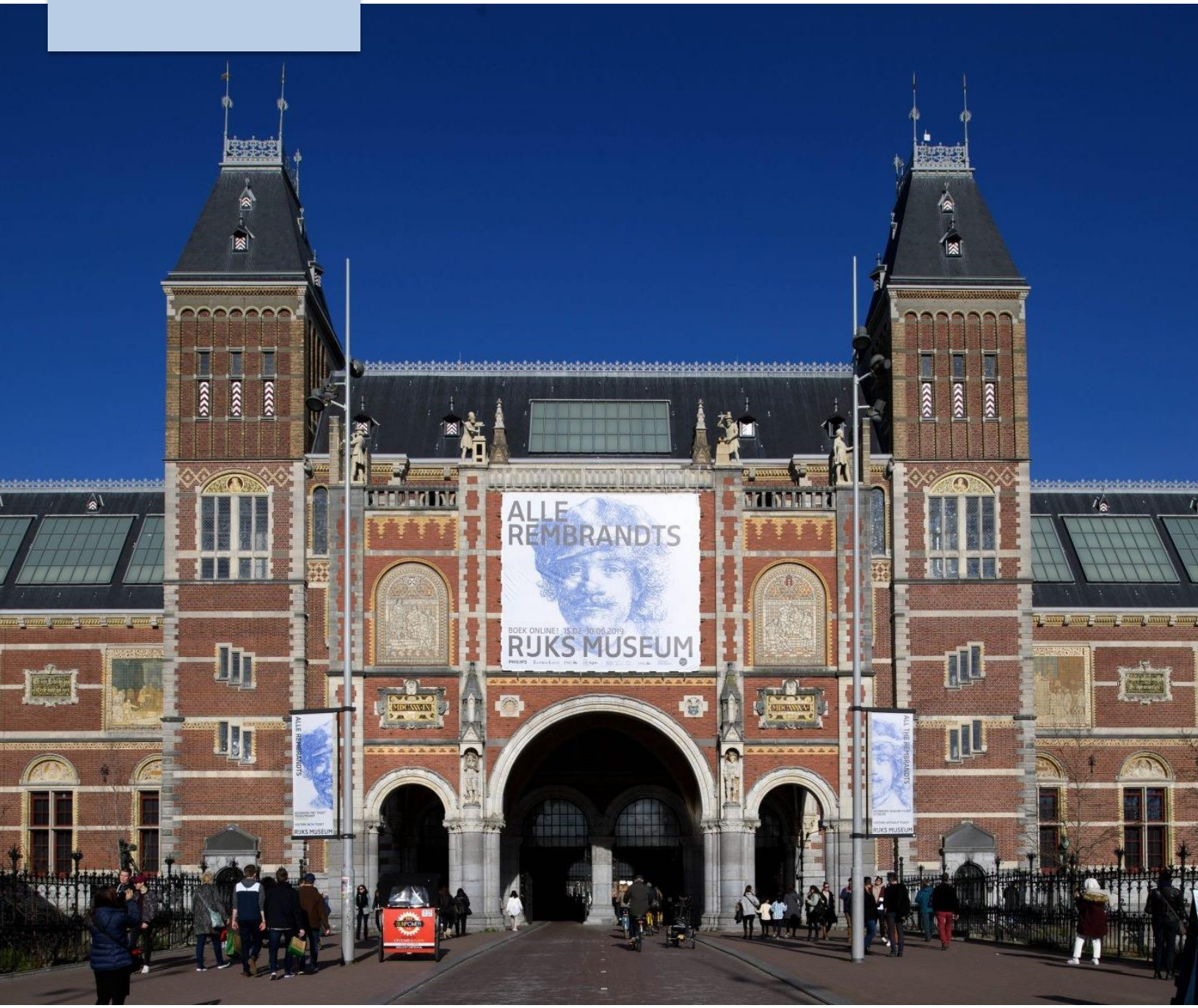
Utrecht University

RIJKS MUSEUM

A Master's Thesis about

Wayfinding in the Rijksmuseum

By Janine de Bruijn



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Wayfinding in the Rijksmuseum

