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# Talking about the elephant in the room: (addressing other visitors') feeding behaviour in zoos

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ABSTRACT

To gain more knowledge about visitors who feed animals during their visit in the zoo, this study examined which characteristics could predict such feeding behaviour and which characteristics predict whether someone would address other visitors' feeding behaviour. The characteristics that were examined were motivation identity, sense of connection with animals, attitude towards feeding behaviour, norms of feeding behaviour and beliefs about the consequences of feeding behaviour. After a pilot study, a survey was created and sent out to subscribers of Diergaarde Blijdorp. 808 participants completed the survey. It was found that feeding behaviour was influenced by a certain attitude, norm and belief. Further, it was found that sense of connection, norms and a certain belief influenced the likelihood of addressing other visitors' feeding behaviour. Zoos could use these findings to create interventions to prevent feeding behaviour. Future research could indicate which intervention would be most effective.

**Keywords: Feeding behaviour, feeders, animals, zoo, visitor behaviour**

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**Talking about the elephant in the room: (addressing visitors') feeding behaviour in zoos**

Visitors who feed animals in the zoo are a problem. Most of these animals have a special diet and, despite the no-feeding signs, some visitors disrupt this by throwing their own food in the residences during their visit. When visitors in Fota Wildlife Park (Ireland) were observed, 45 of the 76 times that visitors tried to interact with free-ranging ring-tailed lemurs (*Lemur catta*), they tried to feed them (Collins et al., 2017). Zoos seem to be reluctant to talk about the consequences of feeding behaviour. This might be due to their priority to make a visit to the zoo enjoyable and this would be at risk when visitors would be reminded of the sad consequences of feeding behaviour. Nevertheless, some examples of the consequences of feeding behaviour were found. At a petting zoo in Heiloo (Netherlands), five deer died within two years because visitors unknowingly fed them poisonous plants that grew nearby the residence ("Vijf herten dood", 2018). Biotope Wildlifepark Anholter Schweiz (Germany) faced a similar problem, with deer dying from wrong food given by visitors ("Jong rendier", 2017). In Warrington Zoo in the United Kingdom, two African pygmy goats died after intruders fed them rhododendron leaves ("African pygmy", 2017). When a visitor in the Lisbon Zoo in Portugal tried to feed a giraffe, the giraffe died before it even reached the actual food; the giraffe fell into a ditch ("Zoo horror", 2018). Even though the giraffe did not eat the food, the feeding behaviour the visitor showed, namely luring the giraffe with food, was fatal in the end.

Besides being deadly in some cases, feeding animals has other, less fatal but still very negative, consequences. The study of Maréchal, Semple, Majolo and MacLarnon (2016) showed that wild adult Barbary macaques which were fed by tourists during a 10 month period showed, among other things, more diarrheal symptoms and higher physiological stress than the wild adult Barbary macaques which were not fed by tourists. Moreover, according to the study of Maréchal and her colleagues (2011), feeding behaviour of tourists was positively associated with experienced anxiety in wild male Barbary macaques, which caused self-directed behaviour (a.k.a. self-mutilation, in this case self-scratching) in the animals. Thus, feeding behaviour can affect the health of wildlife animals negatively and caution is required. Moreover, these findings could indicate that interaction with nonprofessional humans (a.k.a. zoo visitors instead of zoo professionals), who do not know how to properly interact with the animals, could be stressful for zoo animals and could cause anxiety.

Because of these negative consequences, zoos already try to discourage the feeding behaviour of visitors by placing signs. For example, as seen in Figure 1, Diergaarde Blijdorp

placed signs such as "Do not feed: Please do not feed the giraffes. Some branches and leaves are poisonous to them" and "Sharp teeth: Please do not feed and touch these animals, they can bite".


*Figure 1.* No feeding signs in Diergaarde Blijdorp.

In these examples, Diergaarde Blijdorp provides visitors with knowledge about the dangers and consequences of feeding animals, and Diergaarde Blijdorp warns visitors that they should protect themselves. However, visitors who feed animals remain a problem for all zoos. These feeders can be stopped by other visitors, non-feeders, who encounter this behaviour from their fellow visitors. However, non-feeders could also encourage feeding behaviour if they consider it beneficial.

Although feeding animals is considered a problem, little research has been conducted to examine what kind of people show this behaviour. The study of Cook and Hosey (1995) showed that visitors, who tried to interact with chimpanzees in the Chester Zoo (England), did not differ in, among others, their approximate age, sex and activity level from visitors who did not try to interact with the chimpanzees. In their study, one of the manners in which visitors tried to initiate contact was through offering food (Cook & Hosey, 1995). It could be argued that feeders will not differ from non-feeders in these characteristics. The study of Ballantyne and Hughes (2006) showed that bird feeders and non-feeders do differ in their beliefs. For example, bird feeders, more than non-feeders, believed that feeding birds helped them survive when food was scarce and that feeding birds enables humans to see the birds up close. Further, non-feeders, more than feeders, believed that scraps are bad for birds' health and that feeding can be dangerous (Ballantyne & Hughes, 2006). Still, further examination of feeders could create a clearer picture about what kind of people these feeders are. It is also unclear what kind of visitors, who encounter feeders, address this feeding behaviour. What drives

them? No research was found in this area, making it interesting to create a clearer picture about these people.

This study will examine whether certain characteristics explain the eagerness to feed animals in the zoo; it is examined whether feeders have a certain motivation to visit the zoo, whether they feel a sense of connection with the animals, whether they have a certain attitude, feel certain norms or have certain beliefs. It was also examined whether non-feeders, who address feeders' behaviour, feel a sense of connection with the animals and whether they have a certain attitude, feel certain norms or have certain beliefs.

When more knowledge is gained about the characteristics of feeders, zoos could respond to this with signs targeting these characteristics. Although a strict no-feeding sign is well-known and familiar, customising signs to feeders might be more effective. Characteristics of these feeders will be examined in this study. Furthermore, when more knowledge is gained about the characteristics of visitors who address other visitors' feeding behaviour and who try to stop them, zoos could respond to this by making special signs which could motivate these visitors to keep up their good work and which could motivate others to also address the feeding behaviour of others.

**(Addressing other visitors') feeding behaviour**

In this study, feeding behaviour is defined as the process of feeding animals, with food that the visitor brought to the zoo or bought in the zoo, without permission of an authority in the zoo. This behaviour is in violation with the rules. Despite signs, some visitors still show this behaviour. Feeding animals could lead to stress, sickness and sometimes even the death of an animal.

The second dependent variable is addressing other visitors' feeding behaviour. When someone addresses feeding behaviour of others, and successfully prevents or stops feeding behaviour, this could prevent animals from becoming stressed or sick.

**The motivation identities of visitors**

The first variable that has been taken into account to explain a part of feeding behaviour is motivation identity. Motivation identity is based on the different motivations people have to visit, in this case, a zoo (Falk, Heimlich & Bronnenkant, 2008). In their study, they found five core motivation identities to visit a zoo. Falk (2006) first discovered these motivation identities in a study about the motivations visitors have to visit museums. In his study with Heimlich and Bronnenkant (2008), these motivation identities of museum visitors were used

to measure motivation identities in zoo and aquarium visitors. The five identities, based on motivations to visit a zoo or an aquarium, are explorers, professionals/hobbyists, spiritual pilgrims, experience seekers and facilitators (Falk et al., 2008). The *explorers* are motivated by the learning aspect of the visit; they are curious about the content of the zoo and want to increase their own knowledge in general. The *professionals/hobbyists* visit the zoo to fulfil their desires; they are passionate about the content of the zoo and want to remain up-to-date on the new developments in their field of expertise. *Spiritual pilgrims* visit the zoo as a restorative experience; to flee from their everyday life. The *experience seekers* visit the zoo to cross it of their bucket list; they visit the zoo to have fun and because it is one of the highlights of the region. The *facilitators* are more socially focused; their visit is focused on the experience of their social group and enabling their social group to learn something.

It is expected that visitors with a certain motivation identity might be more inclined to feed animals in the zoo than visitors with other motivation identities. It is expected that explorers will be less inclined to feed animals, since they are motivated by the learning aspect of the zoo and they probably know that feeding animals is bad for the animals' health. Even so, it is expected that professionals/hobbyists might be less inclined to feed animals since they are so passionate about the zoo and probably know about the consequences of feeding behaviour. Moreover, it is expected that the spiritual pilgrim will be less inclined to feed animals because they are focused on their own restoration and will prefer peace over the noise of animals and other visitors that follows after throwing food in a residence. However, experience seekers are more comparable to mayflies and might not care as much about the rules or the health of the animals in a zoo. Therefore, it could be expected that they are more inclined to feed the animals. Since the facilitators are mostly focused on their social group when visiting a zoo, it is expected that they would be more inclined to feed animals and thereby to stir things up in a residence because they want to entertain their loved ones. If it turns out that visitors with a certain motivation identity are more inclined to feed the animals in comparison with others, a no-feeding sign could be directly addressed to them.

**H1.** Motivation identity influences the likelihood of feeding behaviour.
**H1a.** The explorer identity negatively influences the likelihood of feeding behaviour.
**H1b.** The professional/hobbyist identity negatively influences the likelihood of feeding behaviour.
**H1c.** The spiritual pilgrim identity negatively influences the likelihood of feeding behaviour.
**H1d.** The experience seeker identity positively influences the likelihood of feeding behaviour.

**H1e.** The facilitator identity positively influences the likelihood of feeding behaviour.

**Sense of connection with animals**

Visitors might be inclined to feed animals due to the sense of connection they feel with the animals. According to the biophilia hypothesis of Kellert and Wilson (1993), it is human nature to feel connected to nature and animals who are not similar to humans. According to Packer, Ballantyne and Hughes (2014), visitors who feel a high sense of connection with animals have more knowledge and experience in looking after animals and are more likely to believe that animals have emotions. Therefore, one could describe sense of connection to animals as a bond in which animals are humanized.

According to Sable (2012), an attachment, or sense of connection, to a pet animal has a positive effect on the well-being of their owners. Moreover, a positive effect of animals on well-being was found in a study in which teenage girls in Finland were interviewed about, among other things, their interactions with animals (Wiens, Kyngäs & Pölkki, 2016). Thus, a sense of connection with animals is beneficial for humans. This can also be seen in zoo professionals who work on a daily basis with animals: if they experience a good human–animal bond, they gain affective benefits from this such as perceiving their work as more emotionally rewarding (Hosey & Melfi, 2010).

Furthermore, the study of Hosey and Melfi (2010) showed that pet ownership, among others, predicted whether the zoo professional felt a human-animal bond. A human-animal bond is defined as "a mutually beneficial and dynamic relationship between people and other animals that is influenced by behaviours that are essential to the health and well-being of both" (AVMA Committee on the Human-Animal Bond, 1998). Clearly, this is not exactly the same as the sense of connection visitors feel with an animal in a zoo. However, a sense of connection is needed to create a human-animal bond and this study of Hosey and Melfi (2010) does give a little insight into the predictors of a sense of connection with animals. Since pet ownership predicted human-animal bonds of zoo professionals, it could indicate that some people are more involved with and care more about animals in general.

Zoo visitors report a higher sense of connection with a zoo animal when the animal pays attention to them or to another visitor (Myers, Saunders & Birjulin, 2004). In their study, it did not matter what kind of animal paid attention to a visitor or to whom this attention was specifically directed. The fact that an animal was giving attention to a human was enough to increase the sense of connection. The study of Luebke, Watters, Packer, Miller and Powell (2016) showed that when lions, cheetahs and red pandas were more active, the positive affect

(including sense of connection) towards these animals increased. However, this effect was not found for visitors watching giraffes. This difference was explained by the fact that giraffes were almost always active, and therefore might always create positive affect in visitors.

When visitors feel a strong sense of connection, they might try to feed the animals as a way of bonding. The sense of connection with animals is also expressed in the helping-motivation some feeders have. Visitors of the three National Parks in Tasmania stated that they fed the birds to help them (Mallick & Driessen, 2003). This could also indicate some sort of bonding. This bonding can only take place when visitors encounter animals. Therefore, feeding might not only be used as a way to bond with the animals in itself, but also as a first step in this process, namely to lure them. Orams (2002) already found that people feed wildlife to lure them. This was supported by the study of Ballantyne and Hughes (2006), which showed that, as stated before, bird feeders more than non-feeders argued that feeding is a way to see the animals more closely. Moreover, as mentioned before, visitors who initiated contact with chimpanzees in the study of Cook and Hosey (1995) did so by, among others, offering food. Their study also showed that chimpanzees were most likely to interact with men holding objects, such as food. They suggested that chimpanzees might only be interested in interacting with visitors to obtain food. The study of Choo, Todd and Li (2011) showed that orangutan behaviour was affected by whether a visitor held food. When a visitor held food, orangutans showed begging behaviour and looked more at the visitor. In short, feeders could use food to lure animals as a first step in the bonding process. In conclusion, the second hypothesis states that sense of connection positively influences the likelihood of feeding behaviour.

**H2.** Sense of connection positively influences the likelihood of feeding behaviour.

Thus, it is expected that when visitors have a strong sense of connection, they are more inclined to feed animals. If it turns out that sense of connection explains a part of the feeding behaviour, zoos could respond to this with customised signs.

Sense of connection could also explain why visitors would not address other visitors' feeding behaviour. When they feel connected to a certain animal, they might be happy if others lure their favourite. In general, the emotional responses of viewing an animal have a strong impact on the enjoyment and fun of a visit (Luebke & Matiasek, 2013). Thus, when an animal, or even the favourite of the non-feeder, is lured by someone else, it will make their visit more enjoyable. The non-feeders could also approve the feeding behaviour of others,

because they think it is beneficial to the animals (Mallick & Driessen, 2003). Then, non-feeders would not address the feeding behaviour of others because of their love for the animals. In conclusion, the third hypothesis states that visitors with a stronger sense of connection are less inclined to address other visitors' feeding behaviour.

**H3.** Sense of connection negatively influences the likelihood of addressing feeding behaviour.

**Theory of Planned Behaviour and feeding behaviour**

It is expected that attitudes and subjective norms could explain why some people feed zoo animals and others do not. According to the Theory of Planned Behaviour, behaviour is caused by certain intentions, which in turn originate from certain attitudes toward the behaviour, subjective norms and perceived behavioural control (Ajzen, 1991).

