) It helps a little bit because it looks like a real rabbit (8) It's the real thing … I just found out they had claws and I didn't know that (Ad)
Living/ non living distinction	It doesn't hop off (4) It's dead and stuffed (6) Its dead and dead things live in the museum (6) It looks like people have took the bones and heart out and it's been left at the museum (6) It's a stuffed animal and it's been alive and its history (8)	It has been real when it was alive and you can learn about it (4) It used to be alive and you can have a look at it then you can learn about rabbits (6) It was actually alive and it's real (8)
Study	You can stroke it (4) It's to look at interesting parts (7) So you can learn about how rabbits catch their food (8) It's to show people what real rabbits look like (8) It can help you with history (10) It's an example of its species (Ad)	They teach you how to jump (4) You can ask questions about it (5) I've never felt a rabbit and it feels soft (6) You can see all the details on it when it's close up and still (8) A wild rabbit you wouldn't be able to get this close up to so you wouldn't be able to look at its claws or look at it in such detail (Ad)

Note. Numbers in parentheses after justifications indicate the age of the participant; Ad = adult.

Does it belong in a museum? Justifications. Participants' reasons for their "yes" responses about the museum worthiness of the taxidermied rabbit were explored to determine whether there was a relationship between age and type of justification for the museum-worthy question, collapsed across condition. The number of Authenticity justifications decreased with age (24% of 4- to 7-year-olds to 2% of adults), the number of Living/Non-living justifications remained similar in each age group (mean = 22%), and the number of Study justifications increased with age (12% in 4- to 7-year-olds to 68% of adults) (see Table 4). A chi squared test revealed that the relationship between justification and age was significant ($\chi^2(6, 172) = 52.504$, $p < .001$, $\phi = .37$). These data partly support the expectation that participants would refer to the authentic nature of taxidermy or its status in relation to the living/non-living distinction to explain why the taxidermied rabbit was museum worthy. The expected pattern was found for children but adults tended to refer to reasons that referred to its value for study.

Does it help you learn about rabbits? Justifications. There was also a significant relationship between justification and age, following visitors' responses of "yes" when asked about educational value, collapsed across condition ($\chi^2(4, 184) = 65.411$, $p < .001$, $\phi = .39$) (owing to low cell counts, the category Living/Non-living was excluded from the analysis). Again, the number of Authenticity justifications decreased with age (38% of 4- to 7-year-olds to 15% of adults) and the number of Study justifications increased with age (22% of 4- to 7-year-olds to 85% of adults). Living/non-living justifications were rarely produced (mean = 2%) when visitors were asked does it help you to learn about rabbits?

Table 4

The percent of visitors in each age group giving each type of justification for the museum worthy and education question, collapsed across condition

	Age group		
Question and justification	4- to 7-yr-olds	8- to 10-yr-olds	Adults
Belong in a museum?			
Authenticity	24 (22)	18 (9)	2 (1)
Living/non-living	23 (21)	18 (9)	23 (7)
Study	12 (11)	50 (25)	68 (21)
Uninformative	41 (37)	14 (7)	7 (2)
Learn about rabbits?			
Authenticity	38 (40)	33 (18)	15 (4)
Living/non-living	1 (2)	3.5 (2)	0
Study	22 (23)	60 (33)	85 (23)
Uninformative	39 (41)	3.5 (2)	0

Note. Numbers in parenthesis represent actual number of visitors.

Effect of Condition

Does it belong in a museum? More visitors thought that the taxidermied rabbit was museum worthy in the toy condition (90%) than the touchable (68%) and encased conditions (71%) (see Table 5). The relationship between condition and museum-worthy judgments was significant ($\chi^2(2, 227) = 13.203$, $p < .001$, $\phi = .23$). More visitors valued the taxidermied rabbit as museum worthy in the toy condition than the other two conditions.

Does it help you learn about rabbits? The number of visitors who thought that the taxidermied rabbit was educational was also higher in the toy condition (91%) than the touchable (84%) and encased (77%) conditions. The relationship between condition and educational judgments was significant ($\chi^2(2, 224) = 10.068$, $p = .007$, $\phi = .20$). Therefore, as

expected, the number of visitors who thought that the taxidermied rabbit was educational increased in the presence of the toy rabbit.

Table 5

The percent of visitors in each condition who judged the taxidermied rabbit as museum worthy and educational, collapsed across age

	Condition		
Question and response	Touchable	Encased	Toy
Belong in a museum?			
Yes	68 (53)	71 (55)	90 (64)
No	32 (25)	30 (23)	10 (7)
Learn about rabbits?			
Yes	81 (63)	77 (58)	94 (67)
No	19 (15)	23 (17)	6 (4)

Note. Numbers in parenthesis represent actual number of visitors.