An exploratory research about the visitor experience on wayfinding and signage in the Rijksmuseum, the possible problems and barriers, and an advice

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Abstract

This research is done in the context of the Rijksmuseum. The central goal of the Rijksmuseum is to provide the visitors with a pleasant visit. They have reasons to think that the wayfinding and signage in the museum should be improved to reach their goal. Therefore, this exploratory research is done. In this research the experiences of the visitors are examined. Next to that it is investigated if the wayfinding and signage is a problem, and, if so, these problems are examined. Finally, an advice is given to the Rijksmuseum. To do this, a mixed method approach is used, which consists of observations and a survey. The results show that the wayfinding and signage can be considered as a problem. Visitors experience multiple barriers in the wayfinding and signage, mostly in the circulations areas. Moreover, it can be concluded that by improving the wayfinding in the Rijksmuseum, the overall experience of the visitor will also improve. The advice for the museum is to change their signs (bigger, higher, more, brighter and more informative), to inform the visitors better about the art collection and the complexity of the building and to use nudges, like footprints on the floor.

Keywords: Rijksmuseum; wayfinding; signage; visitor experience; circulation areas

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1. Introduction

A challenge for museums in the 21st century is to be more visitor-focused. Customer experience namely is an aspect within an organization that becomes more and more important (Lemon & Verhoef, 2016). This growing focus on the experience of the customers is mainly because of the growing influence of customers, and the interaction with and between the customers through for example (social) media channels (Lemon & Verhoef, 2016). Customers can nowadays interact with and review organizations on various ways, which means that there are many potential customer touch points, both online as offline. The experience of the customer is based on various aspects like ticket sales, the products/collections, bathroom facilities, lost and found, wardrobe, signage, wayfinding, parking, and more. The growing influence of the customers and the growing amount of touch points makes the customer journey more complex. The customer journey is made of the steps that a customer goes through from start to finish when engaging with an organization/company, and influences the customer experience (Marquez, Downey & Clement, 2015; Richardson, 2010). A crucial part of the customer journey is wayfinding and signage (Marquez, Downey & Clement, 2015). Wayfinding is, according to Golledge (as cited in Symonds, 2017); "the process of determining and following a path or route between an origin and a destination". Signage are actual signs, such as arrows, maps, facility signs, exit directions and more (Dogu & Erkip, 2000; O'Neill, 1991). Since wayfinding and signage are crucial aspects, this part of the customer journey will be studied in this research.

This research investigates the wayfinding and signage in the context of the Rijksmuseum. The central goal of the Rijksmuseum is to provide the visitor with a pleasant visit to the museum, as customer experience is central in their strategy (Rijksmuseum, 2017). When mapping out the customer journey in assessing the customer experience, it was found that there are a few potential barriers in the customer journey. One of these barriers is the wayfinding and signage in the Rijksmuseum. Accordingly, this current research is conducted to 1) delineate the potential problem of the wayfinding and signage in the Rijksmuseum, 2) give insight in visitor behavior in their visit of the exhibits in the Rijksmuseum, and 3) advice the museum in improving their customer journey regarding the wayfinding and signage. To do so, this research is conducted from a qualitative approach, with a small contribution of quantitative research. This approach is used because it is not clear what phenomenon is being studied, besides the broad topic of wayfinding and signage. Therefore, there are no specific hypotheses. This makes the current

study an exploratory research. Nonetheless, a review of theories and empirical literature related to the topic of wayfinding and signage is of importance, in order to gain a better understanding of the concepts and to give the research an empirical framework.

1.1 Theoretical framework and empirical research

It is important to define the central concepts wayfinding and signage by using existing literature. Thereafter the factors that influence wayfinding will be discussed.