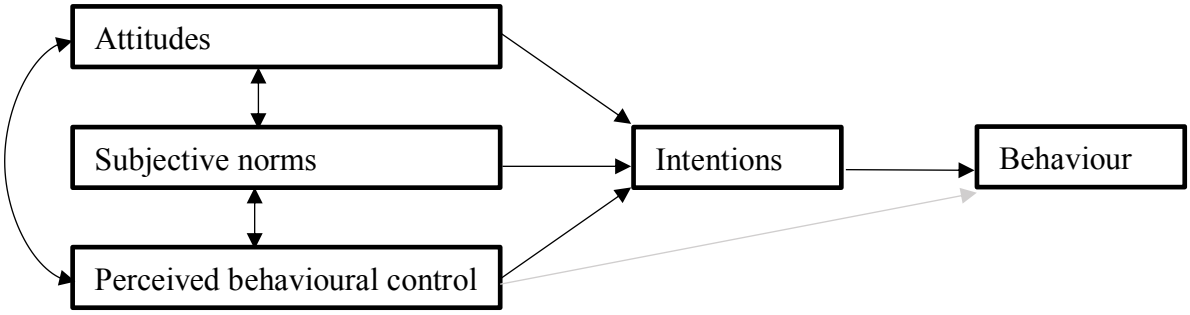
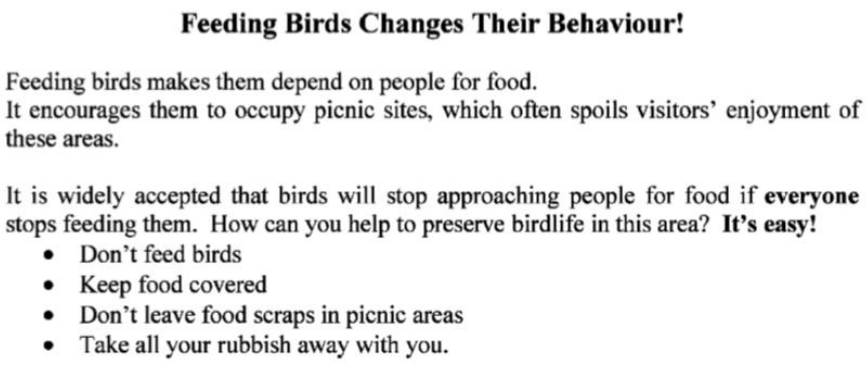



*Figure 2.* Theory of Planned Behaviour model (Ajzen, 1991).

An attitude consists of an evaluative reaction towards and cognitions about the characteristics of something; in this case a type of behaviour (Staats, 2003). A positive attitude towards feeding animals combined with social pressure to feed the animals and perceived control to conduct this behaviour, could result in intentions to feed the animals and in the behaviour of actually feeding the animals. To prevent this behaviour, one could interfere in one or more predictors (attitudes, norms and perceived behavioural control). The study of Ballantyne and Hughes (2006) showed that a no-feeding sign based on the Theory of Planned Behaviour (Figure 3) was not the most effective one, in comparison with signs based on other theories.



**Feeding Birds Changes Their Behaviour!**

Feeding birds makes them depend on people for food.
It encourages them to occupy picnic sites, which often spoils visitors' enjoyment of these areas.

It is widely accepted that birds will stop approaching people for food if **everyone** stops feeding them. How can you help to preserve birdlife in this area? **It's easy!**

- Don't feed birds
- Keep food covered
- Don't leave food scraps in picnic areas
- Take all your rubbish away with you.

*Figure 3.* Feeding sign based on Theory of Planned Behaviour (Ballantyne & Hughes, 2006).

However, this does not indicate that certain attitudes do not influence feeding behaviour. According to a study about no-feeding signs in three National Parks in Tasmania, most visitors already had an extreme opinion about feeding animals: the study showed that of the 82 visitors who had seen a no-feeding sign, 93,7% was moderately to extremely against feeding animals and 3.8% was moderately in favour of feeding animals. The last 2,5% had no opinion (Mallick & Driessen, 2003). It appeared that none of the visitors who had seen the sign were extremely in favour of feeding animals. Although the number of people who had encountered the sign and who were still moderately in favour of feeding animals is not high, it would be preferred that none of the visitors would be in favour of feeding animals. Since this attitude could, with the Theory of Planned Behaviour in mind, lead to feeding behaviour of visitors, it should be taken into account. In conclusion, the fourth hypothesis states that attitude influences the likelihood of feeding behaviour. It is expected that if someone is against feeding animals, this will negatively influence the likelihood of feeding behaviour.

**H4.** A negative attitude towards feeding animals negatively influences the likelihood of feeding behaviour.

Given the Theory of Planned Behaviour, this effect is also expected for social norms; they might also influence the feeding behaviour of visitors (Ajzen, 1991). Social norms, rules that are socially accepted and shared, consist of, among others, descriptive norms (White, Smith, Terry, Greenslade & McKimmie, 2009). Descriptive norms are norms about a common behaviour; something everyone is doing and is normal to do (White et al., 2009). It is expected that visitors who experience descriptive norms such as "Feeding animals during your visit is normal" or "A lot of other visitors feed animals" will be more inclined to feed animals themselves. In conclusion, the fifth hypothesis states that descriptive norms will

influence the feeding behaviour of visitors. Since both norms, "Feeding animals during your visit is normal" and "A lot of other visitors feed animals", support feeding behaviour, it is expected that both norms will positively influence the likelihood of feeding behaviour.

**H5.** Descriptive norms influence the likelihood of feeding behaviour.
**H5a.** The norm "Feeding animals during your visit is normal" positively influences the likelihood of feeding behaviour.
**H5b.** The norm "A lot of other visitors feed animals" positively influences the likelihood of feeding behaviour.

If the attitude towards feeding behaviour and / or norms about feeding behaviour turn out to have an impact on the likelihood of feeding behaviour, the no-feeding signs should focus on that, such as the sign as seen in Figure 3 of Ballantyne and Hughes does (2006).

The Theory of Planned Behaviour could also be applied to the tendency to address other visitors' feeding behaviour. When a visitor is strongly against feeding animals, the social norm is to not feed zoo animals and the visitor knows that he/she is capable of stopping other visitors from feeding animals (perceived behavioural control), it is expected that this visitor will be more inclined to address other visitors' feeding behaviour. Therefore, the sixth hypothesis states that the attitude towards feeding behaviour and / or norms about feeding behaviour influence the tendency of visitors to address other visitors' feeding behaviour.

**H6.** Attitude and / or norms influence the likelihood of addressing other visitors' feeding behaviour.
**H6a.** A negative attitude towards feeding animals positively influences the likelihood of addressing other visitors' feeding behaviour.
**H6b.** The norm "Feeding animals during your visit is normal" negatively influences the likelihood of addressing other visitors' feeding behaviour.
**H6c.** The norm "A lot of other visitors feed animals" negatively influences the likelihood of addressing other visitors' feeding behaviour.

**Beliefs about the consequences of feeding behaviour**

Beliefs might also predict the likelihood of feeding behaviour. As stated before, in the study of Ballantyne and Hughes (2006), 10 of the 47 bird feeders did not share the belief that food scraps are bad for birds. 14 of 47 bird feeders also did not share the belief that it could be

dangerous to the birds. These beliefs, about "the likely outcomes of the behaviour and the evaluations of these outcomes" (Ajzen, 2006, p.1), are called 'behavioural beliefs' (Ajzen, 2006). If one lacks knowledge about the consequences of feeding behaviour, and therefore the likely outcome of this behaviour, it could lead to wrong beliefs which in turn could lead to feeding behaviour.

To create knowledge about the dangers of feeding behaviour, and to change visitors' wrong beliefs, zoos could try to educate visitors about this. Giving visitors a little knowledge about the consequences of feeding animals might be enough to stop them from doing so. As mentioned before, Diergaarde Blijdorp already does this by stating that some branches and leaves are poisonous for their giraffes (Figure 1). The beliefs that will be examined in this study are not specifically focused on one kind of animal but on zoo-animals in general. Three different kinds of beliefs will be examined. The first belief is "Feeding animals enables you to see them up close". The second belief is "By feeding animals, you make sure they have a nice treat". The third kind of belief consists of four items measuring whether one believes that feeding zoo animals is bad for the animals' health. These items are "Human-food is bad for zoo-animals", "Zoo-animals cannot digest human-food properly", "Zoo-animals can become sick of eating our food" and "Feeding zoo-animals is dangerous for the animals". If these beliefs about the consequences of feeding behaviour would influence the likelihood of feeding behaviour, zoos should put information about the consequences of feeding the animals on the signs. In conclusion, the seventh hypothesis states that beliefs about the consequences of feeding behaviour influence the likelihood of feeding behaviour.

**H7.** Beliefs about the consequences of feeding behaviour influence the likelihood of feeding behaviour.
**H7a.** The belief "Feeding animals enables you to see them up close" positively influences the likelihood of feeding behaviour.
**H7b.** The belief "By feeding animals, you make sure they have a nice treat" positively influences the likelihood of feeding behaviour.
**H7c.** Beliefs about the negative consequences of feeding behaviour for the animals' health negatively influence the likelihood of feeding behaviour.

Further, it will be examined whether these different beliefs would influence the likelihood of addressing other visitors' feeding behaviour. For example, the first two beliefs measured, "Feeding animals enables you to see them up close" and "By feeding animals, you make sure

they have a nice treat", might be in favour of feeding animals. Therefore, it is expected that visitors who agree with these statements will be less likely to address other visitors' feeding behaviour than visitors who disagree with these statements. It is also expected that beliefs about the negative consequences of feeding behaviour for the animals' health would influence the likelihood of addressing feeding behaviour of others. If visitors do not have knowledge about the consequences of feeding behaviour and hold the beliefs that feeding animals is not bad for them, they might be less likely to address other visitors' feeding behaviour. Visitors might be more inclined to address the feeding behaviour of others if they are aware of the harm it does. Therefore, it is expected that visitors who have knowledge about the consequences and dangers of feeding behaviour will be more inclined to address other visitors' feeding behaviour. In conclusion, the eighth hypothesis states that beliefs about the consequences of feeding behaviour influence the likelihood of addressing other visitors' feeding behaviour.

**H8.** Beliefs about the consequences of feeding behaviour influence the likelihood of addressing other visitors' feeding behaviour.
**H8a.** The belief "Feeding animals enables you to see them up close" negatively influences the likelihood of addressing other visitors' feeding behaviour.
**H8b.** The belief "By feeding animals, you make sure they have a nice treat" negatively influences the likelihood of addressing other visitors' feeding behaviour.
**H8c.** The beliefs about the negative consequences of feeding behaviour for the animals' health positively influence the likelihood of addressing other visitors' feeding behaviour.

According to the study of Ajzen (2006), behavioural beliefs lead to a positive or negative attitude towards the behaviour. Keeping in mind the Theory of Planned Behaviour model (Ajzen, 1991), as shown in Figure 2, believing in the benefits of feeding behaviour (seeing animals up close and offering them a nice treat) would cause a positive attitude towards feeding behaviour. This would lead to intentions to not address feeding behaviour and act accordingly. It is examined whether a negative attitude towards feeding animals mediates the effect of beliefs on addressing feeding behaviour of others. It is expected that there is a negative relationship between belief "Feeding animals enables you to see them up close" and a negative attitude towards feeding animals. A negative relationship is also expected between the belief "By feeding animals, you make sure they have a nice treat" and a negative attitude towards feeding animals.

Further, knowing about the consequences and dangers of feeding behaviour would cause a negative attitude towards feeding behaviour. This would lead to intentions to address the feeding behaviour of others and eventually doing so. A positive relationship is expected between beliefs about the negative consequences of feeding behaviour for the animals' health and a negative attitude towards feeding animals. A positive relationship is expected between this negative attitude towards feeding animals and addressing other visitors feeding behaviour. In conclusion, the ninth hypothesis states that there is a mediating effect of attitude on the relationship between beliefs and addressing other visitors' feeding behaviour.

**H9.** There is a mediating effect of attitude on the relationship between beliefs and addressing other visitors' feeding behaviour.

As mentioned before in the part about sense of connection, one of the reasons people gave for supporting feeding wildlife was to help them (Mallick & Driessen, 2003). This indicates that feeders might feel connected to the animals. As seen in hypothesis 3, it is expected that if one has a strong sense of connection, one is less inclined to address other visitors' feeding behaviour. However, if one has a strong sense of connection and holds the beliefs that feeding animals is bad and dangerous for the animals' health, it is expected that visitors would be more inclined to address feeding behaviour of others. If there is a moderating effect, zoos should focus on giving visitors knowledge about the consequences of feeding animals, to change the wrong beliefs of the visitors. In conclusion; the tenth hypothesis states that there is a moderating effect of beliefs about the negative consequences of feeding behaviour for the animals' health on the relationship between sense of connection and addressing other visitors' feeding behaviour.

**H10.** There is a moderating effect of the beliefs about the negative consequences of feeding behaviour for the animals' health on the relationship between sense of connection and addressing other visitors' feeding behaviour.

To create a global idea of all the hypotheses, this simplified model of the hypotheses was created (Figure 4). However, a more elaborate model, in which the directions of the relationships are clearly visible, is shown in Figure 5 in the appendix.

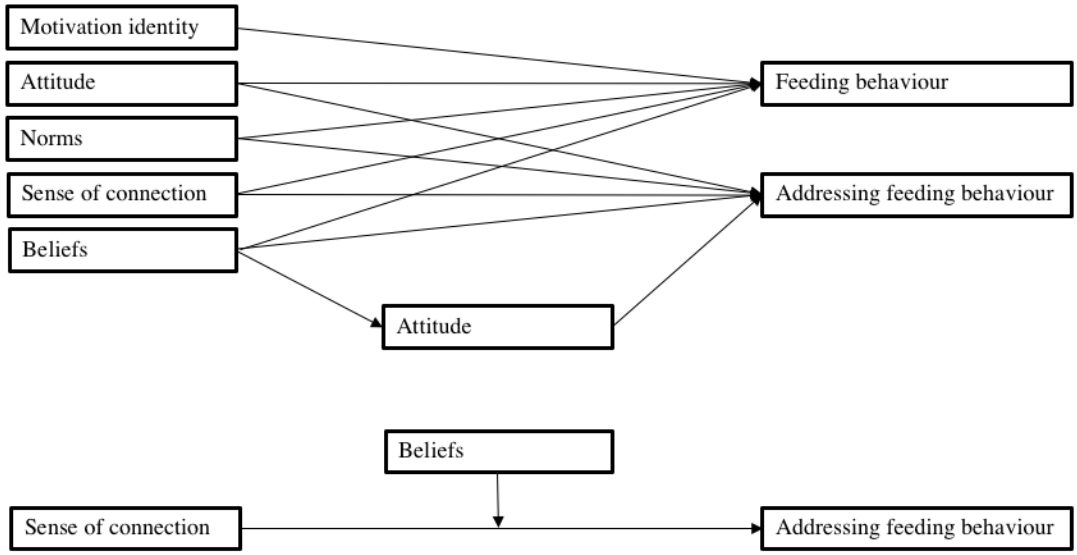



*Figure 4.* Simplified model of the hypotheses.

