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Shedding a light on animal shelters: the use of light and its effect on the adoption process.

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I Abstract

The current study aims to expand the research done in the field of environmental cues. The SOR-model (Mehrabian & Russell, 1974) is applied to an animal shelter. According to the SOR-model, stimuli can cause some sort of evaluation (Organism) leading to either an approach or avoidance response. By manipulating different cues (Stimuli) in an animal shelter, it is aimed at to influence emotions and perceptions that visitors have (Organism) and ultimately improve the adoption likelihood (Response). It is expected that an animal shelter that is (perceived as) more attractive will lead to a more positive experience and increase adoption likelihood. A first study was conducted to discover which stimuli should be used for the manipulation. Results indicated that visitors primarily focus on hygiene, spaciousness and lighting. The second study therefore manipulated the perceived hygiene and perceived spaciousness of a shelter through adjustments of the lighting intensity. The conclusions from the second study indicate that perceived hygiene and perceived spaciousness can successfully be manipulated through lighting. The perception visitors had of the animal shelter could be improved through lighting. Moreover, the perception of the actual animal could be improved through the manipulation. As opposed to these results, the actual adoption likelihood did not significantly improve. It can be concluded that environmental cues can successfully be used in an animal shelter. The adoption process was partly influenced by manipulation of lighting and hygiene and therefore it is recommended that animal shelters pay more attention to the possibilities of environmental cues.

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1. Introduction

Numerous studies have focused on the use of environmental cues in different settings, most often retail stores. Multiple variables guide the design of store environments including in-store music, aroma, colors, and price perceptions (e.g., Baker et al., 2002; Chebat and Michon, 2003; Jang and Namkung, 2009). Even though environmental cues have shown to be successful in retail store settings, the studies available in other settings are limited. The current study aims to expand the areas of environmental cue research by applying it to an animal shelter setting. Currently, animal shelter interiors are often practical and not designed specifically for the visitor. The thought behind the current study is that a more attractive shelter could positively influence the perception visitors have of that shelter and its animals, ultimately making them more likely to adopt. The current study wants to find out whether behavior and perception of visitors of an animal shelter could be influenced by creating a more attractive environment, for instance through bright lighting, appearing cleanliness or spacious cues. Could certain stimuli guide and stimulate a visitor walking through an animal shelter? Yes they could, according to a study by Fantuzzi, Miller and Weiss (2010). They revealed that the number of toys in a cage of an animal shelter could influence the human behavior, ultimately increasing the number of adoptions. The study illustrates that environmental cues in animal shelters can be effective and it was the direct reason for the current study. The current study will dig deeper into the possibilities of using different stimuli in animal shelters. The goal is to increase the number of adoptions at an animal shelter by improving the adoption process, just like increasing revenue in a retail shop through the buying process.

Apart from the theoretical relevance, the current study also is of practical relevance. Animal shelters are an important and current topic in The Netherlands. Many Dutch animal shelters

are in a negative financial situation and are nearly bankrupt. The Party of the Animals is asking for more attention to the acute financial situation that the animal shelters are in and requests more options to limit the enormous number of animals in the shelters (Party for the Animals, 2012). On top of that, many voluntary programs also support the improvement of animal welfare in The Netherlands. The most common is the Animal Protection ('Dierenbescherming'). In their largest campaign they stress that ten thousands of animals are waiting to be adopted and they are asking for funds to finance the shelters (Dierenbescherming, 2013). The current study will try to find a solution to these problems by improving the adoption process.

The current report will start with a literature review. The literature review will first explain the Stimulus-Organism-Response model (Mehrabian & Russell, 1974), which is the framework of the current study. Then two studies are described. In study 1, it was investigated which stimuli visitors of an animal shelter focus on. The results indicated that visitors of an animal shelter find lighting, perceived spaciousness and hygiene very important. In study 2, it was tested whether these stimuli can influence emotions and judgments, For example, whether certain lighting in the animal shelter could make it appear more spacious. Whether the visitor could evaluate this as being something positive (because animals need space thus the animal would be better), leading to behavioral response: the likelihood to adopt. After the studies, the results are discussed and practical recommendations are made.

The central question of the current study can be formulated as:

"To what extent does manipulation of lighting in an animal shelter influence emotions and perceptions of visitors, ultimately leading to the desired response: adopting an animal?"

2. Literature Review

The current section will start with an explanation of the SOR-Model (Mehrabian & Russell, 1974). Then the selected stimuli for the current study are reviewed, based on previous studies. It is explored how the stimuli could play a role in animal shelters. Lastly, the hypotheses for the current main study are formulated.

2.1 The SOR Model

Now the Stimulus-Organism-Response Model (Mehrabian & Russell, 1974) and its relevance for the current study will be explained.

In short, Mehrabian and Russell stated that different stimuli influence the emotional state of a person, leading to a response. Eroglu, Machleit and Davis (2001) define stimuli as factors that affect internal states of the individual. The use of stimuli in retail settings have been researched widely. An article by Turley and Miliman (2000) reviewed previous literature on environmental effects. In their article they stress the importance of these effects. Turley and Miliman state that the atmospherics are an important marketing strategy for most exchange environments. In the current study, an animal shelter is categorized as an environment in which an exchange takes place (in exchange for a small fee, the visitor gets a pet). The aim is to find out whether stimuli can also be used as a marketing tool in animal shelters.

Turley and Miliman stress that the creation of an influential atmosphere could have a large influence on the consumers. Mehrabian and Russell call this the Organism phase. Bagozzi (1986) defines the phase as: "The internal processes and structures intervening between stimuli external to the person and the final actions, reactions, or responses emitted." According to Mehrabian and Russell (1974) the Organism stage includes all affective, emotional and cognitive states of mind. It can be seen as a mediation stage between stimuli and response. In the current study, organism represents the affective state and perception of

the visitor of an animal shelter. It is aimed to evoke an affective state of mind, in which they feel positive toward the animal shelter and the actual animals.

The last stage of the model is Response. Stimuli and Organism will eventually lead to the stage of Reponse. Mehrabian and Russell (1974) argued that people either respond to an atmosphere by approach or avoidance. It is aimed at to trigger an approach-response from the visitor in the shelter. To be able to create a positive response, the environmental cues should stimulate the customer, lead them to some sort of affective and emotional stage and eventually enhance the "right" decision, adopting an animal.

In conclusion, up until now, the SOR model has often been used in retail-settings. The current study will try to expand the usability to a new setting; an animal shelter.

2.2 The use of stimuli in an animal shelter

Now that the SOR model has been explained, the different stimuli used to stimulate adoption likelihood will be discussed. Numerous stimuli could be used, for example color or scent. However, this section is limited to variables that were actually relevant for the current study.