1.1.1 Wayfinding

As an aspect of the customer journey, the way in which individuals find their way around their architectural environment is important to understand (Peponis, Zimring & Choi, 1990). Wayfinding is an important concept here, which was used for many years. The concept of wayfinding was introduced by the American Lynch, who is often cited and referred to in existing literature about wayfinding. He defined wayfinding as "the consistent use and organisation of sensory cues from the external environment" (Lynch 1960, as cited in Farr, Kleinschmidt, Yarlagadda & Mengersen, 2012). However, apart from Lynch's definition of wayfinding, various wayfinding definitions are used and mentioned in existing literature, such as "the process for an individual of finding their way in a familiar or unfamiliar setting using any cues given by the environment" or "the process of identifying a current location and knowing how to get to a desired destination as quickly and effortlessly as possible" (Farr, et al., 2012, p. 2, p. 3; Fewings, 2001; Symonds, Brown & Lo Iacono, 2017). However, one of the most used definitions of wayfinding is given by Golledge (as cited in Symonds, 2017); "wayfinding is the process of determining and following a path or route between an origin and a destination. It is a purposeful, directed, and motivated activity". The definition used can depend on the research field where the study is conducted, however, all definitions have elements in common (Farr, et al., 2012). The definition used in this study is: "the process for an individual of finding their way in a familiar or unfamiliar setting using any cues given by the environment" (Farr, et al., 2012).

Fewings (2001) states that wayfinding can be split up into three types; recreational, resolute and emergency wayfinding. Recreational wayfinding is about wayfinding for somebody's own pleasure, for example on a holiday or on a day-trip to a museum. This way of wayfinding shows that wayfinding is not always about finding the fastest and the shortest path,

but also as wayfinding for enjoyment and satisfaction (Symonds, 2017; Fewings, 2001). Resolute wayfinding is about finding your way in the most effective manner, and emergency wayfinding is only about reaching the destination as easily and quickly as possible (Fewings, 2001; Farr, et al., 2012). The type of wayfinding that is used in the Rijksmuseum can be recreational, since it is for somebody's own enjoyment. However, if the visitor has limited time and just wants to see the highlights of the museum, than the type of wayfinding would most probably be resolute wayfinding. Only in case of emergencies, the emergency wayfinding would be used in the Rijksmuseum.

The process of wayfinding where an individual moves himself/herself from a current location to a desired destination might seem straightforward. Nowadays there are many means of guidance, such as maps and apps to help an individual to find the right way. However, wayfinding is a complex set of various variables and processes (Farr, et al., 2012). It consists of the whole mental process that takes place within a person plus all the cues in the socio-cultural context (Symonds et al., 2017). This means that wayfinding can be examined from both a psychological and a sociological approach (Farr, et al., 2012; Symonds, et al., 2017). In this research the sociological approach to wayfinding will be used. Research about the psychological view on wayfinding is exists already, while the body of literature on sociological aspects of wayfinding is lacking.

Wayfinding is an important concept to examine since it affects how individuals move through their environment, for example a building. If individuals are able to find their way in a building, this will lead these individuals to their destination faster on for example peak times (Farr, et al., 2012). There will be less disorientation and confusion. This is of importance in a museum to make the visitor experience better. Moreover, disorientated visitors will have costs for the organization (museum) itself also, such as lost time and less concentration of the staff, who have to provide directions to the visitors (Farr, et al., 2012). By correctly applying the elements and/or acknowledging the effects of the elements that are important for wayfinding, frustration in visitors will be reduced, which will improve the customer experience (Farr, et al., 2012). There are various factors that play a crucial role in wayfinding, such as 1) signage, 2) individual/demographic characteristics, 3) visitor circulation, 4) the design/characteristics of the environment, and 5) recognition and landmarks (Farr, et al., 2012). These factors will be reviewed in the subsequent sections below.