**Tendency to feed animals and tendency to address other visitors' feeding behaviour**

All the hypotheses described above are centred around actual feeding behaviour and actually addressing feeding behaviour. However, tendencies, which one could also describe as intentions, could eventually lead to actual feeding behaviour or actually addressing feeding behaviour (Ajzen, 1991). Therefore, it is interesting to examine which of the independent variables explain part of the variance in the tendency to feed animals and the tendency to address other visitors' feeding behaviour.

**H11.** The independent variables explain a part of the variance in the tendency to feed animals.
**H12.** The independent variables explain a part of the variance in the tendency to address other visitors' feeding behaviour.

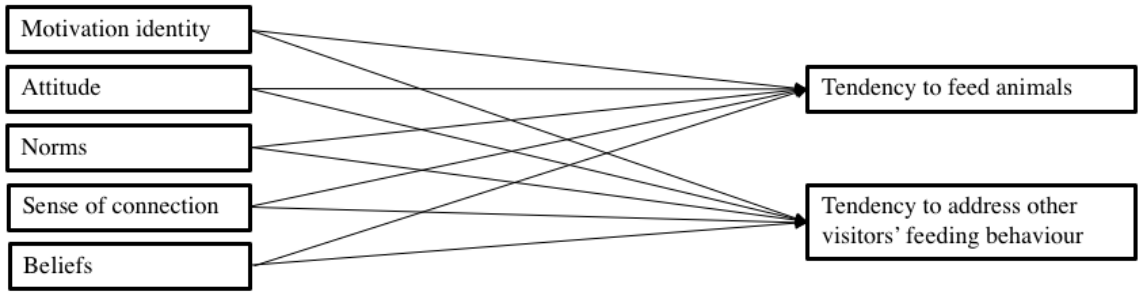



*Figure 6.* Model of the tendency to feed animals and the tendency to address other visitors' feeding behaviour.

### Goal of the study and hypotheses

This study is part of a bigger research in which more aspects about zoo visitors and their behaviour is examined (Figure 7). This current study focuses on the feeding behaviour of zoo visitors and whether this is connected to certain aspects such as their motivation identity, their sense of connection to animals, their attitude, their norms, and their beliefs (Figure 5). This study is also focused on visitors, who do not feed the animals themselves but watch this behaviour in others. It is examined whether certain characteristics, such as their sense of connection, attitude, norms and beliefs are connected to their tendency to address other visitors' feeding behaviour (Figure 5). The goal of this study is to help zoos reduce the number of feeders in their zoo, by providing them with more knowledge about the feeders and non-feeders. With this information, zoos could apply more customised interventions to stop feeding behaviour, such as special signs based on, for example, motivation identities. Moreover, since little research is conducted in the field of feeding behaviour, it will create new insights into this behaviour and might create ideas for future studies.

## Method

### Research design

Whether motivation identity, sense of connection, attitude, norms and beliefs influenced the likelihood of feeding behaviour, was examined using a correlational research design, namely a survey. Whether sense of connection, attitude, norms and beliefs influenced the likelihood of addressing other visitors' feeding behaviour, was also examined using a survey.

### Participants

*The pilot study*

A pilot study was conducted in which eleven subscribers were interviewed. These eleven participants were approached on the website of the subscribers of Diergaarde Blijdorp and they had signed themselves up. Of these eleven participants, eight were female. Seven participants had a subscription for one adult, three participants had a subscription with their (grand)child(ren) and one participant had a subscription for two adults. There was a great variation in the duration of their subscriptions, ranging from a subscription of 1 year to a subscription of 35 years. The participants stated that they visited Diergaarde Blijdorp regularly; varying from once a week to twice a month. Most participants lived in Rotterdam or nearby Rotterdam. The duration of their visit was one average 3,5 hours. The answers of these eleven participants on open questions were used to create the final survey.

*The main study*

The final survey was sent to 5.974 subscribers of Diergaarde Blijdorp. Based on whether the participants had filled in all the questions, some were deleted from the group of participants. In total, 808 participants were included in this study of which 517 (64%) participants were female. Due to a mistake in the format of the survey, there was no age-group for participants between the age of 61 and 70. It is unclear whether participants between the age of 61 and 70 stopped after this question or chose another age-group. Therefore, the distribution of the age-groups is probably an inaccurate representation of the real distribution. However, just to give an indication, most participants (45,5%) assigned themselves to the age-group of 31 to 40 years old (Table 1). The participants were asked what kind of subscription they had. Most (27%) of them stated their subscription included two adults with children ranging from 3 to 17 years old (Table 2). The second most popular subscription was the one consisting of one adult without children (17,5%). Most participants (40,1%) had a subscription between one to three years (Table 3). The majority of the participants (36,4%) visited Diergaarde Blijdorp on average five to six times a year (Table 4). The participants had the option to report all people with whom they usually visit Diergaarde Blijdorp. The most frequently chosen option, selected by 611 participants, was "With my (grand)child(ren) of 12 years old or younger" (Table 5). "With my partner" was the second most frequently chosen option, selected by 321 participants. Most participants (35,4%) stated that they lived 10 to 20 kilometres away from Diergaarde Blijdorp (Table 6). A lot of participants (34,2%) had to travel less than 10 kilometres from home to visit Diergaarde Blijdorp (Table 6). The car was by far the most popular vehicle used to travel to Diergaarde Blijdorp; 612 participants (75,7%) stated they usually travelled by car (Table 7). The time spent travelling was also examined: the majority of the participants (33,8%) spent 11 to 20 minutes travelling to Diergaarde Blijdorp (Table 8). The visit of most participants (61,5%) lasted on average two to four hours (Table 9). When asked whether they would describe their visit as passive or active, the majority of the participants (34,4%) stated they would not describe their visit as passive, nor as active (Table 10). Ninety participants stated that the elephant was their favourite animal species in Diergaarde Blijdorp, followed by apes and monkeys (72 participants) and giraffes (49 participants).

**Measures**

*The pilot study*

The pilot study consisted of open questions, based on different articles. To measure motivation identity, the answers to the question about the motivation of participants to visit the zoo could be categorised in the five motivation identities, as described by Falk and his colleagues (2008). Based on the study of Grajal and his colleagues (2017), participants were asked straight away whether they felt a sense of connection with zoo animals. Thus, a manifest question instead of a latent one was used to measure sense of connection. Attitudes and norms were measured with questions based on a technique as described by Ajzen (2002). This technique consists of mapping possible advantages and disadvantages of certain behaviour as experienced by participants. This technique is applied to measure attitudes and norms. Beliefs about the consequences of feeding animals were implicitly measured with questions about attitudes and norms. When asked what the advantages and disadvantages are of feeding animals, participants reported, besides attitudes and norms, their beliefs by answering with what they thought were the consequences of this behaviour. A summary of the interviews can be found in the results section of this study.

The results of the pilot study were used to create the survey for the main study. The participants' answers about their motivation to visit the zoo indicated that the five motivation identities, as described by Falk and his colleagues (2008) could be used to categorize the participants in the main study. The participants of the pilot study showed a variation in the level of sense of connection: one participant knew a lot of animals by name while another participant did not even have a favourite species. Therefore, instead of a closed-ended question, with a yes or no response, the participants had to indicate the level of sense of connection they felt with animals in the main study. Because the participants of the pilot study all mentioned different animal species, it was decided to ask for the participants' favourite animal in an open question in the main study. Most participants were against feeding behaviour of visitors, although they differed in the extent to which they were against this behaviour. Some participants stated they would speak up to other visitors if they would see them feeding animals. Other participants said they were too scared to do so. Therefore, in the main study, when asked whether participants addressed the behaviour when they had seen it, the option "I did not say anything, but I did feel the tendency to address that person's behaviour" was added. Since this study is part of a larger study, the survey included more questions than the ones described. The relevant questions for this study are shown in the Appendix A. The questions are translated to English; they were originally phrased in Dutch.

*The main study*

The questions of the overall survey that were used in this study, are shown in the Appendix B. These questions are translated to English in the appendix; the original survey was in Dutch. The main study mostly consisted of closed-ended questions. The survey started with an introduction, in which the participants were informed about what they could expect in the survey and how long it would take to fill in the survey. After the introduction, the participants had to answer questions about general information, such as their age, gender and the type and length of their subscription.

Then, the participants stated to which extent the listed items of the scale of motivation identity were applicable to them (Falk et al., 2008). The statements were measured on a five-points Likert scale. An example of a statement is: "I visit Diergaarde Blijdorp because I think it is useful for the work I do or my hobby". Since motivation identity was measured using a customised and translated version of the scale of motivation identity by Falk and his colleagues (2008), the Principle Component Analysis with oblique rotation was used to examine whether the same five identities as found in the study of Falk and his colleagues (2008) would apply to this current study. Based on the pattern matrix, five new motivation identities were discovered (Table 11). The first one is the *motivated learner*. The motivated learner not only visits the zoo to learn something about a specific subject, but also to learn something about himself (*Cronbach's Alpha* = .67). For example, the motivated learner will agree with the item "I visit Diergaarde Blijdorp because I was hoping to find out more about a specific subject". The *facilitator* visits the zoo to spend quality time with family and friends, and to support the learning of his loved ones (*Cronbach's Alpha* = .73). The facilitator will agree with an item such as "I visit Diergaarde Blijdorp because one of my significant others wanted me to". The *hedonic visitor* visits the zoo for fun, thinks the zoo is more inspiring than the cinema or the mall, and he considers visiting the zoo to be a hobby (*Cronbach's Alpha* = .59). The hedonic visitor will agree with the item "I visit Diergaarde Blijdorp because I wanted to have fun". The fourth motivation identity, the *spiritual seeker*, considers Diergaarde Blijdorp to be a place to feel at peace, to escape the normal rush of life and he visits Diergaarde Blijdorp so he can say that he has been there (*Cronbach's Alpha* = .58). An example of an item he will agree with is "I visit Diergaarde Blijdorp because I find going helps me get away from normal rush of life". Last, the *zoo admirer* considers the zoo to be the best place to go to and describes it as a landmark in the region; the zoo admirer is positive about a visit to the zoo and considers it to be informative. (*Cronbach's Alpha* = .75). The zoo

admirer will agree with items such as "I visit Diergaarde Blijdorp because I am quite knowledgeable but I like to keep up with what is new".

Sense of connection was measured with multiple questions from different articles. As in the study of Grajal and his colleagues (2017), the level of sense of connection to animals was asked straight away, with the question: "Do you feel a sense of connection with a certain animal or certain animal species in Diergaarde Blijdorp?". The items "I believe animals have emotions" and " In a zoo, I spend as much time as possible watching animals" were based on items from the study of Parker, Ballantyne and Hughes (2014). They used these items to measure visitors' sense of connection to animals and nature. "I enjoy spending my leisure time watching animals in the zoo" was based on an item used in the study of Luebke & Matiasek (2013). They used this item to measure personal predispositions regarding animals. Overall, the sense of connection scale, consisting of these four items, has a Cronbach's Alpha of .63. The mean inter-item correlation of this scale is .315, with a range of .193 to .518. This correlation is acceptable according to the guidelines of Clark and Watson (1995).

To gain a clear view about feeding behaviour, multiple questions were asked. For example, besides the question whether someone had actually ever fed the animals, it was asked whether the participant had ever felt the tendency to do so. Moreover, if someone had ever seen another visitor feed animals, it was asked what the participant did in that situation. If one had never encountered this situation, it was asked what the participant thought he would do in this situation. So, not only actually addressing feeding behaviour, but also the tendency to address other visitors' feeding behaviour was asked.

The participants' attitude towards feeding behaviour was measured in the same manner as was done in the study of Mallick and Driessen (2003): participants stated the extent to which they were in favour of or against feeding animals.

The norms examined in this study, "Feeding animals during your visit is normal" and "A lot of other visitors feed animals", were based on the answers given by the participants of the pilot study. The Cronbach's Alpha of these two items was low (*Cronbach's Alpha* = .14). The mean inter-item correlation is .08, which is below what is preferred according to the guidelines as described by Clark and Watson (1995). Because this scale only consists of two items, the Pearson correlation was examined. The correlation between these two items was significant ($r$ = .08, n = 808, $p$ < .05). The correlation suggests a small positive relationship between the two items.

The belief "Feeding animals enables you to see them up close" was based on an item used in the study of Ballantyne and Hughes (2006). The belief "By feeding animals, you

make sure they have a nice treat" was based on the answers given by the participants of the pilot study. Some items from the study of Ballantyne and Hughes (2006) were used to measure beliefs about the negative consequences of feeding behaviour for the animals' health. These items are "Human-food is bad for zoo-animals", "Zoo-animals cannot digest human-food properly", "Zoo-animals can become sick of eating our food" and "Feeding zoo-animals is dangerous for the animals" (Appendix B). The Cronbach's Alpha of these items of the beliefs about the negative consequences of feeding behaviour for the animals' health was .836. The mean inter-item correlation of this scale is .564, with a range of .451 to .702, which is slightly higher than is preferred by Clark and Watson (1995).

**Procedure**

First, Diergaarde Blijdorp, a zoo in Rotterdam, was visited to map no-feeding signs and whether it was possible for visitors to feed animals themselves. A meeting with our contact person, who works for the department of marketing and communication, was arranged to acquire more information about the feeding behaviour of visitors.