2.2.1 Lighting

Light is an important part of the environment in a store because it is able to influence the emotions of people (Summers & Hebert, 2001). However, as Bitner (1992) stated, working with light is complex. Flynn (1992) established some of the early work on lighting environments and identified six categories that influence human behavior in terms of environment lighting: perceptual clarity, spaciousness, relaxation and tension, public vs. private space, pleasantness and spatial complexity. Some examples are given to illustrate these ways to influence human behavior through lighting.

Stamps (2010) argued that light has a positive effect on perceived enclosure and that lighter environments appear more open. Flynn categorized this as spaciousness. In their study, Okken, van Rompay and Pruyn (2012) manipulated room and desk size of a consultation room and studied the effects. The increase in space improved the feelings of freedom, spaciousness and perceived comfort. It might be interesting to improve perceived spaciousness in an animal shelter (through lighting) because people tend to positively evaluate spaciousness. However (primed) spaciousness does not always lead to positive evaluations. Williams and Bargh (2008) argue that physical distance cues influence people's judgments and emotional experiences. They conducted four studies in which participants were either primed with spatial closeness or spatial distance, through drawing two dots on a grid that were either close or distant. The general results of their study indicated that spacious primes moderated the emotional intensity of stimuli. Priming spaciousness (through lighting) in an animal shelter could therefore also have negative effects, for example dissociating the visitor's emotions toward the animals. However, it is expected that visitors of an animal shelter do prefer spaciousness. They might feel uncomfortable or dissatisfied with little spaciousness in a shelter and the kennels of the animals, decreasing the likelihood to adopt an animal. It should be taken into account that the effect of spacious cues could also make them feel more emotionally distant from the animals. Therefore, it is interesting to find out what the effect is of lighting on perceived spaciousness in an animal shelter.

Lighting intensity was used by Wanksink and van Ittersum (2012) in a recent study to find out how light and music influenced consumption and satisfaction in a fast food restaurant. They manipulated lighting intensity and music volume and measured whether it influenced eating/spending behavior and satisfaction. Results indicated that dim lighting could significantly decrease calorie intake and improve satisfaction, therefore pleasantness (one of the categorizations of Flynn) of the environment was improved. Even though an animal

shelter is hardly comparable to a fast food restaurant, the study still indicates that lighting influences the way people judge the environment and the products. Just like Baumstarck (2008) stated: lighting is a key factor to create a positive atmosphere. Therefore, it is applicable in the sense that a good atmosphere in the animal shelter could influence the emotional state and behavior of visitor. This was illustrated in a study by Boyce et al. (1996) who changed the lighting intensity in a bakery. The results indicated that lighting improved the perceived comfort and pleasantness of the store. Moreover, in combination with remodeling the bakery it significantly improved the number of sold items. More recently. positive atmosphere through lighting was found in a study by Custers et al (2010). In a field study involving 57 clothing stores, they assessed the lighting and context (i.e. the shops interior) in relation to atmosphere. Results indicated that lighting significantly influences perceived atmosphere in a retail store, also if other environmental cues (such as interior qualities) were present. Even though an animal shelter is not a retail store, it is expected that theories will still be applicable because the essence is the same: people go there to buy a product and during that process they can be influenced by environmental cues. More specifically, manipulation of lighting intensity could play a significant role in creating a better atmosphere in which visitors of an animal shelter are more likely to adopt.

An example of the categorizations “perceptual clarity” and “relaxtion vs. tension” by Flynn can be given based on the study conducted by Johansson, Rosén and Küller (2011). They studied the influence of lighting (and individual factors) on the assessment of an urban footpath. 81 people individually walked along the footpath after dark and afterwards answered a questionnaire. Results indicated that people perceived the path as visually more accessible if the lighting was bright and there was a large visual field. Possibly, an animal shelter could be perceived as being better if the lighting is bright and visitors have a good visual field. By

doing so, the appearance of the shelter might be perceived as being more trustworthy and therefore a better environment for the animals.

Apart from the categorizations that Flynn (1992) created, studies have indicated that lighting also influences other aspects. It was suggested that lighting could influence the examination of merchandise in a store (Areni & Kim, 1994; Donovan et al., 1994). The influence is illustrated more recently by Hinks and Shamey (2011), who conducted a study about lighting as a tool to manage colors of products in a store. They advised retail store managers to collaborate with lighting engineers, advancing retail store lighting and helping to ensure the consumer has the best chance of perceiving what the product designer intended. In an animal shelter, the animals can be seen as the products that should be sold. The current study could figure out whether the perception visitors have of the animals could also be influenced by lighting. For instance, animals could be examined more positively if the environment they were in was more attractive (through lighting).

Lastly, a recent study expanded the use of lighting to the field of perceived cleanliness. Molenaar (2010) conducted a field study in a Dutch metro and found out that people perceived the metro as being more clean if the place was lid (rather than dark), the level of litter was equal in both situations. The metro study adds an interesting perspective to the current study; can the perceived hygiene in an animal shelter be manipulated through lighting? The next section will go in depth on the variable hygiene.

2.2.2 Hygiene

In many different settings, hygiene plays an important role in the evaluation of quality. From guests staying in hotel accommodations (Lockyer, 2005) to tourists visiting shopping malls (Hueng & Kucukusta, 2012) hygiene is considered a top priority for positive evaluation. It is

expected that the quality evaluation visitors make of an animal shelter will also be influenced by the cleanliness.

As was illustrated in the metro study by Molenaar (2010), low correlation exists between perceived cleanliness and actual cleanliness, as the variable is subject to be influenced by other environmental cues. Perceptions of cleanliness of streets in a city are not based on actual litter, but rather the weather and atmosphere play a role (Bonaiuto, 2003). The fact that perceived hygiene is easily manipulated offers opportunities for the current study in the animal shelter. Small adjustments (through lighting) could possibly influence the perceived cleanliness in the animal shelter.

Farrington (2004) argued that the perceived cleanliness/safety of the environment affects the behavior. In a (perceived) unclean/unsafe environment, people tend to behave accordingly, littering/stealing more than in a proper environment. This is based on the Broken Window Theory (Wilson & Kelling, 1982), saying that disorder leads to more crimes. Farrington's argument is an example in which manipulating perceived hygiene (Stimuli) can lead to emotional adjustment (the Organism phase in the SOR-model) and behavioral change (Response). In the current study, lighting intensity adjustments could possibly lead to a better perceived cleanliness of the animal shelter. On its turn it could improve the perception visitors have of the general atmosphere and the actual adoption likelihood. It is interesting to find out how perceived hygiene could influence emotions and response.

2.2.3 Decorations

Ward and Eaton (1994) discovered in their study that decorations could be used as a cue to evoke strong emotions and competence in service. In the case of the animal shelter, it should be considered whether decorations (posters/photos) could evoke a stronger need to adopt a pet. For example, positive images (happy animals) in the animal shelter could evoke a

positive attitude of the visitor (more likely to adopt). However, it could also be the other way around. People might have feelings of guilt and empathy when coming across sad pictures or find the positive pictures unrealistic and by that a negative attitude is evoked.