1.1.2 Signage

Signage is a part of wayfinding, which is the second central concept in this study. Signage is about the actual signs in a building or on a public place that help individuals to find their way. It is mostly used to optimize and strengthen/increase the efficiency of the wayfinding, most likely in complex buildings (Dogu & Erkip, 2000; O'Neill, 1991). The signage consists of for example maps, arrows, room numbers, facility signs and exit directions. When placed at the locations in the building where an individual makes a decision (decision points), this improved the wayfinding performance (Best, as cited in O'Neill, 1991). With simplified signs on decision points, it takes individuals significantly less time to find their destination (Corlett, Manenica & Bishop, as cited in O'Neill, 1991). Some literature however suggests that signs can also make wayfinding more confusing (Soh & Smith-Jackson, 2004). Especially when the signs are made in a way that they blend in with the environment. In that way individuals miss signs more often and, even when they see the signs, they find them hard to read because of this (Soh & Smith-Jackson, 2004). Outdoor research found that visitors of nature parcs want signs to be bright-coloured and contrasting with the environment (Soh & Smith-Jackson, 2004). It can also be the case that the information that is given on the signs is not sufficient (Soh & Smith-Jackson, 2004). When this is the case, it can take visitors more time to interpret the signs. Overall, signs are very helpful in finding the way, but they need to be visible and give sufficient information (Soh & Smith-Jackson, 2004).

1.1.3 Individual differences and demographics

Demographics such as gender, age and culture differ between individuals and can directly or indirectly influence wayfinding (Xia, Arrowsmith, Jackson & Cartwright, 2008).

Some research is done on the difference between men and women in wayfinding strategies and spatial ability (Xia, et al., 2008; Lawton & Kallai, 2002; Farr, et al., 2012). Most literature found that men have better wayfinding performance than women (Chen, et al., as cited in Farr, et al., 2012; Contreras, et al., as cited in Farr, et al., 2012; Lawton & Kallai, 2002;). This could be because of biological factors , such as testosterone levels. Higher testosterone levels show better navigational performance in an individual. Also, the way the brain differs between men and women can cause differences (Farr, et al., 2012). However, Soh and Smith-Jackson (2004) did not find a difference between men and women in wayfinding performance. Lawton &

Kallai (2002) also examined gender differences in wayfinding strategies. There are many wayfinding strategies, however to keep it more simple and clear Lawton and Kallai (2002) condensed this to the two most common wayfinding strategies. Orientation strategy is about maintaining a sense of direction and orientation, and route strategy is about directions regarding a specific and exact route that is being taken. Lawton & Kallai (2002) concluded that men have a preference for the orientation strategy, while women are more likely to use the route strategy. This is why women also prefer the use of landmarks more than men (Barkley & Dye, as cited in Farr, et al., 2012; Lawton, as cited in Farr, et al., 2012; Chai & Jacobs, 2009;). Moreover, women can memorise objects and object-locations better than men. Men however are better in navigating and are more likely to recall previously travelled routes (Farr, et al., 2012). Next to wayfinding strategies and preferences, women have more wayfinding anxiety than men and report feeling less safe than men (Lawton & Kallai, 2002).

Secondly, age plays a role in wayfinding (Head & Isom, 2010; Taillade, N'Kaoua & Sauzéon, 2016). Head and Isom (2010) found that the older an individual gets the harder it will be to recall landmarks and recognize the environment. When going a specific route, older individuals have more difficulty with the temporal order, directional information and location than younger individuals (Head & Isom, 2010).

The third demographic factor that can influence wayfinding is culture (Soh & Smith-Jackson, 2004; Leib, Dillman, Petrin & Young, 2012). Individuals with different cultural backgrounds might interpret wayfinding systems and signage in various ways. Symbols and texts can have a different meaning in different cultures and terminology can differ (Leib, et al., 2012; Farr, et al., 2012). Soh and Smith-Jackson (2004) found that international individuals find it more difficult to understand names of trials, to read the signs, and they missed more signs than individuals from the country itself. This can be explained by the way geography and systems are designed in a country. Individuals from other cultures have different experiences with wayfinding in their home-country, which means that for one group of people some wayfinding techniques might be natural, while they might be somewhat alien to the other group (Symonds, 2017). People are socialized by the culture in their country. This structures their mind and makes them have a different perception of the world (Farr, et al., 2012). Moreover, they might have different education systems, which makes the wayfinding in another country more difficult for

them (Soh & Smith-Jackson, 2004). Furthermore, language problems can play a role (Soh & Smith-Jackson, 2004; Farr, et al., 2012).