Does it belong in a museum? Justifications. This analysis first examined whether there was a relationship between museum worthy justifications and condition. As expected, more visitors justified their decisions by referring to authenticity in the toy condition (43%) than the touchable (3%) and encased (5%) conditions. The number of justifications that referred to the living/non-living distinction did not vary widely by condition (mean = 22%) but the number of Study justifications was higher in the touchable (42%) and encased (40%) conditions than the toy condition (20%). The relationship between justification and condition was significant ($\chi^2(6, 172) = 39.726$, $p < .001$, $\phi = .34$).

Does it help you learn about rabbits? Justifications. The relationship between justification and condition was also significant for the education question ($\chi^2(4, 184) = 34.08$, $p < .001$, $\phi = .31$) (living/non-living justifications were excluded from the analysis owing to low cell counts). Again, as expected, the number of authenticity justifications was higher in

the toy condition (58%) than the touchable (21%) and encased (17%) conditions. The number of Study justifications was higher in the touchable (52%) and encased (55%) conditions than the toy (22%) condition. Living/non-living justifications were rarely produced (mean = 2%).

Table 6

The percent of visitors in each condition giving each type of justification for the museum worthy and education question, collapsed across age

	Condition		
Question and justification	Touchable	Encased	Toy
Belong in a museum?			
Authenticity	3 (2)	5 (3)	43 (27)
Living/non-living	23 (12)	22 (12)	20 (13)
Study	42 (22)	40 (22)	20 (13)
Uninformative	32 (17)	33 (18)	17 (11)
Learn about rabbits?			
Authenticity	21 (13)	17 (10)	58 (39)
Living/non-living	0	0	6 (4)
Study	52 (33)	55 (32)	22 (15)
Uninformative	27 (17)	28 (16)	14 (9)

Note. Numbers in parenthesis represent actual number of visitors.

Toy Rabbit

Does it belong in a museum? Nearly all visitors (92%) said that the toy rabbit was not museum worthy, with the exception of 4 children and 2 adults who argued that it may belong in a museum depending on the context, such as a toy museum. The majority (78%) of visitors explained that this was because the toy rabbit was not authentic; for example, they explained, “It doesn’t look like the actual thing of a rabbit,” “It’s not the real thing,” “It’s got a label on it,” and “It’s just a toy to play with.” The second most common reason (15%) was

that the toy rabbit belonged elsewhere, such as in the museum gift shop or a toy shop. The remaining visitors (7%) gave an uninformative response.

Does it help you learn about rabbits? There was less agreement among visitors about the educational value of the toy rabbit and some variation by age group. Among the 4- to 7-year-olds, 51% denied that the toy rabbit had educational value, explaining that this was because it was not authentic (e.g., "It's not really the actual thing but pretend," "It's fake," and "It doesn't have real ears"). The remaining 49% said that the toy had educational value because it had authentic aspects (e.g., "It looks like it's actually a real rabbit and you can imagine it's real," "It's a rabbit and it has a nose and they might not know it [rabbits] has a nose," and "It's still a rabbit and it's like a real one."

Among the 8- to 10-year-olds, 75% denied that the toy had educational value, and most explained that this was because it was not authentic (e.g., "It's just a toy," "It's fake," and "It's not realistic"). Finally, 91% of adults argued that the toy rabbit had educational value, particularly for children, because of its authentic aspects (e.g., "It could do for younger children; it's a representation of a rabbit, it's got two eyes," "It's very similar to a real rabbit and you can touch it," and "It's shaped like a rabbit and you can see the back legs").

Discussion

The current study investigated visitors' understanding of the value of museum taxidermy as an authentic biofact by asking them to consider whether a taxidermied rabbit belongs in a museum and can help visitors learn about rabbits. Children and adult visitors were presented with a taxidermied rabbit in one of three ways—as a touchable, inside an exhibition case, or alongside a realistic soft toy rabbit. It was anticipated that there would be an increase with age in the number of visitors who judged the taxidermy as museum worthy and educational, and that the concepts of authenticity and the living/non-living distinction would play a role in visitors' reasoning about its value. It was also expected that providing a realistic soft toy rabbit to allow visitors to make a direct comparison between the taxidermied

rabbit and the toy rabbit would increase visitors' perception of the value and the role of authenticity in their reasoning (Bunce & Harris, 2013).