2.3 Hypotheses

Based on the literature, hypotheses can be formulated that will be tested during the current main study. First of all, it is tested whether lighting can successfully manipulate the perceived hygiene and perceived spaciousness of an animal shelter. On top of that, it is hypothesized that the effect of brightness will be different at different levels of perceived hygiene and perceived spaciousness. Therefore:

H1: *Brightness influences the perception of hygiene/spaciousness in an animal shelter*
H2: *The effect of hygiene and brightness will be most significant if the animal shelter is in a (perceived) clean and spacious state.*

Secondly, the theory suggests that the perception of the environment can change the perception of the product (animal). Also, studies have indicated that environmental cues can successfully influence affect and judgments. Therefore:

H3: *The perceived hygiene/spaciousness influences the visitors' perception of the animal in the shelter.*

Lastly, it is hypothesized that brightness not solely influences perceived hygiene, spaciousness and animal perception, it can also affect the actual behavior of a visitor in the animal shelter.

H4: *The perceived hygiene/spaciousness influences the likelihood to adopt an animal from the shelter.*

3. Study 1

The goal of the first study is to find out which environmental elements of an animal shelter visitors perceive and in which setting they would be most likely to adopt an animal. It is important to discover what the visitors perceive during their visit in order to select the most effective variables to manipulate.

3.1 Method

For this study, interviews were held. Interviews are a good way to gain qualitative and in depth information about what people see and prefer during their visit at an animal shelter because they offer the possibility to discuss and ask follow-up questions.

First, open questions were asked to find out what the participants perceived during their visit and how their opinion of the shelter influenced their adoption process. However, solely asking the participants about their experience may not lead to in-depth answers. As Colucci (2007) stated, the best results are collected when participants are asked to interactively "do" something. Therefore, in the second part of the interview certain stimuli will be discussed by interactively letting the participants observe different settings of a shelter and picking their preference. There are five variables that will be tested; cleanliness, the interior atmosphere, the decorations in the shelter, the cages of the animals and the exterior cages. The goal of these questions is to find out how the variables play a role in the adoption process and whether the visitors prefer a certain setting. It is hypothesized that the basic elements in the shelter (such as lighting and decorations) influence the perception of an animal shelter.

3.1.1 Sample participants

In the current study, the 12 participants were people who had visited an animal shelter, assuming that these people are oriented to adopt an animal from the shelter. The participants were aged above 18, to ensure that they are seriously and thoroughly considering adopting a pet. The age condition was chosen to ensure that the participants could responsibly consider adopting an animal from a shelter. Participants of different genders and ages were included to discover whether there exists a difference between these groups. In total 12 persons participated in the interviews, five men and seven women. The age ranged from 19 to 57.

3.1.2 Procedure

The interview consisted of two parts. In the first part, open questions were asked so participants could freely come up with aspects they had observed in an animal shelter. The goal was to gain a deeper insight about the aspects participants remembered and that stood out when visiting the animal shelter. After the participants finished, more directed questions were asked, for example: “What colors do you remember and how did this make you feel?” After completing the first phase, the second phase of the interview was done. During the second phase participants needed to pick preferences for one of two photos of an animal shelter in different categories (such as interior, cleanliness, etc.), keeping in mind in which setting they would be most likely to adopt an animal.

3.1.3 Materials

The photos used in the second part of the interview will now be discussed. Each time the participants chose one of the two animals to adopt. First of all; the kennels outside

Buiten 1

Buiten 2

Figure 1.1 The exterior

Secondly, the kennels:

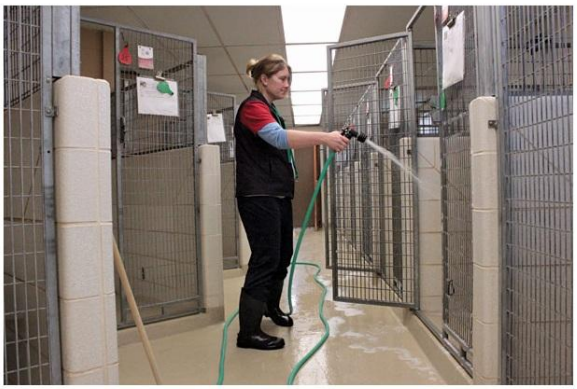
Hokken 1

Hokken 2

Figure 1.2 The kennels

Thirdly, the cleanliness:

Interieur 1



Interieur 2

Figure 1.3 The cleanliness

Then, the atmosphere:

Binnen 1

Binnen 2

Figure 1.4 The interior

And lastly; the decorations in the animal shelter:

Decoratie 1

Decoratie 2

Figure 1.5 The decorations

Every time, the participant was offered the two options above. The aim was to portray two situations; one in which the conditions (of the animals) were bad and one in which they were good. By asking the participant to choose and verify their decision, it was measured whether they preferred to adopt their animal from a good or bad conditioned shelter. The good/bad conditions were not always in the same order to conceal the aim of the study. In the

‘Decorations’ part the participant was asked to imagine either option 1 or 2 hanging on the walls in the animal shelter. Then they were asked again from which animal shelter they would be more likely to adopt a pet and explain why.

3.2 Results

The results of the interviews will now be discussed, split up into the first (open) part of the interview and the second part in which the participants had to choose between options. Data analysis was done based on the notes made during the interviews. The notes were summarized and read thoroughly and the variables that stood out were selected, based on how many participants mentioned the same variable. Then the results were analyzed and the common keywords were selected.

3.2.1 Experience and needs

The participants were asked to describe the animal shelter they had visited and to try and recall the environment. The aspect that came up in every interview was the *hygiene* in the shelter. Everyone recalled the level of hygiene in the animal shelter and clearly stated the importance of cleanliness. As one of the participants recalled: “The shelter appeared clean. I found this very important because it makes me feel like they take good care of the animals as well.” Based on the emphasis on hygiene in the shelter, it can be concluded that the (appearing) hygiene should be taken into consideration, as it might be of influence in the adoption process.

The *general atmosphere* in an animal shelter was often described as being quite dark, sober and cold. A participant stated that the atmosphere was rather practical and therefore not warm or welcoming. Some of the participants did not find an adjustment of the cold atmosphere necessary (“It is not important because I would rather want them focusing on more important

things than the atmosphere"), whereas the majority did prefer a warmer surrounding. To illustrate this, one of the participants mentioned: "I do not feel invited to adopt an animal because the atmosphere in the shelter is sober and dark." Based on these results, it might be useful to try and create a better atmosphere. Lighting and warmer colors could be used to make this adjustment.