1.1.4 Visitor circulation

Bitgood (2006) states that to do research about, and understand and explain visitors' behavior and wayfinding it is important to understand how visitors circulate through museums. For years the importance of understanding the way in which individuals move through museums is recognized, since this affects the visitor's experience (Bitgood, 2006). However, there is no consistency in what existing literature found. Looking at existing literature it namely appears to be difficult to predict choice behavior of visitors. Visitor movement seems chaotic and existing literature mention different ways in which visitors move. Some researches talk about the right-turn bias, which means that individuals mostly turn right at choice points (Bitgood, 1995; Bitgood, 2006). However, other studies do not agree with these findings. Altogether, there are studies that show predictable walking patterns and there are studies that argue that visitors move randomly through museums (Bitgood, 2006). Existing literature does agree about the facts that large and moving objects, as well as objects about high-interest topics attract a visitor's attention (Bitgood, 2006).

Many studies on visitor circulation state that visitors often move through the museum according to their own agendas, without following the exact sequence that was intended by the museum and the developers (Bitgood, 2006; Melton, as cited in Bitgood, 2006; Porter, 1938). This can be seen as a visitor-centered explanation, where the exhibit/museum design does not play a role and where there are no exhibit-visitor interactions (Shettel, as cited in Bitgood, 2006). Visitor circulation, however, includes both what visitors bring to the museum (interests, agenda, prior knowledge, etc.) and the design of the museum (architecture, exhibitions, signs, open space, etc.). Predicting choice behavior of individuals can lead to an expectation of the visitors' circulation. The general value principle, which is based on costs and benefits, can be applied to predict the choices individuals make (Bitgood, 2006). The general value principle argues that the movement of visitors through museums and the value of their experience can be explained and calculated by looking at the relationship between costs (effort and time) and benefits (satisfied curiosity, enjoyment). This means that an experience can change when either the benefits or the costs change. If the (perceived) benefits stay the same, but the costs (time, effort, etc.) reduce,

the value of the experience will be higher. The benefits divided by the costs shows the choice of viewing specific parts of the museum or a specific piece of art for an individual (Bitgood, 2006), and all these costs and benefits during the visit together show the experience of the visitor. In this study the assumption is made that decreasing the costs can also be done by providing the visitor with good signage and an easy wayfinding. In this way it will be more easy for the visitor to walk their way to a specific piece of art or an exhibition that they want to see/go to, which will also increase their experience.

1.1.5 Environment; the (complex) museum building

The environment in which individuals move has an influence on their wayfinding performance (Farr, et al., 2012). This environment can be a building. Individuals form expectations of their environment, based on, amongst other things, previous experiences (Frankenstein, et al., as cited in Farr, et al., 2012; Symonds, 2017). According to Lynch (1960, as cited in Farr, et al., 2012), a building consists of paths, edges, districts, nodes and landmarks (Farr, et al., 2012). A path is where people can move along, like a street or a walkway. Without paths people would not be able to move through the building (Farr, et al., 2012). An edge is a boundary between two areas, such as a wall. Edges are not necessary for individuals to move through the building, however they organise the building and the layout. A district is a part of the building that has a specific function or character and a node is a point in the environment where people decide where to go (decision point), like a resting place or a junction where more paths come together. Finally landmarks are reference points, like central located stairs (Farr, et al., 2012). These elements in a building are all important, especially the landmarks are crucial in wayfinding (Farr, et al., 2012), which will be elaborated on more later in section 1.1.6.

Next to these elements in an environment, like the inside of a building, environments vary in their degree of complexity. Since the world is complex, individuals try to make the world easier to understand by structuring and making hierarchies (De Jesus, 1994). An important aspect of making the world easier to understand is the interaction between individuals and their environment. Individuals establish systems for orientation and create relationships with their environment by which space and orientation in the space are the basis (De Jesus, 1994). Among other things, landmarks (later more about this), signs and the function of buildings are important aspects in making spaces understandable and structured. However, sometimes spaces are very

complex and the signage and landmarks cannot support the needs for navigation and orientation that individuals have. Individuals may get confused and lost in the complex web of spatial relationships (De Jesus, 1994). This is why physical experience of space and environment are important factors in wayfinding. It is important to minimize ambiguities in space and vision (De Jesus, 1994). When examining a space where people move through and interact with each other it is important to not only look at one space, but to see more spaces in a context, which is called the layout (Hooper-Greenhill, 2006). The spaces itself and how these spaces are configured in the layout have an effect on choices and ways in which an individual can move through the spaces.