The pilot study was conducted in restaurant "De Lepelaar" in Diergaarde Blijdorp (Appendix A). As mentioned before, the answers to the pilot study were used to create the final survey. The participants for this pilot study were subscribers who voluntarily offered to participate in an interview. The interviews took 30 minutes on average. Since this thesis is part of a larger study, more variables than the ones described in this thesis were included. After the interview, the participants were rewarded with a coupon for a free coffee and pastry that could be used in a restaurant in Diergaarde Blijdorp. This coupon was offered by Diergaarde Blijdorp.

The survey of the main study was sent to 5.974 subscribers of Diergaarde Blijdorp. Their invitation is shown in appendix C. In total, 808 participants were included in this study. To prevent social desirability in the answers of the participants, they were asked to not think too long about the answers to the questions. The invitation and introduction of the survey together served as the informed consent. The participants were allowed to fill in the survey at any time in any environment; there were no rules regarding this. Moreover, the participants did not have a time limit per question or in total: they could take as much time as they wanted and / or needed to fill in the survey. After the participants completed the survey, they were informed about the purpose of this study (Appendix B). At the end of the survey, the participants could add their e-mail address to have a chance to win a price: a coupon at the

value of 10 euros. Also, an e-mail address was given to which participants could send questions and / or complaints about the survey.

**Data analysis plan**

First, participant information was analysed with SPSS, using the descriptives and frequencies function.

To examine whether the motivation identity questionnaire would indeed measure five factors, the data was analysed using the Principle Component Analysis with oblique rotation. To specifically examine whether motivation identity impacts the likelihood of feeding behaviour, a binary logistic regression was used. A binary logistic regression is a statistical method to examine the impact of a continuous variable on the likelihood of a dichotomous variable. It is a method to "predict membership of only two categorical outcomes" based on the score on a continuous variable (Field, 2013, p. 761).

A binary logistic regression was also used to examine whether sense of connection had an impact on the likelihood of feeding behaviour. Whether sense of connection impacts the likelihood of actually addressing feeding behaviour, was examined using a multinomial logistic regression. A multinomial logistic regression is a statistical method to examine the impact of a continuous variable on the likelihood of a categorical variable with more than two categories. It is a method to "predict membership of more than two categories" based on the score on a continuous variable (Field, 2013, p. 761).

Moreover, a binary logistic regression was used to examine whether attitude and norms have an impact on the likelihood of feeding behaviour. The impact of attitude and norms on the likelihood of actually addressing feeding behaviour was analysed using a multinomial logistic regression.

Whether the three different kinds of beliefs had an impact on likelihood of feeding behaviour, was examined using a binary logistic regression. Further, whether beliefs had an impact on the likelihood of actually addressing feeding behaviour was examined using a multinomial logistic regression.

The mediating effect of attitude on the relationship between the three different kinds of beliefs and the tendency to address feeding behaviour was examined using a regression program called PROCESS as created by Hayes (2012) and recommended by Field (2013).

This regression program (Hayes, 2012) was also used to examine the moderating effect of beliefs about the negative consequences of feeding behaviour for the animals' health on the relationship between sense of connection and addressing feeding behaviour.

Last, multiple regressions were used to measure which independent variables explain a part of the variance in the tendency to feed animals and the tendency to address other visitors' feeding behaviour.

## Results

### Pilot study

Most participants of the pilot study were facilitators, who experienced a day at the zoo as a family-trip. However, they also showed signs of the motivation identity of spiritual pilgrims and professionals/hobbyists. As mentioned in the *measures* part, the participants all differed in their level of sense of connection with animals. When asked about feeding behaviour, it was found that most participants were against feeding. However, two participants confessed to having fed an animal once. When asked about whether they had or would address another visitor's feeding behaviour, seven stated they had or would do so. Four participants said they would want to address the behaviour, but would be scared of the reaction of the other visitor, and therefore, probably, not do so.

### General feeding behaviour

Of the 808 participants, 704 participants (87,1%) stated they had never felt the tendency to feed animals; the other participants ranged in their tendency from weak to very strong (Table 12). When asked whether they had ever fed an animal in the zoo, 29 participants (3,6%) admitted they had. Of these feeders, most (34,5%) stated that they had fed an animal just once (Table 13). When asked if they had ever seen someone else feeding animals in Diergaarde Blijdorp, 314 (38,9%) participants said they had. Of these participants, 59 (18,8%) had not addressed this behaviour and also had not felt the tendency to do so (Table 14). 160 participants (51%) stated they had not addressed this behaviour, but that they had felt the tendency to say something. 95 participants (30,3%) had actually addressed this feeding behaviour. Of the 494 participants who never had encountered this situation, 439 participants (88,9%) stated they would feel a tendency, varying from weak to very strong, to address the feeding behaviour of others (Table 15). Last, when asked about their opinion about feeding animals, most participants (89,2%) were a bit or strongly against feeding animals (Table 16). In contrast, some participants (3,9%) were a bit or strongly in favour of feeding animals.

### Motivation Identity

To examine whether motivation identity would have an impact on the likelihood of feeding behaviour, a binary logistic regression was used. Preliminary analyses were

conducted to ensure no violation of linearity and multicollinearity. The motivation identities did not have an impact on the likelihood of feeding behaviour ($\chi^2$ (5, n = 808) = 3.69, $p$ = .60).

**Sense of connection**

*Sense of connection and feeding behaviour*

It was examined with a binary logistic regression whether sense of connection would positively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. Sense of connection did not have an impact on the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = .00, $p$ = .95).

*Sense of connection and addressing feeding behaviour*

A multinomial logistic regression was used to examine whether sense of connection would negatively influence the likelihood of addressing other visitors' feeding behaviour. The model with sense of connection did have an impact on the likelihood of feeding behaviour ($\chi^2$ (2, n = 314) = 8.83, $p$ <.05). Both the Pearson statistic ($\chi^2$ (22, n = 314) = 16.83, $p$ = .77) and the Deviance statistic ($\chi^2$ (22, n = 314) = 18.18, $p$ = .70) indicated that the model was a good fit for the data. According to the Likelihood Ratio Tests, sense of connection is a significant predictor in the model ($\chi^2$ (2, n = 808) = 8.83, p < .05). The model would explain between 2,8% (Cox & Snell $R^2$ = .028) and 3,2% (Nagelkerke $R^2$ = .032) of the variance in addressing feeding behaviour. Whether someone felt a sense of connection significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour ($B$ = –.20, Wald $\chi^2$ (1, n = 314) = 7.89, $p$ < .01) (Table 17). The odds ratio indicates that as the participant shows more sense of connection, the participant is more likely to address feeding behaviour than to not having the tendency to address feeding behaviour (*Exp(B)* = .82). Whether someone felt a sense of connection significantly predicted whether someone did address the behaviour or someone did have a tendency to address feeding behaviour but did not act accordingly ($B$ = –.12, Wald $\chi^2$ (1, n = 314) = 4.54, $p$ < .05) (Table 17). The odds ratio indicates that as a participant shows more sense of connection, the participant is more likely to address feeding behaviour than to have the tendency but not address feeding behaviour (*Exp(B)* = .89). In conclusion, sense of connection did positively influence the tendency to address someone's feeding behaviour.

Table 17
*Sense of connection and addressing feeding behaviour*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | -.20 | 7.89 | .005 | .82 |
| No, but I did feel the tendency to address that person's behaviour | -.12 | 4.54 | .033 | .89 |
| Df = 1 | | | | |

**Attitude and norms**

*Attitude and feeding behaviour*

A binary logistic regression was used to examine whether a negative attitude towards feeding behaviour would negatively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. Attitude did have an impact on the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = 13.02, $p < 0.01$). The Hosmer and Lemeshow Test supported the model as being useful ($\chi^2$ (1) = .24, $p$ = .63). The model would explain between 1,6% (Cox & Snell $R^2$ = .016) and 6,0% (Nagelkerke $R^2$ = .060) of the variance in feeding behaviour, and would correctly classify 96,4% of the cases, which is the same amount as the original model would. The Wald statistic indicates that attitude is making a significant contribution to the prediction of feeding behaviour ($B$ = .604, Wald $\chi^2$ (1, n = 808) = 15.91, $p < .001$). The odds ratio indicates that as participants agree more with this negative attitude, they are more likely to be non-feeders than a feeders (Exp(B) = 1.83). Thus, a negative attitude towards feeding behaviour negatively influenced the likelihood of feeding behaviour.

*Norms and feeding behaviour*

A binary logistic regression was used to examine whether certain norms would positively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. Together, the norms did not impact the likelihood of feeding behaviour ($\chi^2$ (2, n = 808) = 5.64, $p$ = .06). However, when the norms were separately analysed, the norm "Feeding animals during your visit is normal" did have an impact on the likelihood ($\chi^2$ (1, n = 808) = 5.22, $p < .05$). The model with just this norm would explain between 0,6% (Cox & Snell $R^2$ = .006) and 2,4% (Nagelkerke $R^2$ = .024) of the variance in feeding behaviour, and would correctly classify 96,4% of the cases, which is the same amount as the original model would. The Wald statistic indicates that the norm is making a significant contribution to the prediction of feeding behaviour ($B$ = –.47, Wald $\chi^2$ =

6.77, $p < .01$). The odds ratio indicates that as participants agrees more with the norm, they are more likely to be feeders (*Exp(B)* = .63). Therefore, the norm "Feeding animals during your visit is normal" positively influenced the likelihood of feeding behaviour. The norm "A lot of other visitors feed animals" did not have an impact on the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = .65, $p$ = .42).

In conclusion, the negative attitude towards feeding behaviour negatively influenced the likelihood of feeding behaviour. The norm "Feeding animals during your visit is normal" positively influenced the likelihood of feeding behaviour.

*Attitude and addressing feeding behaviour*

It was examined using a multinomial logistic regression whether a negative attitude towards feeding behaviour would positively influence the likelihood of addressing other visitors' feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model with attitude did have an impact on the likelihood of addressing feeding behaviour ($\chi^2$ (2, n = 808) = 24.37, $p < .001$). However, both the Pearson statistic ($\chi^2$ (6, n = 808) = 31.89, $p < .001$) and the Deviance statistic ($\chi^2$ (6, n = 808) = 30.43, $p < .001$) indicated that the model was not a good fit for the data. The dispersion parameter indicated that this misfit of the data could be due to overdispersion (Φ pearson = 5.32, Φ deviance = 5.07). Although the data was further analysed, one must be cautious with the results.

According to the Likelihood Ratio Tests, attitude is a significant predictor in the model ($\chi^2$ (2, n = 808) = 24.37, p < .001). The model would explain between 7,5% (Cox & Snell $R^2$ = .075) and 8,6% (Nagelkerke $R^2$ = .086) of the variance in addressing feeding behaviour. Whether someone was more against feeding animals significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour (B = -1.02, Wald $\chi^2$ (1, n = 808) = 17.02, p < .01) (Table 18). The odds ratio indicates that as a participant is more against feeding behaviour, the participant is more likely to address feeding behaviour than to not address feeding behaviour (Exp(B) = .36). Whether someone was more against feeding behaviour did significantly predict whether someone did address the behaviour or someone did have a tendency to address feeding behaviour but did not act accordingly (B = -.48, Wald $\chi^2$ (1, n = 808) = 4.18, p < .05) (Table 18). The odds ratio indicates that as a participant is more against feeding behaviour, the participant is more likely to address feeding behaviour than to having the tendency to address feeding behaviour but not

act accordingly (Exp(B) = .62). In conclusion, a negative attitude towards feeding behaviour did positively influence the likelihood of addressing other visitors' feeding behaviour.

Table 18
*Attitude and addressing feeding behaviour*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | -1.02 | 17.02 | .000 | .36 |
| No, but I did feel the tendency to address that person's behaviour | -.48 | 4.18 | .041 | .62 |
| Df = 1 | | | | |

*Norms and addressing feeding behaviour*

Next, it was examined using a multinomial logistic regression whether the norms would negatively influence the likelihood of addressing someone's feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model containing these norms did have an impact on the likelihood of addressing feeding behaviour ($\chi^2$ (4, n = 314) = 32.05, $p < .001$). Both the Pearson statistic ($\chi^2$ (28, n = 314) = 47.12, $p < .05$) and the Deviance statistic ($\chi^2$ (28, n = 314) = 42.02, $p < .05$) indicated that, although the norms had an impact on the likelihood of addressing feeding behaviour, the model was not a good fit for the data. The dispersion parameters indicated that the data might be overdispersed (Φ pearson = 1.68, Φ deviance = 1.50). This means that the "discrepancies between the observed responses and the predicted values" might be larger than the model would predict ("Overdispersion", 2018). Although the data was further analysed, one must be cautious with the results.

The model would explain between 9,7% (Cox & Snell $R^2$ = .097) and 11,2% (Nagelkerke $R^2$ = .112) of the variance in addressing feeding behaviour. According to the Likelihood Ratio Tests, both "Feeding animals during your visit is normal" ($\chi^2$ (2, n = 314) = 14.75, $p < .001$) and "A lot of other visitors feed animals" ($\chi^2$ (2, n = 314) = 16.99, $p < .001$) are significant predictors of the model. First, the norm "Feeding animals during your visit is normal" was analysed. Whether someone agreed with this norm significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour ($B$ = .68, Wald $\chi^2$ (1, n = 314) = 8.16, $p < .01$) (Table 19). The odds ratio indicates that as a participant scores higher on the norm, he is more likely to not address feeding behaviour than to address feeding behaviour (*Exp(B)* = 1.97). Whether someone agreed with this norm did not significantly predict whether someone did address the behaviour or

someone did have a tendency to address feeding behaviour but did not act accordingly ($B$ = .08, Wald $\chi^2$ (1, n = 314) = .10, $p$ = .76) (Table 19).

Table 19
*Norm "Feeding animals during your visit is normal"*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | -.68 | 8.16 | .004 | 1.97 |
| No, but I did feel the tendency to address that person's behaviour | .08 | .10 | .755 | 1.08 |
| Df = 1 | | | | |

Then, the norm "A lot of other visitors feed animals" was analysed. Whether someone agreed with this norm significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour ($B$ = –.69, Wald $\chi^2$ (1, n = 314) = 13.56, $p$ < .001) (Table 20). The odds ratio indicates that as a participant agrees more with the norm, the participant is more likely to address feeding behaviour than to not address feeding behaviour (*Exp(B)* = .50). Whether someone agreed with this norm significantly predicted whether someone did address the behaviour or someone did have a tendency to address feeding behaviour but did not act accordingly ($B$ = –.43, Wald $\chi^2$ (1, n = 314) = 9.78, $p$ < .01) (Table 20). The odds ratio indicates that as a participant agrees more with this norm, he is more likely to address feeding behaviour than to having the tendency but not address feeding behaviour (*Exp(B)* = .65).