Apart from the atmosphere, participants also paid attention to the *spaciousness* of the shelter. A non-spacious shelter, in which animals had little space and the routes through the shelter were not broad, had a negative effect on the satisfaction of the visitor in the animal shelter. The importance of spaciousness can be illustrated by another quote: "I could not move freely through the shelter, everything was quite narrow and because of that I found it hard to make my adoption-decision."

People did not recall the *decorations* in the shelter, but when asking directed questions about decorations, such as: "Do you remember any posters or pictures on the wall?" participants did remember them. Often the participants would state that they did not care about decorations. One of the participants said: "I do not pay attention to decorations, as it has nothing to do with my purpose there, which is adopting a pet." However in the second part of the interview the same participant did have a clear opinion on which decoration would be preferable. This happened several times.

3.2.2 Preferences

In the second part, participants were asked about their preferences and in which setting they would rather adopt a pet from the shelter. They were asked to ground their decision and think aloud. The different aspects will now be discussed.

1. *Interior*

The participants had two options, to pick a photo in which the interior hygiene was high or a photo of a dirty environment. The majority of the participants preferred the setting in which the animal shelter was clean and which appeared hygienic. “The fact that the shelter looks clean gives me the feeling that it is also well-organized and therefore the animals are treated better. I would rather adopt from a shelter that treats their pets well.” said one of the participants. Few participants chose the dirty condition; their argument was that they felt sorry for the animals in the shelter and wanted to help them. To illustrate: “The animal is likely to feel sad and is living in bad conditions; I would rather adopt my pet here because I want to save him from this bad environment.”

2. *Exterior*

The exterior pictures showed two options, one in which the conditions were bad and unorganized (with a cold atmosphere) and one in which the animals were held in better cages and the atmosphere was more organized and warm (caring). All but one participant chose the option in which the conditions were better. The arguments to adopt from that shelter ranged from the effect a bad condition would have on the animal to it looking cleaner and less chaotic. The argument given to adopt from the bad-conditioned shelter was to help the animal.

3. Decorations

The participants were given two options; one with posters of happy and satisfied animals and one with posters of neglected animals, living in bad conditions. They were asked to picture the posters in a shelter. The reactions differed but the opinions were always very strong. The majority chose the "sad" pictures because it portrays the reason why they should adopt from an animal shelter. A participant stated: "This is how animals should look and it is what you want to offer them by adopting them from the shelter." It gave them a feeling of rescuing the animals. However, participants did feel a bit tricked by the sad images and felt hesitant toward seeing images like that in the animal shelter: "I get the feeling that the shelter is trying to persuade me and is blackmailing me emotionally. Therefore, I would feel very hesitant toward adopting a pet from this shelter." One or two participants picked the "happy" images because they preferred a positive approach. "The animals look happy and therefore I feel happy too."

4. Kennels

The next variable was the kennels the animals were kept in. The goal was to measure the preference for spaciousness as one of the pictures portrayed a spacious shelter and the other was an image of animals in small cages. Participants unanimously chose the spacious option, except for one participant who chose the small cages because it urged him to rescue the animals from the shelter. Arguments to choose the spacious version are illustrated in the following quote of one of the participants: "I think the behavior of the animal is more natural in the spacious shelter. The character of the animal is being fully appreciated if the kennel is more spacious." It can be concluded that a spacious shelter offers better facilities to observe the character of the animal and that the interaction with other animals is more natural. In other

words; the environment of the animal should be as natural as possible in order to observe what the animal is like.

5. Atmosphere

The last variable had to do with the general atmosphere in the shelter. Two different pictures were given. One in which the shelter looked dark, cold and using cheap materials and another one in which the shelter looked light, warm and using more rich materials. The majority of the participants chose the lighter version. One of the participants stated: "I think the animal is living a better life here and it just looks better and warmer overall." The participants appreciated the warmer atmosphere and found the living conditions better in the lighter version of the animal shelter.

3.3 Discussion

Based on the interviews, two different types of adopters can be sketched. First of all, the most occurring was the realist, who valued high quality of the shelter and its animals. In order to adopt an animal from the shelter, it should be well-organized and the environment should express professionalism. Aspects that came up often for realists were (appearing) *hygiene* and *spaciousness*. Those two characteristics are often valued in an animal shelter as it is perceived as an indicator of a good organization and well-being of the animals. On the other hand there was the rescuer. The rescuer paid less attention to the above mentioned variable but focused most on the well-being of the animal and the need to rescue the animal from its environment. The rescuer would be more likely to adopt from an animal shelter in which the animals are living in bad conditions.

Realists and rescuers had something in common; they felt skepticism towards *decorations* in the animal shelter. Often they would feel tricked by the decorations and would not feel comfortable with the persuasive images. It is important to keep in mind this skepticism and to

not exaggerate the message that the decorations try to express as it might have a counter-effect. A more subtle way of influencing the likelihood to adopt might be preferable.

Participants all mentioned *light* often. Their preference was for the animal shelter to be bright, as it made the atmosphere better. This is in line with the theory, as light is able to create a positive atmosphere (Baumstarck, 2008)

In conclusion, the manipulation of environmental cues should have its focus on (appearing) hygiene and spaciousness, as they were most often recalled and mentioned during the interviews. Based on the previous studies (Stamps, 2010, Molenaar, 2010), lighting could be used to manipulate the two variables. It should also be taken into account whether the adoption likelihood differs between realists and rescuer type of visitors.

4. Study 2: the influence of environmental cues.

The purpose of the second study is to find out whether perceived hygiene and spaciousness can be manipulated through lighting intensity(brightness), whether they can influence the perception that visitors have of an animal and lastly whether the likelihood to adopt an animal can be influenced. The environmental cues that have been selected are based on the first study about most significant environmental factors.

The goal of the second study can be defined as:
"To find out to what extent there is an effect of brightness on perceived hygiene/spaciousness in relation to the actual hygiene/spaciousness in an animal shelter and whether this influences the adoption process."

4.1 Method

4.1.1 Design

The study was conducted in a 2 x 2 experimental design. The two variables mentioned most often during the first study were selected. The two variables were hygiene and lighting. It was expected that brighter lighting would improve the perceived spaciousness of the shelter, as participants would be able to see more. Hygiene was expected to be perceived as low if the lighting intensity was low because it made the shelter look dark and disordered.

4.1.2 Sample participants

A total of 116 respondents participated in the study. All participants had to be above 18. The age condition was chosen to ensure that the participants could responsibly consider adopting an animal from a shelter. The age ranged from 18 to 63. Participants of different genders and

ages were included. In total 53 men and 63 women participated in the study. 23% was MBO educated, 41% was HBO educated, 29% WO educated and 7% other education.