When looking at a museum as the environment; the anthropologist Bell (as cited in Hatala & Wakkary, 2005) described museums as cultural ecologies, which is about the interactions among organisms, in this case visitors, and their environment. Visiting a museum can be decomposed into three categories: visitors, space, and interactions and rituals. Since space is an important factor in moving through environments, making choices and the experiences, it is important to look at the building of the Rijksmuseum. A museum can namely be seen as a complex system with various aspects where visitors have to navigate through (Hatala & Wakkary, 2005). The navigation through a complex building can be challenging. If a building is complex, it will take individuals more time to find their way (Farr, et al., 2012), which can cause frustration if individuals for example want to visit the museum, but have limited time. Good wayfinding and signage can make it more easy for visitors to find their way through the complexity of the building (Hatala & Wakkary, 2005).

Peponis, et al. (1990) state that individuals tend to, after a brief exposure to a building, try to understand the building and its layout and rely less to signs. Besides that, the building layout and build form/design also increases the possibility of encountering others when going through the building, which means people tend to walk the same routes through a building.

1.1.6 Landmarks

A crucial aspect within the environment are landmarks and recognition. They play a role in the way individuals experience space (De Jesus, 1994). Xia, et al. (2008) define landmarks as the following: *"A landmark is a salient object that is used as a reference to help people memorise and recognise routes, and locate themselves in terms of their ultimate destination"*. These

landmarks can be natural or artificial, for example a large tree or a building in an outside environment or, in case of the Rijksmuseum, The Night Watch and the entrance hall (The Atrium). Individuals use landmarks to recognise a route or path and to locate their own position in a building. (Xia, et al., 2008; Frankenstein, Brüssow, Ruzzoli & Hölscher, 2012). When a visitor in the Rijksmuseum stands in front of The Night Watch, which can be considered as a landmark, it is easier for the visitor to locate oneself in the museum when for example looking at the paper map.

Landmarks and their importance depend on the familiarity of the individual with the environment through which the individuals are wayfinding. In unfamiliar environments, individuals link object types or certain regions in buildings based on their background knowledge about functions of certain objects or areas (Frankenstein, et al., 2012). For example, the Atrium in the Rijksmuseum consists of a tickets office, an information desk, lockers, restrooms, etc. Individuals might, based on their background knowledge, interpret this area as a public area, where visitors come before and after their visit.

As mentioned previously, women tend to use landmarks more than men (Barkley & Dye, as cited in Farr et al., 2012; Lawton, as cited in Farr, et al., 2012; Chai & Jacobs, 2009).

1.2 Current research

As stated above, the Rijksmuseum wants to do research about the wayfinding and signage in the museum. The Rijksmuseum is located in a big and complex building (many rooms, various floors, and an east- and westside) where good signage and wayfinding is needed to provide the visitors with an as comfortable, easy and enjoyable visit as possible. Besides that, the flow of the visitors and the safety are crucial factors in this case. Some more information about the Rijksmuseum is important to get an understanding of the museum itself, the building with its renovations and their strategy.

The Rijksmuseum is a museum which is being visited by many Dutch inhabitants as well as many tourists who come to admire the art in the museum. The museum opened their doors for the very first time in 1800 as a national art gallery, and was then located in The Hague (Rijksmuseum, n.d.). However, in 1808 the Rijksmuseum moved to the new capital of the Netherlands; Amsterdam. In 1885 the museum was located in the building where it is located at the moment. Many renovations took place during the years, with the biggest rebuilding and

renovation in 2004 (Rijksmuseum, n.d.). This renovation took place mainly because of the growing amount of people that wanted to visit the museum. In 2013 the Rijksmuseum opened their doors after the renovation and rebuilding of approximately 10 years (Rijksmuseum, n.d.). The goal was to attract 1.5 million visitors a year. In 2018, however, the number of visitors is much larger than the desired 1.5 million, namely 2.3 million visitors visited the museum (Rijksmuseum, 2018, December 17).