Table 20
*Norm "A lot of other visitors feed animals" and addressing feeding behaviour*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | -.69 | 13.56 | .000 | .50 |
| No, but I did feel the tendency to address that person's behaviour | -.43 | 9.78 | .002 | .65 |
| Df = 1 | | | | |

In conclusion, a negative attitude towards feeding behaviour positively influenced the likelihood of addressing other visitors' feeding behaviour. The norm "Feeding animals during your visit is normal" negatively influenced the likelihood of addressing feeding behaviour,

while the norm "A lot of other visitors feed animals" positively influenced the likelihood of addressing feeding behaviour.

**Beliefs**

*Beliefs and feeding behaviour*

First, it was examined with a binary logistic regression whether the belief "Feeding animals enables you to see them up close" would positively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. This belief did not have an impact in the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = 3.81, $p$ = .05). Since this p-value was close to significance, other statistics were examined. The Hosmer and Lemeshow Test supported the model as being useful ($\chi^2$ (3, n = 808) = 4.54, $p$ = .21). Nevertheless, the Wald statistic indicated that the belief would not make a significant contribution to the prediction of feeding behaviour ($B$ = -.28, Wald $\chi^2$ (1, n = 808) = 3.52, $p$ = .06). Thus, the belief "Feeding animals enables you to see them up close" did not influence the likelihood of feeding behaviour.

Then, it was examined with a binary logistic regression whether the belief "By feeding animals, you make sure they have a nice treat" would positively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model did have an impact on the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = 6.99, $p$ < .01). The Hosmer and Lemeshow Test supported the model as being useful ($\chi^2$ (2, n = 808) = 1.83, $p$ = .40). The model would explain between 0,9% (Cox & Snell $R^2$ = .009) and 3,2% (Nagelkerke R2 = .032) of the variance in feeding behaviour, and would correctly classify 96,4% of the cases, which is the same amount as the original model would. The belief "By feeding animals, you make sure they have a nice treat" did make a significant contribution to the prediction of feeding behaviour ($B$ = –.43, Wald $\chi^2$ (1, n = 808) = 7.75, $p$ <.01). The odds ratio indicates that as participants agree more with this belief, they are more likely to be feeders than non-feeders (*Exp(B)* = .65). In conclusion, the belief "By feeding animals, you make sure they have a nice treat" did positively influence the likelihood of feeding behaviour.

Further, it was examined using a binary logistic regression whether beliefs about the negative consequences of feeding behaviour for the animals' health would negatively influence the likelihood of feeding behaviour. Preliminary analyses were conducted to ensure no violation

of linearity and multicollinearity. Beliefs about the negative consequences of feeding behaviour for the animals' health did not have an impact on the likelihood of feeding behaviour ($\chi^2$ (1, n = 808) = .03, $p$ = .87).

In conclusion, the belief "By feeding animals, you make sure they have a nice treat" positively influenced the likelihood of actual feeding behaviour.

*Beliefs and addressing feeding behaviour*

It was examined using a multinomial logistic regression whether the belief "Feeding animals enables you to see them up close" would negatively influence the likelihood of addressing someone's feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model did have an impact on the likelihood of addressing feeding behaviour ($\chi^2$ (2, n = 314) = 13.51, $p$ < .001). Both the Pearson statistic ($\chi^2$ (6, n = 314) = 8.98, $p$ = .18) and the Deviance statistic ($\chi^2$ (6, n = 314) = 8.81, $p$ = .19) indicated that the model was a good fit for the data. The model would explain between 4,2% (Cox & Snell $R^2$ = .042) and 4,8% (Nagelkerke $R^2$ = .048) of the variance in addressing feeding behaviour.

Whether someone agreed with the belief "Feeding animals enables you to see them up close" significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour ($B$ = .44, Wald $\chi^2$ (1, n = 314) = 11.81, $p$ < .01) (Table 21). The odds ratio indicates that as a participant scores higher on the belief, the participant is more likely to not address feeding behaviour than to address feeding behaviour (*Exp(B)* = 1.55). Whether someone agreed with this belief did not significantly predict whether someone did address the behaviour or someone did have a tendency to address feeding behaviour but did not act accordingly ($B$ = .09, Wald $\chi^2$ (1, n = 314) = 1.00, $p$ = .32) (Table 21).

Table 21
*Belief "Feeding animals enables you to see them up close" and addressing feeding behaviour*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | .44 | 11.81 | .001 | 1.55 |
| No, but I did feel the tendency to address that person's behaviour | .09 | 1.00 | .316 | 1.09 |
| Df = 1 | | | | |

Further, it was examined using a multinomial logistic regression whether the belief "By feeding animals, you make sure they have a nice treat" would negatively influence the likelihood of addressing someone's feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model did not have an impact on the likelihood of addressing feeding behaviour ($\chi^2$ (2, n = 314) = 5.97, $p$ = .05). Since this p-value was close to significance, other statistics were examined. The Pearson statistic ($\chi^2$ (6, n = 314) = 13.36, $p$ < .05) indicated that the model was not a good fit for the data, while the Deviance statistic ($\chi^2$ (6, n = 314) = 11.37, $p$ = .08) indicated that it was. The model would explain between 1,9% (Cox & Snell $R^2$ = .019) and 2,2% (Nagelkerke $R^2$ = .022) of the variance in addressing feeding behaviour.

Whether someone agreed with the belief "By feeding animals, you make sure they have a nice treat" significantly predicted whether someone did address feeding behaviour or someone did not address feeding behaviour ($B$ = .38, Wald $\chi^2$ (1, n = 314) = 5.00, $p$ < .05) (Table 22). The odds ratio indicates that as a participant scores higher on the belief, the participant is more likely to not address feeding behaviour than to address feeding behaviour (*Exp(B)* = 1.47). Whether someone agreed with the belief did not significantly predict whether someone did address feeding behaviour or someone did have the tendency to address the behaviour but did not act accordingly ($B$ = .05, Wald $\chi^2$ (1, n = 314) = .11, $p$ = .74) (Table 22).

Table 22
*Belief "By feeding animals, you make sure they have a nice treat" and addressing feeding behaviour*

| Baseline: Yes, I did address feeding that person's behaviour | B | Wald | Sig. | Exp(B) |
|---|---|---|---|---|
| No, and I did not feel the tendency to address that person's behaviour | .38 | 5.00 | .025 | 1.47 |
| No, but I did feel the tendency to address that person's behaviour | .05 | .11 | .739 | 1.05 |
| Df = 1 | | | | |

It was examined using a multinomial logistic regression whether beliefs about the negative consequences of feeding behaviour for the animals' health would positively influence the likelihood of addressing someone's feeding behaviour. Preliminary analyses were conducted to ensure no violation of linearity and multicollinearity. The model with beliefs about the negative consequences of feeding behaviour for the animals' health did not have an impact on the likelihood of addressing feeding behaviour ($\chi^2$ (2, n = 314) = 4.96, p = .08).

In conclusion, the belief "Feeding animals enables you to see them up close" and the belief "By feeding animals, you make sure they have a nice treat" negatively influenced the likelihood of addressing feeding behaviour.

**Mediation**

*Beliefs, attitudes and the tendency to address feeding behaviour*

Then, a mediating effect of attitude on the relationship between the different beliefs and the tendency to address other visitors' feeding behaviour was examined. Three different analyses were conducted: one with the belief "Feeding animals enables you to see them up close", one with the belief "By feeding animals, you make sure they have a nice treat" and one with the beliefs about the negative consequences of feeding behaviour for the animals' health.

A significant indirect effect of the belief "Feeding animals enables you to see them up close" on the tendency to address other visitors' feeding behaviour through attitude was found ($b$ = -.06, BCa CI [-.081, -.034]) (Figure 8). This belief explained 7,1% ($R^2$ = .071) of the variance in attitude. With attitude included in the model, the model explained 5,7% ($R^2$ = .057) of the variance in the tendency to address other visitors' feeding behaviour.

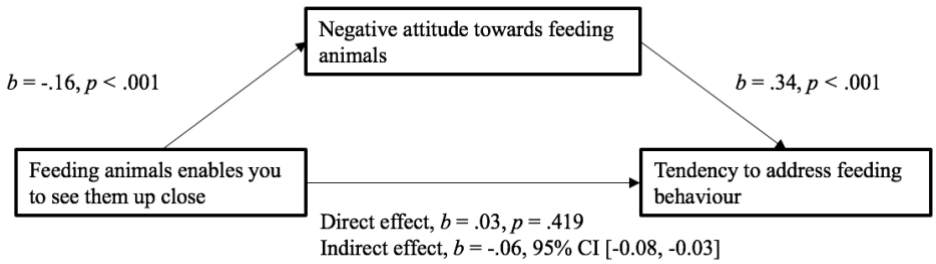



*Figure 8*. Mediation model with the belief "Feeding animals enables you to see them up close".

Further, a significant indirect effect of the belief "By feeding animals, you make sure they have a nice treat" on the tendency to address other visitors' feeding behaviour through attitude was found ($b$ = -.11, BCa CI [-.163, -.060]) (Figure 9). This belief explained 15,9% ($R^2$ = .159) of the variance in attitude. With attitude included in the model, the model explained 5,6% ($R^2$ = .056) of the variance in the tendency to address other visitors' feeding behaviour.

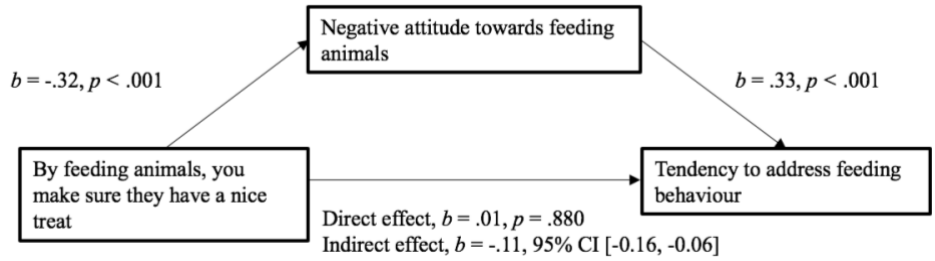



*Figure 9.* Mediation model with the belief "By feeding animals, you make sure they have a nice treat".

A significant indirect effect was also found of the beliefs about the negative consequences of feeding animals for the animals' health on the tendency to address feeding behaviour through attitude (*b* = .01, BCa CI [.005, .024]) (Figure 10). These beliefs explained 2,5% ($R^2$ = .025) of the variance in attitude. With attitude included in the model, the model explained 7% ($R^2$ = .070) of the variance in the tendency to address other visitors' feeding behaviour.

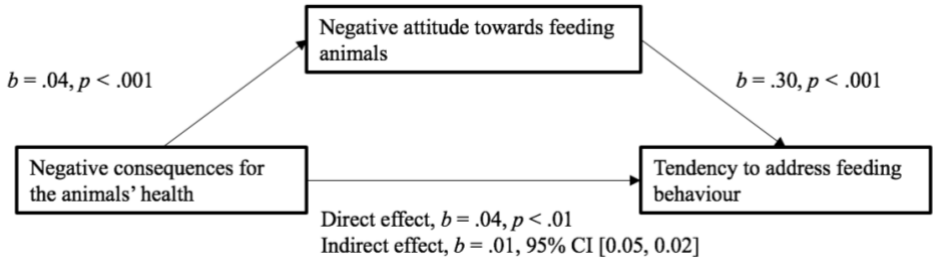



*Figure 10.* Mediation model with the beliefs about the negative consequences of feeding animals.

**Moderation**

*Beliefs, sense of connection and the tendency to address feeding behaviour*

A moderating effect of beliefs about the negative consequences of feeding animals for the animals' health on the relationship between sense of connection with animals and the tendency to address other visitors' feeding behaviour was examined. No interaction effect was found for these beliefs on the relationship between sense of connection and whether one would address someone's feeding behaviour (*b* = .00, 95% CI [–0.014, 0.015], *t* = .08, *p* =.94). However, a main effect of sense of connection (*b* = .08, 95% CI [0.039, 0.122], *t* = 3.83, *p* < .001) and a main effect of beliefs about the negative consequences of feeding animals for the animals' health (*b* = .05, 95% CI [0.018, 0.082], *t* = 3.09, *p* < .01) on whether one would address someone's feeding behaviour were found. In conclusion, no moderating effect of beliefs about the negative consequences of feeding behaviour on the relationship

between sense of connection and the tendency to address other visitors' feeding behaviour was found.

**Overall model tendency to feed animals**

All the independent variables (motivation identity, sense of connection, attitude, norms and beliefs) were taken together in a multiple regression to examine their influence on the tendency to feed animals. Preliminary analyses were conducted to ensure no violation of the assumptions of multicollinearity, additivity, linearity, homoscedasticity and independence of errors. The assumption of normality was violated. Taking into account the large sample (n = 808), this was not considered a problem. 13,7% of the variance in the outcome was accounted for by all the predictors ($F$ (12, 795) = 10.49, $p < .001$, $R^2 = .137$). In the final model, the hedonic visitor motivation identity (*beta* = .11, $p < .05$), attitude (*beta* = -.24, $p < .001$), the belief "Feeding animals enables you to see them up close" (*beta* = .12, $p < .01$) and the belief "By feeding animals, you make sure they have a nice treat" (*beta* = .10, $p < .01$) were all significant predictors of the tendency to feed animals. The hedonic visitor motivation identity and the beliefs have a positive relationship with the tendency to feed animals. If a participant scores higher on this motivation identity or tends to agree more with these beliefs, this participant is also more likely to have a greater tendency towards feeding animals. The negative attitude towards feeding animals has a negative relationship with the tendency to feed animals: if a participant is more against feeding animals, he is less likely to have a tendency to feed animals. The hedonic visitor motivation identity explained 0,7% (*part* = .084), the negative attitude towards feeding animals explained 4,4% (*part* = -.210), the belief "Feeding animals enables you to see them up close" explained 1,2% (*part* = .109), and the belief "By feeding animals, you make sure they have a nice treat" explained 0,8% (*part* = .087) of the variance in the tendency to feed animals. A multiple regression equation was created: a participant's tendency to feed animals is equal to .927 + .029(hedonic) + -.186(attitude) + .058 (up close) + .068 (treat), where all variables are measured on a five-point scale.