4.1.3 Procedure

The measures were done by distributing (four different versions of) a survey. 71 online and 45 offline surveys were done. A small pre-test was done by observing how long people looked at the photos in an online and offline setting and how fast they filled in the survey. The result was that in both the online and offline version, participants looked at the moodboards for approximately 15 seconds before continuing to the questions. Both surveys took about five minutes to fill in. Whether there existed an influence of the type of survey on results was also tested afterwards (see results section).

Participants were randomly allocated to one of the following four surveys:

1. Moodboard of an animal shelter with low hygiene and low spaciousness
2. Moodboard of an animal shelter with high hygiene and high spaciousness
3. Moodboard of an animal shelter with low hygiene and high spaciousness
4. Moodboard of an animal shelter with high hygiene and low spaciousness

On the same page as the moodboard, they were asked about their opinion of the animal shelter. Then, participants saw the next page showing a dog and a cat. The photo of the dog and cat was equal in all four surveys. Then, participants were asked questions about the dog/cat they saw and to give their opinion. By doing so it was measured whether their perception of the animal differed after being exposed to different types of animal shelters. On the last page participants were asked to what extent they would be likely to adopt an animal and whether they would classify themselves as being a realist or a rescuer.

4.1.4 Stimulus Materials

Several photos of a real animal shelter have been taken and lighting intensity was adjusted in Lightroom 4 and Adobe Photoshop CS 6. The different photos used on the moodboard will now be explained, starting with the photos representing high vs. low spaciousness:

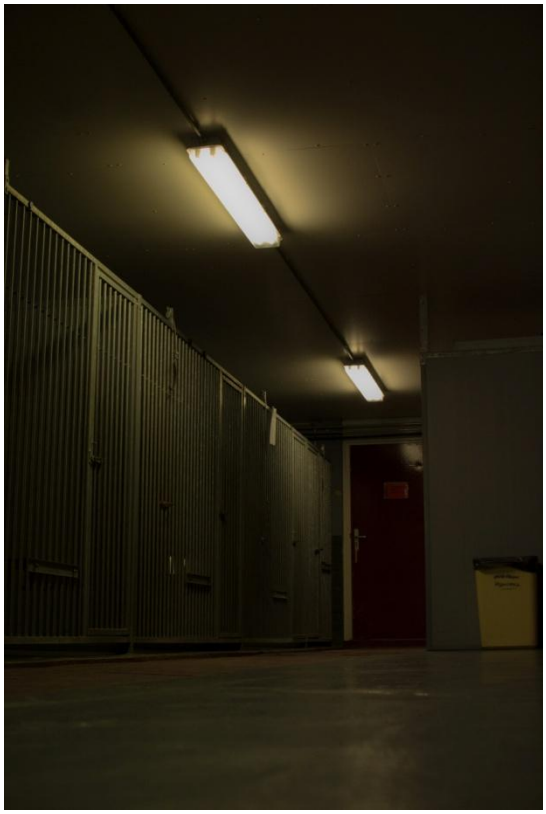


Figure 2.1 Level of lighting

Three photos were selected to express different levels of brightness. The first photo (with two options) was taken from a lower perspective to be able to overlook the whole room and also include the lamps in the photo. The spacious option is rather light, you can see all the aspects in the room clearly and the lighting has a clear and warm feel to it. The non-spacious option is dark. The second photo of the "lighting" factor was taken from a higher perspective and looking down on the floor. In the first option the lighting the reflection on the walls and floor are clear (to make it appear larger). The non-spacious option is rather dark, the details are not clear and there is no reflection of light. The last photo of the "lighting" section is taken from an inside to outside of the shelter perspective. There is a grid in front of the window. Perceived spaciousness was aimed to be manipulated by adjusting the lighting and the focus of the photo. In the first option the focus is on the outside of the shelter and the photo is light and open. The second option has a more non-spacious feel to it as the focus is on the grid in front of the window. By doing so, the photo expresses a narrower feel. Over all, by selecting three different (low, high, inside-to-outside) perspectives, and adjusting the lights, a perception of a real (non)spacious shelter is created.

Figure 2.2 High vs. low hygiene

The second variable is hygiene. Again three different photos were selected to express this variable as either being high (clean) or low (greasy). The first one exists of two images of a storage cabinet in the shelter. This photo was selected because there are many details in the photo that either express high or low hygiene. The first photo is rather tidy and clean; the towels are white, the bowls are shiny, the cabinet itself looks steady and clean and one is able to see all the details clearly. However, on the second photo the cabinet is dirtier, it does not look clean or organized and the towels are brown. The second photo in the section of hygiene focused on the cleanliness that the animals come across. The photos show two bowls of food: one in which the food and bowl look clean, healthy and the hygiene is good and the other in which the bowl and the food look greasy and unhygienic. This photo was selected because it offers a close-up perspective. The last photo in the section of hygiene was picked because it is an area in which the hygiene is important (bathing the animals). By adjusting the lights the distinction was created between an organized and hygienic and an unorganized and unhygienic environment.

To illustrate, this is how the moodboard looked that expressed high hygiene and spaciousnes

s:

Figure 2.3 Example of one of the moodboards

4.1.5 Measures

Perceived spaciousness of the shelter was measured through eight items (α=.89). Participants were asked to indicate the level of: openness, spaciousness, tightness (recoded), reliability, light, spaciousness & open (taking together) overview and easy to find.

Perceived hygiene was measured through five items (α=.71), the level of: cleanliness, light, cold atmosphere(recoded), dust(recoded) and unhygienic (recoded).

It was measured whether these variables had an effect on the *perception of the animal* which was measured through nine items (α=.90). The level of: sweetness, attractiveness, being a good pet, taken care of, character, history, had a good life, had a good life and people not feeling sorry for the animal.

Likelihood to adopt was measured through a question asking participants whether they were likely to adopt an animal (based on the spaciousness or hygiene).

Lastly, participants were asked which *type of adopter* they considered themselves to be. The option was to either choose a realist or a rescuer.

4.2 Results

An independent-samples t-test was conducted to compare online survey vs. offline survey participants. There was no significant difference in the scores for online (M=2,1, SD=0.56) and offline (M=2.0, SD=0.56) conditions; t (113)=0.71, p = 0.94.

The results of the main study will now be discussed.

4.2.1 Perceived spaciousness

A factorial between groups analysis of variance (ANOVA) was used to compare the average scores of perceived spaciousness in an animal shelter. There were four groups of participants:

(a) participants who observed the animal shelter low on hygiene and low on brightness, (b) participants who observed the animal shelter low on brightness but high on hygiene, (c) participants who observed the animal shelter high on hygiene and high on brightness and (d) participants who observed the animal shelter high on brightness but low on hygiene. Shapiro-Wilk and Levene's tests were used to evaluate the assumption of normality and homogeneity of variance respectively. Neither was violated.