The results revealed that there was an increase with age in the number of visitors who judged the taxidermied rabbit as museum worthy, from 69% of 4- to 7-year-olds to 91% of adults. The number of visitors who judged the taxidermied rabbit as educational did not show similar increases with age but was high across all age groups (84%). This suggests that even young children understood that a taxidermied rabbit could help you learn about rabbits. These findings complement and extend those obtained by Frazier and colleagues (e.g., Frazier & Gelman, 2009; Frazier et al., 2009). They found that young children understand that some types of objects are museum worthy, such as possessions that belonged to famous people, whereas the current study shows that young children also judge biofacts, in this case a taxidermied animal, as museum worthy and having educational value. However, it could be argued that the high number of times that visitors agreed that the taxidermied rabbit was museum worthy and educationally valuable in the current study was simply because participants were already visiting a museum. Young museum visitors will likely have some understanding or expectation (possibly communicated to them by their adult companions) that they will see special objects, whereas children visiting a university laboratory in the studies by Frazier and colleagues will probably not have the same conversations or expectations. Although this makes the current research more applicable to museums than the studies conducted in a university laboratory setting, these responses need to be understood in connection with visitors' reasons about what makes an object museum worthy.

It was expected that young children would be able to draw on their understanding of authenticity and the living/non-living distinction when making judgments about the value of museum taxidermy. This was found to be the case; however, there were substantial changes with age in the reasons that they gave. The number of visitors who referred to the presence or absence of authentic properties when justifying judgments of museum worthiness and

educational value was highest in the younger children and decreased dramatically with age. In other words, young children often referred to physical properties, such as real fur or sharp claws, that rendered the taxidermied rabbit authentic to justify their decisions (cf. Bunce & Harris, 2013). Adults, on the other hand, rarely gave such explanations. This may be considered surprising because an important feature inherent in museum objects is their authentic properties. It is possible that the authentic properties of the taxidermied rabbit were so obvious to adults that they did not explicitly mention them.

Explanations in support of museum-worthy judgments that referred to the living/non-living distinction, such as that the rabbit is not alive anymore or that it no longer contains internal organs, were equally common across all ages (accounting for approximately one fifth of justifications). In other words some visitors explained that the taxidermied rabbit was museum worthy because it used to be alive. The presence of this explanation amongst even the youngest children is in line with previous research showing that preschoolers understand many of the differences between living things and objects (e.g. Gottfried & Gelman, 2005). This explanation, however, was very rarely given to justify decisions about educational value. Instead, the most common explanations to justify the educational value as well as museum-worthiness were in the category "Study." In other words, visitors described the fact that the taxidermied rabbit was suitable for close and intense observation, exploration, and reflection. For example, visitors explained that it could be looked at close-up and touched, and that this would not be as easy with a wild rabbit. This type of reason accounted for over one third of responses and was more common in older children and adults. It was associated with a decrease in authenticity explanations, which implies that Study explanations may be based on an inherent understanding that taxidermy is authentic in origin.

Visitors' ability to explain their decisions about the museum-worthy and educational value of the taxidermied rabbit supports the findings from those judgments. However, a notable minority (just over one third) of the youngest children gave uninformative reasons for

their decisions. This means that it is not clear to what extent they understood what made the taxidermied rabbit a valuable and educational museum biofact. This suggests that young children could benefit from support to help them understand and engage with museum taxidermy. One way of providing such support is evident by looking at the different ways in which the taxidermied rabbit was presented in the current study.

In the current study the taxidermied rabbit was presented to visitors in one of three ways—as a touchable, inside an exhibition case, or alongside a realistic soft toy rabbit. As predicted, more visitors (approximately 90%) judged the taxidermied rabbit as museum worthy and as being able to help you learn about rabbits when it was presented alongside the toy rabbit. This was substantially more than when the taxidermy was presented as a touchable or inside an exhibition case. Furthermore, visitors explained their decisions about taxidermy when it was presented alongside the toy by referring to its authentic properties, whereas when it was presented as a touchable or inside an exhibition case the most common justification was a Study explanation. The difference between the types of reasons given between the three presentation formats was particularly striking for the 4- to 7-year-old group of children. They gave almost no authenticity justifications when the taxidermied rabbit was presented as a touchable or inside an exhibition case, whereas almost half of the children referred to authentic properties of the taxidermy in the toy condition. These data support the prediction made on the basis of Bunce and Harris (2013, Expt. 2) who found that making judgments about pairs of items that differ in their level of realness (real and toy animals) helps young children reason about their authenticity. In part this is because they have an early robust understanding of toys as pretend versions of real entities. (This is also supported by the analysis of responses to the toy rabbit in the current study; nearly all visitors responded that the toy was not museum worthy because it did not have authentic properties.)