**Overall model tendency to address other visitors' feeding behaviour**

Last, a multiple regression with the same independent variables (motivation identity, sense of connection, attitude, norms and beliefs) was conducted to examine whether they explained a part of the variance in the tendency to address someone's feeding behaviour. Preliminary analyses were conducted to ensure no violation of the assumptions of multicollinearity,

additivity, linearity, homoscedasticity, independence of errors and normality. 12,3% of the variance in the outcome was accounted for by all the predictors ($F$ (12, 481) = 5.62, $p < .001$, $R^2 = .087$). In the final model, the facilitator motivation identity (*beta* = .14, $p < .01$), sense of connection (*beta* = .13, $p < .01$) and attitude (*beta* = .22, $p < .001$) were all significant predictors of the tendency to feed animals. The facilitator motivation identity, sense of connection and the negative attitude towards feeding animals all have positive relationships with the tendency to address someone's feeding behaviour. When a participant is more a facilitator, feels a greater sense of connection or is more against feeding animals, this participant is more likely to have a greater tendency towards addressing someone's feeding behaviour. The facilitator motivation identity explained 1,7% (*part* = .129), sense of connection (SOC) explained 1,3% (*part* = .115) and attitude explained 3,6% (*part* = .189) of the variance in the tendency to address someone's feeding behaviour. A multiple regression equation was created: a participant's tendency to address someone's feeding behaviour is equal to -1.232 + .048(facilitator) + .062(SOC) + .300(attitude), where every variable is measured on a five-point scale.

## Discussion

After the data was analysed, it was clear that motivation identity had no impact on the likelihood of feeding behaviour: there is not one specific motivation identity that is more or less inclined to feed animals during a visit to the zoo. The first hypothesis was rejected. Therefore, interventions based on motivation identities will not be effective.

Further, it was found that sense of connection did not have an impact on the likelihood of feeding behaviour. Thus, whether one scores high or low on sense of connection with animals did not predict feeding behaviour. Based on the findings of Mallick and Driessen (2003), which showed that visitors fed birds to help them, it was expected that visitors with a high sense of connection would try to help the animals of Diergaarde Blijdorp by feeding them. Feeding was expected to be a way to show affection to the animals. However, the current results found that sense of connection did not have an impact on the likelihood of feeding behaviour, and therefore the second hypothesis was rejected. This means that zoos could not prevent feeding behaviour by encouraging or discouraging a sense of connection with animals.

Sense of connection did have an impact on the likelihood of addressing someone's feeding behaviour. In contrast with what was expected, sense of connection positively influenced the tendency to address someone's feeding behaviour. If a participant feels a sense

of connection, he / she is more likely to address someone's feeding behaviour. Instead of helping animals by feeding them, visitors with a high sense of connection might address other visitors' feeding behaviour to help animals by protecting them from the bad consequences of feeding behaviour. This would suggest that visitors with a high sense of connection also have more knowledge about the consequences. However, if this was truly the case, a negative influence of sense of connection on the likelihood of feeding behaviour should have been found. As mentioned before, no impact of sense of connection on the likelihood of feeding behaviour was found. Therefore, another explanation was examined.

Visitors with a high sense of connection might feed or not feed animals because they care for them: feeding them healthy snacks to help them or not feeding them to protect them from the consequences of this feeding behaviour. Hypothetically, this would divide the group of visitors with a high sense of connection in feeders and non-feeders. These feeders might believe that they cause no harm because they trust themselves and believe the food they give to the animals is not bad for the animals' health. However, they might not trust others and their choices of snacks and therefore address other visitors' feeding behaviour. The non-feeders would believe in the harm of feeding behaviour and therefore not feed animals themselves and address other visitors' feeding behaviour. This could explain why sense of connection does not impact the likelihood of feeding behaviour but does impact the likelihood of addressing other visitors' feeding behaviour.

Zoos could respond to this finding by targeting visitors with a high sense of connection with interventions, for example signs stating: "Keep your loved ones safe; if you see other visitors feed animals, please ask them to stop". Since it was not originally expected that sense of connection would positively influence addressing feeding behaviour, the third hypothesis was rejected.

Moreover, it was found that a negative attitude towards feeding behaviour negatively influenced the likelihood of feeding behaviour: if a participant is more against feeding animals, he / she is less likely to feed them. This was expected from the Theory of Planned Behaviour of Ajzen (1991), in which, among others, attitudes lead to intentions which in turn lead to behaviour (Figure 2). In conclusion, hypothesis 4 was not rejected.

In agreement with hypothesis 5a, agreeing with the norm "Feeding animals during your visit is normal" positively influenced feeding behaviour: if a visitor agrees with this norm, he /she is more likely to feed animals. This is in agreement with the Theory of Planned Behaviour of Ajzen (1991) in which norms, among others, lead to intentions which in turn lead to behaviour (Figure 2). The zoo could respond to this finding with interventions with

which visitors who agree with this norm will be targeted. The intervention should focus on the fact that feeding animals during a visit is not normal, to change this norm.

The norm "A lot of other visitors feed animals" did not have an impact on the likelihood of actual feeding behaviour. Therefore, hypothesis 5b was rejected. Whether one agrees with the norm that a lot of other visitors feed animals during their visit does not influence whether oneself feeds animals. This descriptive norm does not influence the behaviour. This contradicts the Theory of Planned Behaviour of Ajzen (1991), which states that, among others, norms lead to intentions which in turn lead to behaviour (Figure 2). Focusing interventions on this norm, would not be effective to decrease the likelihood of feeding behaviour.

When analysing the tendency to address someone's feeding behaviour, it was found that a negative attitude towards feeding animals positively influenced the likelihood of addressing other visitors' feeding behaviour: if one is more against feeding animals, he / she is more likely to address feeding behaviour from other visitors. Therefore, hypothesis 6a was not rejected.

In agreement with hypothesis 6b, the norm "Feeding animals during your visit is normal" negatively influenced the likelihood of addressing other visitors' feeding behaviour. If a visitor agrees with the norm "Feeding animals during your visit is normal", he / she is more likely to not address other visitors' feeding behaviour than to address it. This makes sense: if one considers something to be normal, he / she will not criticize others for acting the same way. Therefore, interventions should be focused on decreasing this norm. If visitors agree less with this norm, they are more likely to address other visitors' feeding behaviour.

The norm "A lot of other visitors feed animals" positively influenced the likelihood of addressing other visitors' feeding behaviour. This is in contrast with what was expected. Therefore, hypothesis 6c was rejected. If a visitor agrees with the norm "A lot of other visitors feed animals", he / she is more likely to address the feeding behaviour of others instead of not addressing it. People who experience this norm might consider feeding behaviour to be a large-scale problem, and feel the urge to do something about it. Therefore, they might address other visitors' feeding behaviour.

Moreover, it was found that the belief "Feeding animals enables you to see them up close" did not influence feeding behaviour. Therefore, hypothesis 7a was rejected. This item was taken from the study of Ballantyne and Hughes (2006). In their study, bird feeders and non-feeders differed in scores on this belief, with bird feeders agreeing more with the item (Ballantyne & Hughes, 2006). Therefore, it was expected that this belief would impact the

likelihood of feeding behaviour. The fact that this result was not found could be due to the fact that the current study was conducted in a zoo, in which all animals have a limited space and where the residences are all designed in such a way that it allows visitors to watch animals during their visits, instead of an open area in which birds come and go as they please, as was the case in the study of Ballantyne and Hughes (2006). Therefore, feeding animals to see them closely might be less necessary in Diergaarde Blijdorp. Thus, this would explain why this belief does not positively influence the likelihood of feeding behaviour. Even when participants would strongly agree with this item, it would not be necessary to feed animals of Diergaarde Blijdorp to see them up close.

Further, in agreement with hypothesis 7b, the belief "By feeding animals, you make sure they have a nice treat" positively influenced feeding behaviour. If a visitor agrees more with this belief, he / she is more likely to feed animals. This finding suggests that visitors might feel bad for zoo-animals and their diet, and want them to feel better by feeding them. If zoos would make clear that the animals already get enough delicious food, this might change this belief in visitors and prevent them from feeding animals.

Furthermore, it was found that beliefs about the negative consequences of feeding behaviour did not have an impact on the likelihood of feeding behaviour; hypothesis 7c was rejected. Based on the current finding, it would not be effective to create interventions to create the beliefs among visitors that feeding animals is bad for their health.

When analysing the tendency to address someone's feeding behaviour, it was found that, in agreement with hypothesis 8a, the belief "Feeding animals enables you to see them up close" negatively influenced the likelihood of addressing other visitors' feeding behaviour. If a visitor agrees with the belief, he / she is more likely to not address other visitors' feeding behaviour instead of addressing it. Thus, while this belief does not impact the likelihood of feeding behaviour, it does impact the likelihood of addressing other visitors' feeding behaviour. To see animals up close is not a reason to feed or not to feed animals; as mentioned before, this finding could be due to the fact that animals in Diergaarde Blijdorp are mostly visible to the visitors. However, the belief "Feeding animals enables you to see them up close" is a reason to not address other visitors' feeding behaviour: if someone else enables a visitor to see an animal up close, it is beneficial to the visitor to not address this behaviour. Although the animals of Diergaarde Blijdorp are visible for most of the time, the privilege of seeing them even more closely because someone else violates the no-feeding rule, might outweigh visitors' moral compass and therefore decreases their intention to address this feeding behaviour. To watch animals from more up close is not a reason to violate or not

violate the rules oneself, but is a reason to not prevent someone else from violating the no-feeding rule. To motivate visitors to address feeding behaviour of others, this belief should be tackled.

The belief "By feeding animals, you make sure they have a nice treat" did not influence the likelihood of addressing other visitors' feeding behaviour, and therefore, hypothesis 8b was rejected. Focusing on this belief to increase the likelihood of addressing feeding behaviour is not effective. Although giving animals a nice treat is a reason to feed them, it is not a reason to address or not address other visitors' feeding behaviour. The latter might be due to the fact that what someone else is feeding animals is unknown to others. Therefore, it is probably not clear whether this indeed is a nice treat. Thus, whether someone addresses other visitors' feeding behaviour might not be based on whether the food is considered a nice treat.

Moreover, beliefs about the negative consequences of feeding animals did not have an impact on the likelihood of addressing other visitors' feeding behaviour. Therefore, hypothesis 8c was rejected. Based on this finding, interventions based on beliefs would not be effective to increase the likelihood of addressing feeding behaviour.

Three mediating effects of attitude on the relationship between the three different beliefs and addressing feeding behaviour were found. Therefore, hypothesis 9 was not rejected. A positive relationship between a negative attitude towards feeding animals and the tendency to address other visitors' feeding behaviour was found. A negative relationship of the beliefs "Feeding animals enables you to see them up close" and "By feeding animals, you make sure they have a nice treat", and a negative attitude towards feeding animals was found. Thus, interventions should be focused on changing these beliefs, to create negative attitudes towards feeding animals, and in turn increase the tendency to address other visitors' feeding behaviour. Since the relationship between beliefs about the negative consequences of feeding animals for the animals' health and a negative attitude towards feeding animals is positive, interventions could also focus on establishing these beliefs among visitors.

Moreover, no moderating effect of beliefs about the negative consequences of feeding behaviour on the relationship between sense of connection and addressing feeding behaviour was found. Therefore, hypothesis 10 was rejected. Beliefs about the negative consequences of feeding behaviour do not change the relationship between sense of connection and addressing feeding behaviour. As mentioned before, it was found that sense of connection, in contrast with what was expected, negatively influenced the likelihood of feeding behaviour. The moderating effect was examined because it was expected that beliefs about the negative

consequences of feeding behaviour could change the relationship between sense of connection and addressing feeding behaviour from positive to negative. However, these beliefs were not needed for this negative relationship. Moreover, the beliefs about the negative consequences of feeding behaviour did not reinforce the relationship between sense of connection and addressing feeding behaviour. It might be the case that visitors with a high sense of connection have already gained more knowledge about the consequences of feeding behaviour compared to visitors with a low sense of connection. These two hypotheses might explain why no moderating effect of beliefs was found.

When all variables are put together in a model, the hedonic visitor motivation identity, a negative attitude towards feeding behaviour, the belief "Feeding animals enables you to see them up close" and the belief "By feeding animals, you make sure they have a nice treat" explain a part of the variance in the tendency to feed animals. Moreover, when all variables are put together in a model, the facilitator motivation identity, sense of connection and a negative attitude towards feeding animals explain a part of the variance in the tendency to address other visitors' feeding behaviour. Therefore, hypothesis 11 and 12 were not rejected. Based on these findings, zoos could decide to create interventions to decrease the tendency to feed animals and increase the tendency to address other visitors' feeding behaviour.

**Limitations**

This study was conducted with the participation of subscribers from Diergaarde Blijdorp. Therefore, the characteristics found in this study that influence feeding behaviour and addressing feeding behaviour might not be generalizable to other zoos. For example, the belief "Feeding animals enables you to see them up close" could influence feeding behaviour in other zoos where animals are less visible than in Diergaarde Blijdorp. Moreover, the findings might not be generalizable to all sorts of visitors. In this study, the participants were all subscribers of Diergaarde Blijdorp. They might behave differently from visitors who visit Diergaarde Blijdorp incidentally. This difference between subscribers and day-visitors could be an interesting topic for future research.

Further, there were some doubts about the manner in which statements were phrased. More specifically, the norm "A lot of other visitors feed animals" maybe should have been phrased differently. The current phrasing might have measured beliefs that participants had about other visitors instead of a norm that participants felt. Whether this item measured a belief or a norm does not matter for the implications: this item has a positive influence on the

likelihood of addressing feeding behaviour, and when an intervention would be created, it would probably include this item quite literally.