The main effect of hygiene on perceived spaciousness was statistically significant, $F(1, 112) = 7.88$, $p = < .001$, with participants observing the hygienic shelter (M=2.80, SD=0.69) perceiving the shelter as significantly more spacious than participants observing the unhygienic shelter (M=2.50, SD=0.58). Partial eta-squared (η^2)for this effect was .066.

The main effect of brightness was also statistically significant, $F(1,112) = 62.19$, $p = < .001$, and large, partical $\eta^2 = .357$. The participants in the bright condition perceived the shelter significantly more spacious (M = 3,02, SD = 0.55) than those in the dark condition (M = 2.26, SD = 0.52)

Furthermore, a statistically significant interaction indicated that the effects of brightness on perceived spaciousness depend on the level of hygiene, $F(1, 112) = 6,09$, $p = .015$, partical $\eta^2 = .52$. The nature of this interaction is illustrated in Figure 1.

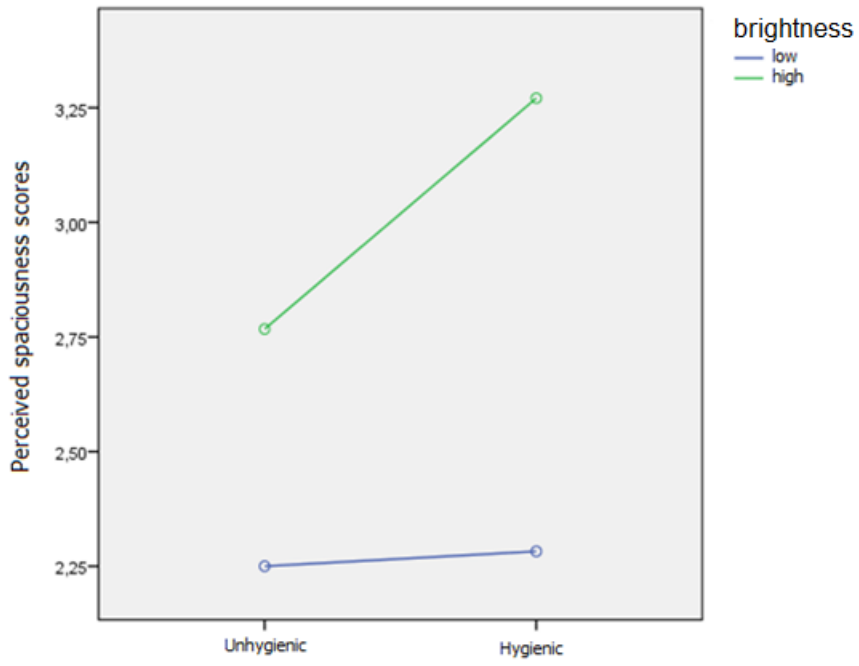


Figure 3.1 The interaction effect of brightness and hygiene on perceived spaciousness.

Simple effects analyses were used to further examine the interaction between hygiene and brightness. These analyses indicated that hygiene has a significant effect on perceived spaciousness in the bright condition $F(1, 112) = 14.17$, $p = < .001$. However, hygiene does not influence the perceived spaciousness when the shelter is in a dark condition, $F(1,112) = .057$, *ns*.

4.2.2 Perceived hygiene

An ANOVA test was also used to compare the average scores of perceived hygiene in an animal shelter. Shapiro-Wilk and Levene's tests were used to evaluate the assumption of normality and homogeneity of variance respectively. Neither was violated.

The main effect of hygiene on perceived hygiene was statistically significant, $F(1, 112) = 15.63$, $p = <.001$, partical $\eta^2 = .122$, with participants observing the clean shelter (M=3,13,

SD=0.51) perceiving the shelter as significantly more clean than participants observing the unhygienic shelter (*M*=2.76, *SD*=0.56).

The main effect of brightness was also statistically significant, $F(1,112) = 35.61$, $p = <.001$, partical $\eta^2 = .241$. The participants in the bright condition perceived the shelter as significantly cleaner (*M* = 3,21, *SD* = 0.48) than those in the dark condition (*M* = 2.67, *SD* = 0.52)

However, a statistically significant interaction was not found. This indicated that the effects of brightness on perceived hygiene did not depend on the level of hygiene in the shelter, $F(1, 112) = .345$, *ns*.

4.2.3 Perception of the animal

Again, an ANOVA test was used to compare the average scores of the perception of an animal in an animal shelter. Shapiro-Wilk and Levene's tests were used to evaluate the assumption of normality and homogeneity of variance respectively. Levene´s test for equality of error variances was violated, as it was significant at the $\alpha = .05$ level, $F(3,111) = 5.19$, $p = .002$. However, it is assumed that ANOVA is not sensitive to this violation because the sample is of moderate size and the different samples are approximately evenly sized.

The main effect of hygiene on perception of the animal was not statistically significant, $F(1, 111) = .319$, *ns*, with participants observing the clean shelter (*M*=3,87, *SD*=0.78) not perceiving the animal as significantly more positive than participants observing the unhygienic shelter (*M*=3.78, *SD*=0.74).

However, the main effect of brightness was statistically significant, $F(1,112) = 9.68$, $p = .002$, partical $\eta^2 = .080$. The participants in the bright condition perceived the animal

significantly more positive (M = 4,03, SD = 0.58) than those in the dark condition (M = 3.62, SD = 0.85)

On top of that, a statistically significant interaction was found. This indicated that the effects of brightness on the perception of the animal depended on the level of hygiene in the shelter, $F(1, 112) = 6.25$, $p = .014$, partical $\eta^2 = .053$. The nature of this interaction is illustrated in Figure 1.

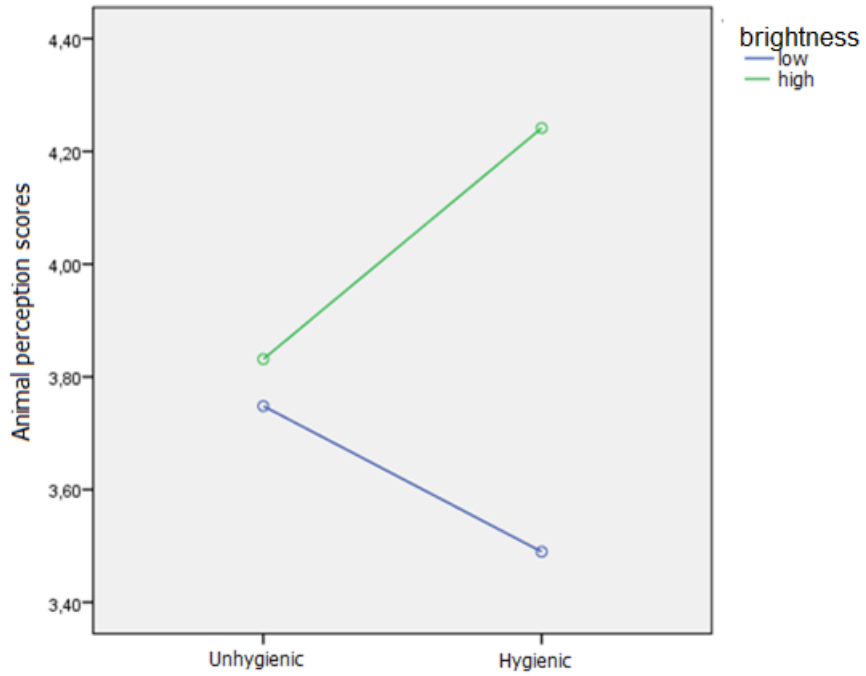


Figure 3.2 The interaction effect of brightness and hygiene on perception of the animal.