The effect of presenting the taxidermied rabbit alongside a toy rabbit in the current study served to increase substantially young children’s responses that referred to the presence

of authentic properties of the taxidermied rabbit. This suggests that museum professionals can support children's understanding of the value of taxidermy as an authentic biofact by providing direct comparisons with a soft toy version of the same animals. For example, practitioners could develop a museum trail in which children are given a small number of soft toy animals and are instructed to find the real, taxidermied one. Alternatively, touchable tables could contain both taxidermied animals alongside toy versions of those animals. Discussion questions could be provided to focus children's awareness of the authentic nature of the taxidermied animals in comparison to the toy animals, such as, "Which one has real fur?" or "Which one used to be alive?" This should serve to help children to understand the importance of the authentic properties of taxidermy, which contrasts with the artificial nature of toys.

Limitations of the Current Study

One limitation of the current study is that participants were only asked about an individual piece of taxidermy, a rabbit, which is a common and familiar animal in the UK. Arguably, the findings from the current study would apply to other common taxidermied animals but visitors' responses may be affected by a number of factors. These may include familiarity and experience with the animal (e.g., pets versus zoo animals), their level of direct experience with animals in general, and their level of biological knowledge about animals (Geerdts, Van de Walle, & LoBue, 2015). Another factor is whether the exterior of the animal is comprised of scales, feathers, or skin as opposed to fur (e.g., elephants or crocodiles). For the untrained eye, a taxidermied reptile is sometimes difficult to distinguish from a manufactured replica because of the nature of its skin, whereas the difference between the fur of a rabbit and a toy is more readily perceptible. Finally, knowledge of whether or not the animal is extinct may also play a role in perception of value. Perceptions of value are likely to increase because knowing that an animal is extinct implies a rarity and uniqueness of

the taxidermied version, which is another criterion by which authenticity judgments can be made (cf. Roberts, 1997).

It is also important to bear in mind that these results are from a sample of visitors who were predominantly well-educated and previous museum visitors. Therefore, these results may present a more generous level of understanding than may be evident in mixed groups of children visiting on a school trip, whose parents have not chosen to visit the museum as a leisure activity.

Future Research

An interesting avenue for future research involves the effect of context on judgments concerning the value of museum taxidermy. It has been argued that judgments involving authenticity can *only* be made in a given context or in relation to another item (Dutton, 2003; Reisinger & Steiner, 2006). In the current study, context could also have been provided by presenting a taxidermied animal with a live version of the animal. However, in contrast to the effect of the toy rabbit comparison, a live animal comparison may emphasize the value of taxidermy in terms of its status as a previously living animal.

The wider context in terms of the location in which judgments about taxidermy are made could also affect people's interpretation of its value. Taxidermy can be found in stately homes, public houses, art galleries, and even school classrooms. It is possible that taxidermy encountered in the context of a stately home in a country estate may be interpreted in relation to the living/non-living distinction if there is evidence of a tradition of hunting animals. In contrast, taxidermy encountered in the context of a traditional public house and displayed alongside other manufactured artefacts may be interpreted in relation to the authentic and the artificial.

Cultural experience has also been found to influence judgments of authenticity. People from individualistic cultures place greater value on authentic objects associated with famous or special individuals than people from collectivist cultures (Gjersoe et al., 2014).

Future research could examine the effect of visitors' cultural backgrounds and how this affects perceptions of the value of authentic museum objects.

Conclusion

The current study demonstrated that children have an emerging understanding of the value of taxidermy in terms of its status as a museum-worthy and educational biofact from the age of 4 years. This understanding develops substantially during early childhood such that by the age of 8 years, children understand that taxidermy is valuable by virtue of the ability to study details of the animal close up, its status as a previously living animal, and its authentic properties. The current study also tested the possibility that young children's appreciation of the value of museum taxidermy could be improved by presenting it alongside a soft toy version of the taxidermied animal. This manipulation was highly successful: Substantially more children demonstrated an understanding of the value and authentic nature of taxidermy when it was presented in comparison to the toy. The results of this study thus suggest that museum professionals should consider including toy animals as part of their educational offering to help young children engage with and learn from animal taxidermy. By doing so, practitioners stand to foster awe-inspiring reactions to their natural history collections that make for a meaningful museum visit.

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