An e-mail address was given to the participants to which they could send questions and / or complaints about the survey. Two participants sent an e-mail in which they stated that they had other motivations to visit Diergaarde Blijdorp than the ones included in the motivation identity questionnaire. Therefore, they felt that the survey did not measure their motivations correctly. However, the motivation identity questionnaire was chosen to measure five identities. It was expected that not all possible motivations would be captured with this questionnaire. It is advised to others, who include the motivation identity scale of Falk and his colleagues (2008) in their research, to give participants some guidelines about how to fill in this scale beforehand. This, to limit the chance that the participants just think of one motivation, answer no to all other motivation options, and are disappointed when this one motivation they had in mind is not available in the list of items.

One of the 29 feeders sent an e-mail in which she explained that, although feeding behaviour was explained (Appendix B), it was unclear to her that the animals meant in the questions were actual zoo-animals. The participant stated in the e-mail that she had fed animals in Diergaarde Blijdorp, but that she meant ducks and that she would never feed "real zoo-animals". Although ducks might not be considered "real zoo-animals", Diergaarde Blijdorp states that it is forbidden to "feed animals and to bother them". One could argue that this includes ducks. However, it is unclear whether these ducks receive the same special diet as "real zoo-animals" and thus whether feeding these ducks is a violation of the rules regarding zoo-animals. Since this study was anonymous, it was impossible to delete her from the data. Therefore, the participant is included in the study. Since only one e-mail was sent about this problem, it is expected that the other participants, who reported themselves as feeders, have fed at least one zoo-animal once.

This study consisted of a survey, in which social desirability might have created a problem. Although some participants admitted that they had at least once fed an animal, it is possible that other participants might have lied about their feeding behaviour. One could argue that observing feeding behaviour in a zoo and interviewing these visitors might create a more accurate picture. Since some of the participants in this study did admit their feeding behaviour and the survey did not emphasize how bad feeding behaviour is, it is expected that this study does create an accurate picture and that social desirability was not a substantial problem in this study.

**Future research**

Throughout this study, signs were suggested as a way for zoos to prevent feeding behaviour or to increase the likelihood of visitors to address other visitors' feeding behaviour. No-feeding signs are commonly used to prevent feeding behaviour. However, their effectiveness is questionable. The study of Mallick and Driessen (2003) showed that, of the 82 visitors of National Parks in Tasmania who had encountered a no-feeding sign, 11,5% stated that the sign had no effect on their original opinion and none of the participants stated that their opinion was changed due to the signs. Therefore, if some of these participants wanted to feed animals, the sign would probably not change their minds. Furthermore, when in Milwaukee County Zoo in Wisconsin signs were placed stating "Coins Kill", to prevent visitors from throwing coins into the Humboldt penguins' pool, more coins were thrown in than before (Sandin, 2002). This is an example of how signs can introduce new ideas in visitors' minds. Placing more no-feeding signs could eventually increase the number of feeders.

A solid solution to prevent feeding, as also proposed by Kawata (2008), is placing a glass partition between the visitors and the animals. Then, it is physically not possible for visitors to feed animals. Kawata (2008) states that this is a better option than "old-style iron bars and wire mesh" because glass partition still allows visitors to see animals from up close. Although visitors can view animals from up close, placing glass partition does create a certain distance between the visitor and the animal. Zoos should think about which animals are fed by visitors the most and for which animals it is beneficial to place a glass partition, while also taking into account the decrease in experience and interaction as experienced by visitors.

Another solution to feeding behaviour of visitors, was found by Jones, McGregor, Farmer and Baker (2016). They suggested, based on an experiment with crowned lemurs (*Eulemur Coronatus)*, that feeding animals by visitors had some benefits in comparison with feeding by a zoo-keeper (Jones et al., 2016). For example, being fed by multiple visitors instead of one zoo-keeper would decrease the direct-competition to get food. They also stated that feeding by visitors could enhance the well-being of the crowned lemurs while also improving the visitors' experience (Jones et al., 2016). The idea of feeding programs for visitors is supported by the study of Orban, Siegford and Snider (2016), who tested this with giraffes. When visitors are offered this opportunity, they might become less inclined to feed animals at other times.

Whether zoos choose to tackle the problem of feeding behaviour by trying to change behaviour with signs, by making it impossible to show the behaviour with glass partitions or by centring the behaviour with feeding schedules for visitors, is up to them. The purpose of

this study was to gain more knowledge about feeders and about visitors who address feeding behaviour of others. Future research could experiment with different signs in zoos based on the feeders' characteristics to change feeding behaviour, such as Ballantyne and Hughes (2006) did in picnic areas. They could also experiment with the different solutions mentioned above to change, to prevent or to center feeding behaviour. For example, they could experiment with programs to include feeding in the zoo experience or examine whether glass partitions would affect the zoo experience to answer the question which intervention is best to prevent feeding behaviour in zoos.

**Conclusion**

In conclusion, it was found that the negative attitude towards feeding animals, the norm "Feeding animals during your visit is normal" and the belief "By feeding animals, you make sure they have a nice treat" influenced the likelihood of feeding behaviour. Sense of connection, the negative attitude towards feeding animals, the norm "Feeding animals during your visit is normal", the norm "A lot of other visitors feed animals", the belief "Feeding animals enables you to see them up close" and "By feeding animals, you make sure they have a nice treat" influenced the likelihood of addressing other visitors' feeding behaviour. Furthermore, the hedonic visitor motivation identity, the negative attitude towards feeding behaviour, the belief "Feeding animals enables you to see them up close" and the belief "By feeding animals, you make sure they have a nice treat" explain a part of the variance in the tendency to feed animals. The facilitator motivation identity, sense of connection and the negative attitude towards feeding behaviour explain a part of the variance in the tendency to address other visitors' feeding behaviour. In short, the purpose of this study was to address the elephant in the room, feeding behaviour, and gain more knowledge about this problem by focusing on characteristics of feeders and non-feeders. Based on these findings, zoos could create interventions to tackle the problem of visitors who feed their animals. Future research could indicate which interventions will work best. In the end, more research on this subject matter might save the lives of our furry, and some not so furry, friends.

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## Appendix

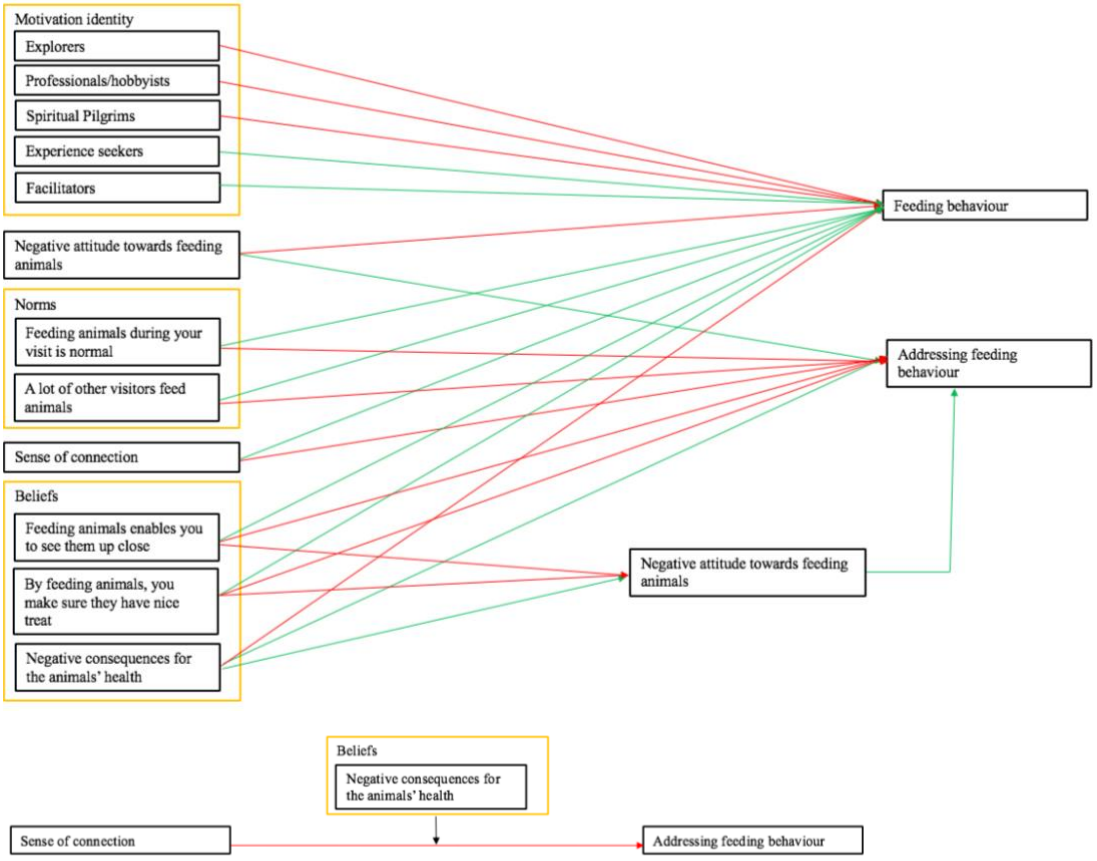


*Figure 6.* Expected model of this study.

Green arrows indicating a positive relationship; red arrows indicating a negative relationship; black arrow indicating a moderation.

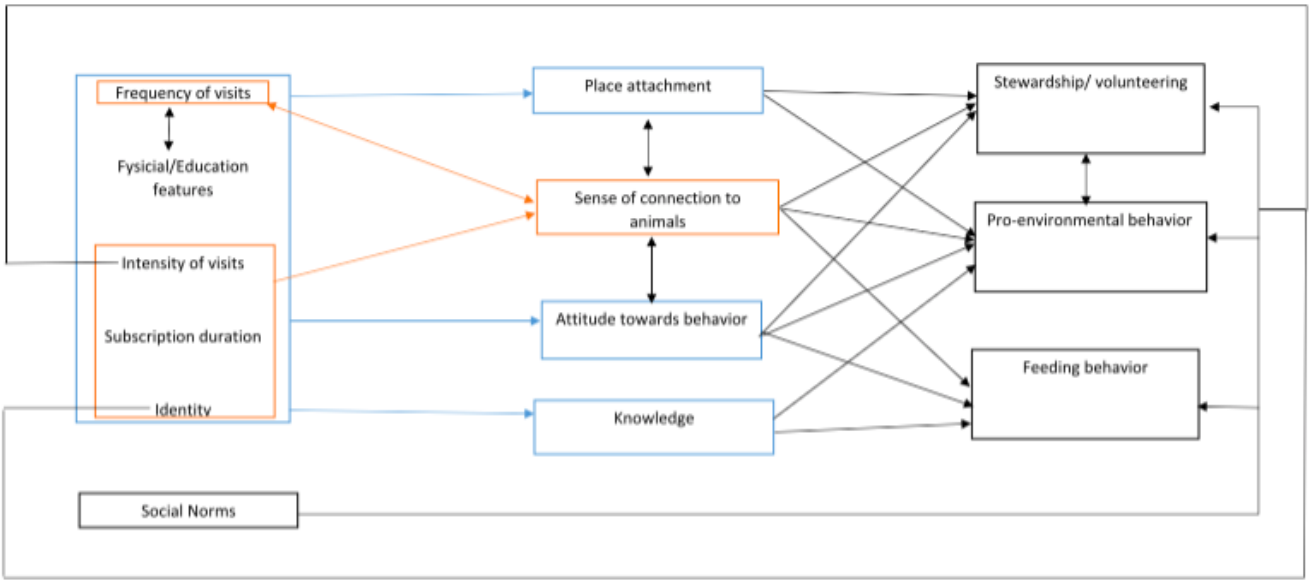


*Figure 7.* Overall model of the entire study.

Table 1
*Age groups*

| | Number of participants |
|---|---|
| ≤ 20 years old | 5 (0,6%) |
| 21 – 30 years old | 108 (13,4%) |
| 31 – 40 years old | 368 (45,5%) |
| 41 – 50 years old | 139 (17,2%) |
| 51 – 60 years old | 156 (19,3%) |
| 71 – 80 years old | 32 (4,0%) |
| 81 years old or older | 0 (0,0%) |
| N = 808 | |

Table 2
*Kind of subscription*

| | Number of participants |
|---|---|
| One adult without children | 141 (17,5%) |
| One adult with children under 3 years old | 70 (8,7%) |
| One adult with children from 3 to 17 years old | 56 (6,9%) |
| One adult with children under 3 years old and children from 3 to 17 years old | 11 (1,4%) |
| Two adults without children | 63 (7,8%) |
| Two adults with children under 3 years old | 126 (15,6%) |
| Two adults with children from 3 to 17 years old | 218 (27,0%) |
| Two adults with children under 3 years old and children from 3 to 17 years old | 123 (15,2%) |
| N = 808 | |

Table 3
*Subscription duration*

| | Number of participants |
|---|---|
| Less than half a year | 79 (9,8%) |
| Between half a year and 1 year | 244 (30,2%) |
| Between 1 and 3 years | 324 (40,1%) |
| Between 3 and 6 years | 101 (12,5%) |
| 6 years or longer | 60 (7,4%) |
| N = 808 | |

Table 4
*Visits per year*

| | Number of participants |
|---|---|
| Less than once a year | 0 (0,0%) |
| 1 to 2 times a year | 15 (1,9%) |
| 3 to 4 times a year | 92 (11,4%) |
| 5 to 6 times a year | 294 (36,4%) |
| Once a month | 213 (26,4%) |
| Twice a month | 157 (19,4%) |
| Once a week | 28 (3,5%) |
| More often than once a week | 9 (1,1%) |
| N = 808 | |

Table 5
*Company during visit*

| | Number of participants |
|---|---|
| Alone | 95 |
| With my partner | 321 |
| With my (grand)child(ren) of 12 years old or younger | 611 |
| With my (grand)child(ren) older than 12 years old | 43 |
| With another relative | 119 |
| With friend(s) | 118 |

Table 6
*Distance home – Diergaarde Blijdorp*

| | Number of participants |
|---|---|
| ≤10 km | 276 (34,2%) |
| 10 – 20 km | 286 (35,4%) |
| 20 – 40 km | 206 (25,5%) |
| ≥40 km | 40 (5%) |
| N = 808 | |

Table 7
*Means of transport*

| | Number of participants |
|---|---|
| Pedestrian | 50 (6,2%) |
| Bicycle | 78 (9,7%) |
| Public transport | 61 (7,5%) |
| Car | 612 (75,7%) |
| Another vehicle | 7 (0,9%) |
| N = 808 | |

Table 8
*Travel duration*

| | Number of participants |
|---|---|
| 0 – 10 minutes | 87 (10,8%) |
| 11 – 20 minutes | 273 (33,8%) |
| 21 – 30 minutes | 261 (32,3%) |
| 31 – 40 minutes | 114 (14,1%) |
| 41 – 50 minutes | 31 (3,8%) |
| 51 - 60 minutes | 22 (2,7%) |
| Longer than 60 minutes | 20 (2,5%) |
| N = 808 | |

Table 9
*Visit duration*

| | Number of participants |
|---|---|
| Less than 2 hours | 83 (10,3%) |
| 2 to 4 hours | 497 (61,5%) |
| 4 to 6 hours | 201 (24,9%) |
| 6 to 8 hours | 23 (2,8%) |
| 8 hours or longer | 4 (0,5%) |
| N = 808 | |

Table 10
*Active – passive visit*

| | Number of participants |
|---|---|
| Very passive | 31 (3,8%) |
| Somewhat passive | 220 (27,2%) |
| Not passive, but also not active | 278 (34,4%) |
| Somewhat active | 250 (30,9%) |
| Very active | 29 (3,6%) |
| N = 808 | |

## Appendix A

*Pilot study questions*

General information

- Are you from Rotterdam?
- What kind of subscription do you have?
- Do you visit Diergaarde Blijdorp frequently?
- How long have you been a subscriber?
- How long, on average, do you stay during your visit?