Simple effects analyses were used to further examine the interaction between hygiene and brightness. These analyses indicated that brightness has a significant effect on the perception participants have of the animal when the animal shelter is in a clean state, $F(1, 111) = 15.28$, $p < .001$. However, brightness does not influence the perception of the animal significantly when the shelter is in a unhygienic state, $F(1, 111) = .197$, *ns*.

4.2.4 Adoption Likelihood

An ANOVA test was used to compare the average scores of adoption likelihood in an animal shelter. Shapiro-Wilk and Levene's tests were used to evaluate the assumption of normality and homogeneity of variance respectively. None were violated.

The main effect of hygiene on adoption likelihood was not statistically significant, $F(1, 111) = .017$, *ns*, with participants observing the clean shelter (M=1.89, SD=0.24) not being more likely to adopt an animal than participants observing the unhygienic shelter (M=1.89, SD=0.25).

Also, the main effect of brightness was not statistically significant, $F(1,111) = .176$, *ns*. The participants in the bright condition were not significantly more likely to adopt (M = 1.90, SD = 0.23) than those in the dark condition (M = 1.88, SD = 0.26)

4.2.5 Type of adopter

ANOVA tests were conducted to compare people who categorized themselves as being realists versus rescuers. There was no significant main effect of type of adopter on the perceived spaciousness scores, $F(1, 115) = .310$, *ns*, with realists (M=2,7, SD=0.67) not perceiving the animal shelter as significantly more spacious than rescuers (M=2.5, SD=0.61). Also, there was no interaction effect between type of adopter and brightness on spaciousness scores, $F(1,115) = .000$, *ns*, nor an interaction effect between type of adopter and hygiene on spaciousness scores, $F(1, 115) = .359$, *ns*.

No main effect of type of adopter on perceived hygiene scores was found, $F(1, 115) = .504$, *ns*. Realists (M=2,9, SD=0.60) did not perceive the hygiene significantly different than did rescuers (M=2.9, SD=0.50). Again, no interaction effects were found between type of adopter

and brightness on hygiene scores, $F(1,115) = .172$, *ns*, and between type of adopter and hygiene on hygiene scores, $F(1, 115) = .890$, *ns*.

The perception of the animal also did not significantly differ between realists and rescuers, $F(1, 115) = .253$, *ns*. Realists did not perceive the animal significantly different (M=3.9, SD=0.73) than rescuers (M=3.8, SD=0.79). No interaction effects were found between type of adopter and brightness on animal perception, $F(1,115) = 1.345$, *ns*, and between type of adopter and hygiene on animal perception, $F(1, 115) = 1.033$, *ns*.

Lastly, there was no significant main effect of type of adopter on adoption likelihood scores, $F(1, 115) = 2.973$, *ns*, with realists (M=2,3, SD=0.69) not being significantly more likely to adopt than rescuers (M=2.5, SD=0.55). Also, type of adopter did not interact with the effects of brightness, $F(1, 115) = .054$, *ns*, and hygiene, $F(1, 115) = .709$, *ns*, on adoption likelihood scores.

4.3 Conclusion

Now that the results of the first and main study have been described, the Stimulus-Organism-Response Model (Mehrabian & Russell, 1974) will be recalled to draw conclusions.

First of all, it can be stated that manipulation of perceived spaciousness through lighting was successful in the animal shelter. Both the main effect of hygiene and brightness had significant effects on the how spacious the animal shelter was perceived. Especially brightness had an effect on the perceived spaciousness. Manipulated hygiene only had a significant effect when in a bright shelter. Therefore, lighting as a stimulus can definitely improve the perception people have of the spaciousness of the shelter. The most positive results are booked when the lighting accentuates a spacious and clean shelter, spaciousness perception is then at its highest. Results indicate that lighting can also successfully

manipulate and improve the perceived hygiene in an animal shelter. Both brightness and better hygiene positively influenced the image people had of the cleanliness in the animal shelter. There was no interaction effect found, indicating that different levels of brightness in combination with different levels of hygiene did not significantly influence the hygiene perception.

These results indicate that the first hypothesis ("*Brightness influences the perception of hygiene/spaciousness in an animal shelter*") is confirmed. The second hypothesis ("*The effect of hygiene and brightness will be most significant if the animal shelter is in a (perceived) clean and spacious state."*) is partly confirmed, as there only exists an interaction effect on perceived spaciousness and not on perceived hygiene.

Based on the results, it can be concluded that lighting in the animal shelter can improve the affect towards and perception of the animal (Organism phase) that people have and therefore the third hypothesis ("*The perceived hygiene/spaciousness influences the visitors' perception of the animal in the shelter*") is confirmed. People with a spacious perception of the animal shelter (through lighting) significantly had a better image of the animal in that shelter. Hygiene did not have a main effect on the perception of the animal. There also existed an interaction effect: the shelter had to be in a hygienic state for the brightness effect to be optimal. In other words, the perception of the animal was improved most if the shelter was clean and bright.

The results indicate that perceived hygiene or spaciousness did not improve the likelihood to adopt an animal. The fourth and last hypothesis ("*The perceived hygiene/spaciousness influences the likelihood to adopt an animal from the shelter*.") was not confirmed. Even though the SOR-model could be applied to the current study, the ultimate Response was not affected by the Stimulus and Organism phase.

5. Discussion

The results of the main study indicate that lighting significantly influences the perception people have of an animal shelter. Brighter lighting makes the shelter look more spacious and clean. These results are in line with the findings by Stamps (2010) and Molenaar (2010), who argued that lighting can increase perceived spaciousness and hygiene.

Based on the study by Williams and Bargh (2008) it was taken into consideration that spaciousness could lead to distance of emotions toward the animals. The current results reject this consideration, most likely because the results from the study by Williams and Bargh turned out not to be applicable in an animal shelter setting. Perception of spaciousness significantly improved the image people had of the animal in that shelter. Especially a shelter that was perceived as being spacious and clean (through bright lighting) scored high in the Organism phase of the model. The current study therefore confirms that small lighting adjustments can affect the emotional state and judgment of a person in an animal shelter. This is in line with the study by Hinks and Shamey (2011), who argued that lighting could make people perceive the actual product (animal) differently.

The current study did not find significant results that indicate that the Response (adoption likelihood) in an animal shelter could be influenced by environmental cues. First of all, a possible explanation is that other variables that were left out in the current study play a role. The current study only focused on lighting (on spaciousness and hygiene). Another possible explanation for these results is that the decision (to adopt or not adopt) is too complex and cannot solely be based on the perception people have of the shelter and the animal. Some people are just more likely to adopt an animal because their situation is right; they have the financial means, are at home a lot, etc. Lastly, it could also be the case that there is little room

to influence the decision through environmental cues, as the decision is largely based on the animal itself rather than the shelter it is in.

There were a couple of limitations for the current study. First of all it was not conducted in a real life setting, where the participants were actually in the animal shelter. It might be the case that the results were influenced because participants were unable to put their selves in the actual position of adopting an animal from a shelter. Secondly, there was a small sample (*n*= 116) and it is not likely to represent the whole Dutch population. A large scale research could further deepen the use of environmental cues in animal shelters. Lastly, manipulation of lighting is known to be complex (Bitner, 1992). The current study experimented with the intensity of the light but left out other possible variables such as the warmth and direction of the lighting.

Future research should focus on the possibilities of lighting in an animal shelter with a broader scope (taking into consideration other light variables such as warmth and direction). Secondly, future research should focus on the gap between conducting the current study 'on paper' and actually letting people go through an animal shelter which is manipulated (through lighting) and see to which extent this influences the result. Also, future research should focus on other variables that could influence the decision making of a visitor in an animal shelter. For example, Morrison et al. (2011) discovered that a vanilla-scented store has an impact the mood of a person and time spent in a store. It could be interesting to apply such theories to the animal shelter setting.

The results offer practical implementations for animal shelters. Based on a survey send to several animal shelters in The Netherlands, it became clear that the managements are interested in changing their shelter environment. They limited these changes in terms of budget and emphasized that the adjustments had to be easy and practical. The current study

offers a way to improve the image of the shelter and animals to a certain extent, by making small adjustments. Animal shelters are recommended to create appearing spaciousness and hygiene. A quick and easy way to do so is by intensifying the light in the animal shelter.

In conclusion, it can be stated that the current study indicates that environmental cues can be used more broadly than in just in a retail-environment. Manipulation of cues has proven to be successful also in an animal shelter setting. It has been observed that cues like lighting, spaciousness and hygiene can effectively improve the perception people have of an animal shelter and their judgment of the animal. To answer the central question of the current study: yes, environmental cues influence the adoption process in an animal shelter to a certain level. Stimuli can be successfully manipulated and the emotional perception can be significantly influenced. To be able to influence the last state of the process, the actual response, more research is needed. For now, the current study has discovered a part of the potential of environmental cues by shredding some light on animal shelters.

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IV Appendix: the survey

Stelt u zich de volgende situatie voor: u bent geinteresseerd in het adopteren van een hond of kat uit een asiel. Om u te orienteren gaat u langs bij het asiel in uw stad. U komt binnen en loopt door het asiel. Tijdens het rondlopen komt u door de gangen en langs de hokken van de dieren. Vervolgens ziet u op de grond de bakken staan waar de dieren uit eten. U komt ook langs de voorraadkast en bekijkt deze even. Dan komt u in de ruimte waar de dieren gewogen, verzorgd en gewassen kunnen worden. Als laatste kijkt u nog even uit het raam en vertrekt weer. Beeld u in dat het asiel er als volgt uitzag en beantwoord vervolgens de vragen.

** one of four moodboards here**

1. Geef aan in hoeverre u vindt dat de volgende aspecten aansluiten bij het asiel op de foto's

	Geheel mee oneens	Mee oneens	Mee eens	Geheel mee eens
Schoon	○	○	○	○
Koude Sfeer	○	○	○	○
Stoffig	○	○	○	○
Ruimtelijk	○	○	○	○
Licht	○	○	○	○
Onhygienisch	○	○	○	○
Krap	○	○	○	○
Warm	○	○	○	○
Open	○	○	○	○
Betrouwbaar	○	○	○	○

2. In hoeverre bent u het eens met de volgende stellingen

	Geheel mee oneens	Mee oneens	Mee eens	Geheel mee eens
Ik heb het gevoel dat ik in dit asiel een goed overzicht krijg.	○	○	○	○
In dit asiel voel ik me prettig.	○	○	○	○
Ik denk dat ik in dit asiel gemakkelijk de dingen kan vinden die ik zoek.	○	○	○	○
Dit asiel is ruimtelijk en open.	○	○	○	○
Ik denk dat de organisatie van dit asiel goed is.	○	○	○	○

Bekijk de foto's van de volgende twee asieldieren en beantwoord de vragen.

3. Bekijk de foto's van de dieren uit het voorgaande asiel en beantwoord s.v.p. de onderstaande stellingen

	Geheel mee oneens	Mee oneens	Mee eens	Geheel mee eens
Dit lijkt mij een lief dier.	○	○	○	○
Ik vind dit een mooi dier.	○	○	○	○
Dit dier zal een goed huisdier zijn.	○	○	○	○
De verzorging van dit dier is goed.	○	○	○	○
Het dier heeft een goed karakter.	○	○	○	○
De herkomst van dit dier is goed.	○	○	○	○
Dit dier heeft tot op heden een goed leven gehad.	○	○	○	○
Ik denk dat het dier genoeg ruimte heeft gehad.	○	○	○	○
Ik vind het dier niet zielig.	○	○	○	○

4. Welke van de volgende uitspraken is het meest op u van toepassing na het zien van de foto's.

- ○ Door de slechte hygiene in het asiel zou ik het dier niet graag adopteren
- ○ Door de goede hygiene in het asiel zou ik het dier wel graag adopteren.
- ○ Door de slechte hygiene in het asiel zou ik het dier wel graag adopteren.
- ○ Door de goede hygiene in het asiel zou ik het dier niet zo graag adopteren.

5. Welke is het meest van toepassing:

- ○ Het dier had niet genoeg ruimte en daarom zou ik het dier niet graag willen adopteren.
- ○ Het dier had wel genoeg ruimte en daarom zou ik het dier wel graag willen adopteren.
- ○ Het dier had niet genoeg ruimte en daarom zou ik het dier juist wel graag willen adopteren.
- ○ Het dier had wel genoeg ruimte en daarom zou ik het dier juist niet graag willen adopteren.

6. Ik zou mijzelf typeren als een:

- ○ Realist (rationeel van aard)
- ○ Redder (emotioneel van aard)

7. Ik ben een

- Man
- Vrouw

***8. Leeftijd:**

9. Opleiding:

- MBO
- HBO
- WO
- Middelbare school
- Overige

Bedankt voor het invullen.