Identity

- What is your motivation to visit this zoo regularly?
- With whom did you visit this zoo last year?
- What was the reason for you to become a subscriber?
- Would these reasons or desires you mentioned to become a subscriber of this zoo, also be satisfied in other zoos?

Sense of connection

- Do you feel a special bond with or do you have affinity with a certain animal or animal species?
- Are these animals or animal species the main reason for you to visit the zoo?

(Stopping) Feeding behaviour

- Have you ever seen someone feed an animal in this zoo?
- Were you inclined to address this behaviour? If you would see someone feeding an animal, would you be inclined to address this behaviour?
- Do you think the zoo could influence someone's tendency to address unwanted behaviour? If so, how do you think they could influence someone's tendency?
- Have you ever felt tempted to feed an animal in a zoo?
- Do you think the zoo could influence someone's tendency to feed animals? If so, how do you think they could do that?
- How do you feel about the advantages of feeding animals?
- How do you feel about the disadvantages of feeding animals?

**Appendix B**

*Survey main study*

Dear subscriber of Diergaarde Blijdorp,

Thank you for your interest in the research of Leiden University in collaboration with Diergaarde Blijdorp. This research consists of a survey which will take approximately 20 minutes to complete. Various topics will be discussed about your visit and your appreciation of Diergaarde Blijdorp.

We advise you to not think too long about your answer to a question; your first thought is usually the best.

The survey is anonymous and the results will be handled with care.

Thank you in advance for your participation!

Kind regards,

The research team of Leiden University

General information

- What is your age?
  (≤ 20 years; 21 – 30 years; 31 – 40 years; 41 – 50 years; 51 – 60 years; 71 – 80 years; 81 years or older)
- What is your gender?
  (Male; Female)

- What kind of subscription do you have?
  (One adult without children; One adult with children under 3 years old; One adult with children from 3 to 17 years old; One adult with children under 3 years old and children from 3 to 17 years old; Two adults without children; Two adults with children under 3 years old; Two adults with children from 3 to 17 years old; Two adults with children under 3 years old and children from 3 to 17 years old)
- For how long have you been a subscriber of Diergaarde Blijdorp?
  (Less than half a year; Between half a year and 1 year; Between 1 and 3 years; Between 3 and 6 years; 6 years or longer)
- Since you have been a subscriber, how often did you visit Diergaarde Blijdorp approximately?
  (Less than once a year; 1 to 2 times a year; 3 to 4 times a year; 5 to 6 times a year; Once a month; Twice a month; Once a week; More often than once a week)
- With whom do you usually visit Diergaarde Blijdorp? (Multiple answers are possible)
  (Alone; With my partner; With my (grand)child(ren) of 12 years old or younger; With my (grand)child(ren) older than 12 years old; With another relative; With friend(s); Others, such as…)
- How far do you live from Diergaarde Blijdorp?
  (≤10 km; 10 – 20 km; 20 – 40 km; ≥40 km)
- What vehicle do you use most to travel to Diergaarde Blijdorp?
  (Pedestrian; Bicycle; Public transport; Car; Another vehicle, such as..)
- How much time do you spend travelling to Diergaarde Blijdorp on average? (With your usual vehicle: walking/biking/car/public transport etc.)
  (0 – 10 minutes; 11 – 20 minutes; 21 – 30 minutes; 31 – 40 minutes; 41 – 50 minutes; 51 - 60 minutes; Longer than 60 minutes)
- When visiting Diergaarde Blijdorp, how much time do you spend on average?
  (Less than 2 hours; 2 to 4 hours; 4 to 6 hours; 6 to 8 hours; 8 hours or longer)
- When visiting Diergaarde Blijdorp, would you describe your visit as active or passive?
  During an active visit, one reads the information signs, visits (feeding) shows, and talks to a volunteer or zookeeper once in a while.
  During a passive visit, one walks around through the zoo, but is not really involved with all the activities.
- (Very passive; Somewhat passive; Not passive, but also not active; Somewhat active; Very active)

Motivation identity

One can think of many different reasons why people choose to (frequently) visit Diergaarde Blijdorp. A few of those reasons are listed below. We request you to indicate to what extent these reasons are applicable to you.

(Strongly disagree; Somewhat disagree; Not agreed, not disagreed; Somewhat agree; Strongly agree)

I visit Diergaarde Blijdorp because…

- I think it is useful for the work I do or my hobby
- I was hoping to find out more about a specific subject
- I find going helps me get away from normal rush of life
- because Diergaarde Blijdorp is the kind of place where people like me go to
- I like to support the learning of my (grand)children or other significant others
- I wanted to be able to say that I had been there
- I went because it satisfies my curiosity
- one of my significant others wanted me to
- I discover things about myself when I come here
- visiting the zoo is my hobby
- it is a special place; one I do not encounter everyday
- I wanted to have fun
- I find it more inspiring than going to the mall or a movie
- this is a good way for my family/friends to share quality time
- I feel at peace in these surroundings
- my family/friends learn things here they cannot learn in other places
- I am quite knowledgeable but like to keep up with what is new
- I think that it is one of the best places to visit around here
- to learn new things
- this place is a landmark in this region

Sense of connection

- Do you feel a sense of connection with a certain animal or certain animal species in Diergaarde Blijdorp?

  (No, I do not feel a sense of connection; Yes, I feel a weak sense of connection; Yes, I feel a fairly sense of connection; Yes, I feel a strong sense of connection; Yes, I feel a very strong sense of connection)

- With which animals or which animals species do you feel the strongest sense of connection? We request you to just name one animal (species).

Below, a number of statements are listed about your sense of connection with animals. We request you to indicate to what extent these statements are applicable to you.
(Strongly disagree; Somewhat disagree; Not agreed, not disagreed; Somewhat agree; Strongly agree)

- In a zoo, I spend as much time as possible watching animals
- I believe animals have emotions
- I enjoy spending my leisure time watching animals in the zoo

(Stopping) feeding behaviour

The next questions are about visitors feeding animals in Diergaarde Blijdorp. This means that visitors, on their own initiative, bring food and feed it to animals.

- Have you ever felt the tendency to feed the animals of Diergaarde Blijdorp?
  (No, I never felt the tendency; Yes, I felt a weak tendency; Yes, I felt a fairly tendency; Yes, I felt a strong tendency; Yes, I felt a very strong tendency)
- Have you ever fed an animal of Diergaarde Blijdorp?
  (Yes; No)
- How often have you fed an animal of Diergaarde Blijdorp?
  (Just once; Rarely; Sometimes; Often; Very often)
- Have you ever seen other visitors feeding animals of Diergaarde Blijdorp?
  (Yes; No)
- If you have ever seen other visitors feeding animals of Diergaarde Blijdorp; did you address that person on his or her behaviour?
  (No, and I did not feel the tendency to address that person's behaviour; No, but I did feel the tendency to address that person's behaviour; Yes, I did address that person's behaviour)
- If you would ever see other visitors feeding animals of Diergaarde Blijdorp; would you feel the tendency to address that person on his or her behaviour?
  (No, I would not feel the tendency; Yes, I would feel a weak tendency; Yes, I would feel a fairly tendency; Yes, I would feel a strong tendency; Yes, I would feel a very strong tendency)
- What is your opinion about visitors feeding animals of Diergaarde Blijdorp?
  (I am strongly for visitors feeding animals; I am somewhat for visitors feeding

animals; I do not have an opinion about visitors feeding animals; I am somewhat against visitors feeding animals; I am strongly against visitors feeding animals)

- Do you think Diergaarde Blijdorp could influence visitors' tendency to feed animals? (No; Yes, a little; Yes)

A few statements about visitors' feeding behaviour are listed below. We request you to indicate to what extent these statements are applicable to you.

(Strongly disagree; Somewhat disagree; Not agreed, not disagreed; Somewhat agree; Strongly agree)

- Feeding animals enables you to see them up close
- By feeding animals, you make sure they have a nice treat
- A lot of other visitors feed animals
- Human-food is bad for zoo-animals
- Zoo-animals cannot digest human-food properly
- Feeding animals during your visit is normal
- Zoo-animals can become sick of eating our food
- Feeding zoo-animals is dangerous for the animals

End

Thanks for your participation!

This survey was part of a research of Leiden University, on behalf of the Nederlandse Vereniging van Dierentuinen ("Dutch Association of Zoos") in collaboration with Diergaarde Blijdorp. This study examined education, pro-environmental behaviour, donation behaviour and feeding behaviour of visitors.

The results of this study will be available at the end of May. You will receive a short summary of the results by e-mail or at the subscribers website of Diergaarde Blijdorp.

Among the participants of this study, a price will be raffled. If you want to win this prize, please enter your e-mail address in the next question.

Table 11
*Pattern matrix Motivation Identity*

| | Motivated learner | Facilitator | Hedonic visitor | Spiritual seeker | Zoo admirer |
|---|---|---|---|---|---|
| I think it is useful for the work I do or my hobby | .618 | | | | |
| I was hoping to find out more about a specific subject | .712 | | | | |
| I discover things about myself when I come here | .562 | | | | |
| I went because it satisfies my curiosity | .327 | | | | |
| One of my significant others wanted me to | | .772 | | | |
| This is a good way for my family/friends to share quality time | | .744 | | | |
| I like to support the learning of my (grand)children or other significant others | | .744 | | | |
| My family/friends learn things here they cannot learn in other places | | .702 | | | |
| I wanted to have fun | | | .741 | | |
| I find it more inspiring than going to the mall or a movie | | | .592 | | |
| Visiting the zoo is my hobby | | | .457 | | |
| It is a special place; one I do not encounter everyday | | | .418 | | |
| I find going helps me get away from normal rush of life | | | | .711 | |
| Because Diergaarde Blijdorp is the kind of place where people like me go to | | | | .674 | |
| I feel at peace in these surroundings | | | | .481 | |
| I wanted to be able to say that I had been there | | | | .446 | |
| This place is a landmark in this region | | | | | -.799 |
| I am quite knowledgeable but like to keep up with what is new | | | | | -.599 |
| I think that it is one of the best places to visit around here | | | | | -.562 |
| To learn new things | | | | | -.502 |

APPENDIX C

Dear subscriber,

In collaboration with Leiden University, we would like to invite you to participate in a study among current subscribers of Diergaarde Blijdorp. This study is conducted by a team of students and professors of the department of Social and Organizational Psychology of Leiden University in collaboration with Diergaarde Blijdorp. The study consists of a survey, which will take approximately 20 minutes to complete. The survey consists of subjects which are all related to your visit and your appreciation of Diergaarde Blijdorp.

Your answers are very valuable and, therefore, Diergaarde Blijdorp would like to involve you in this study. Among the participants of these study, five vouchers to the value of €10,- will be raffled, which can be used in one of the restaurants or the shop of Diergaarde Blijdorp. To have a chance at this price, fill in your e-mail address at the end of the survey. Naturally, your personal data and answers will be handled with care.

Click on this link to fill in the survey.

Thanks in advance for your time and participation. If you have any questions in response to this e-mail, you could contact us by sending an e-mail.

Table 12
*Have you ever felt the tendency to feed animals?*

| | Number of participants |
|---|---|
| No tendency | 704 (87,1%) |
| Weak tendency | 56 (6,9%) |
| Fairly tendency | 28 (3,5%) |
| Strong tendency | 15 (1,9%) |
| Very strong tendency | 5 (0,6%) |
| N = 808 | |

Table 13
*How often did you feed an animal in Diergaarde Blijdorp?*

| | Number of participants |
|---|---|
| Just once | 10 (34,5%) |
| Rarely | 9 (31%) |
| Sometimes | 6 (20,7%) |
| Often | 2 (6,9%) |
| Very often | 2 (6,9%) |
| N = 29 | |

Table 14
*If you ever saw other visitors feed animals of Diergaarde Blijdorp; did you address that person on his or her behaviour?*

| | Number of participants |
|---|---|
| No, and I did not feel the tendency to address that persons' behaviour | 59 (18,8%) |
| No, but I did feel the tendency to address that persons' behaviour | 160 (51%) |
| Yes, I did address that persons' behaviour | 95 (30,3%) |
| N = 314 | |

Table 15
*If you would ever see other visitors feed animals of Diergaarde Blijdorp; would you feel the tendency to address that person on his or her behaviour?*

| | Number of participants |
|---|---|
| No tendency | 55 (11,1%) |
| Weak tendency | 110 (22,3%) |
| Fairly tendency | 158 (32%) |
| Strong tendency | 118 (23,9%) |
| Very strong tendency | 53 (10,7%) |
| N = 494 | |

Table 16
*What is your opinion about visitors feeding animals of Diergaarde Blijdorp?*

| | Number of participants |
|---|---|
| Strongly for | 10 (1,2%) |
| Somewhat for | 22 (2,7%) |
| No opinion | 56 (6,9%) |
| Somewhat against | 116 (14,4%) |
| Strongly against | 604 (74,8%) |
| N = 808 | |