In 2017 the Rijksmuseum developed a renewed/sharpened vision with three main priorities, namely; the visitors, the digital domain and the exhibitions (Rijksmuseum, 2017). The museum wants to surprise, amaze and interest their visitors. The visitors of the museum are central in the strategy of the Rijksmuseum. Another important ambition for the Rijksmuseum is to welcome 2.5 million visitors in the year of 2020, with the most important aspect to give the visitors a good quality visit. To realize this, the museum mapped out the customer journey. A customer journey map (CJM) is a visual representation of the experience and journey of a customer when using a space or service (Marquez, Downey & Clement, 2015). It helps understanding the steps, stages and touchpoints a customer passes from the start to the finish when engaging with an organization (Marquez, et al., 2015). By doing this, various customer barriers in the museum could be seen. One of these important customer barriers is the wayfinding and signage in the Rijksmuseum. The museum expects that, when these important customer barriers are removed, the museum can provide the visitors with a better quality visit and eventually this might lead to an even further increase of the number of visitors. To remove the potential customer barrier of wayfinding and signage, the Rijksmuseum finds it important to gather data and do research about the current wayfinding and signage in the museum, and the behavior and experiences of the visitors.

The Rijksmuseum expects that to remove or decline the customer barrier, the wayfinding and signage in the museum should be improved. This expectation resulted from preliminary evidence by gathering feedback from visitors and their staff members/employees that work in the museum (front office and security). The staff members indicated that visitors often ask them questions about the direction in which they want to or have to go. Even though there are expectations that there are problems in the current wayfinding and signage in the Rijksmuseum, it is hard to say if visitors see this as a problem, and why and where these potential problems in the wayfinding and signage exactly take place/arise. Information from the visitors themselves is

namely missing. The Rijksmuseum wants to improve their wayfinding and signage in such a way that the visitors experience a visit as pleasant and enjoyable as possible to increase the visitor experience. A good wayfinding will namely provide visitors with a sense of control and empowerment because they understand the environment. This will reduce fear, stress and anxiety for the visitors (Passini & Arthur, 1992).

To accomplish this the wayfinding and signage in the museum has to speak for itself and lead the visitor through the museum in the way the visitor wants to be led. To achieve this, it is important to do research, gather literature, observe and gather information among the visitors of the Rijksmuseum.

In sum, the goal of this study is to achieve a better understanding of the wayfinding, signage, and the visitor experience in the Rijksmuseum, and the explanation of visitor behavior by doing a mixed method research.

In this study three research questions will be answered; an explorative question, an explanatory question and a policy advice question. The research questions in this study are the following:

Q1: What are the general experiences with the wayfinding and signage of the visitors of the Rijksmuseum?

Q2: Are there specific barriers/problems in the wayfinding and signage in the Rijksmuseum, what are the underlying reasons and how can they be solved?

Q3: How can the wayfinding and the signage in the Rijksmuseum be improved, based on a literature review and the answers on Q1 and Q2?

The questions above are examined in the Rijksmuseum in the permanent exhibition, but also in the temporary exhibition in the Philips Wing of the Rijksmuseum. Next to the permanent exhibition, a temporary exhibition was namely opened at the 15th of February, which was called “All the Rembrandts”. This exhibition opened, because this year is the year of Rembrandt, since he passed away 350 years ago. Therefore, all the paintings of Rembrandt that are in the collection of the Rijksmuseum will be shown in the Philips Wing. This means that all

Rembrandt's painting in the storage of the museum will be shown and that the paintings from the Gallery of Honour (where The Jewish Bride is usually located) and room 2.8 (where The Young Rembrandt is usually located) in the Rijksmuseum are moved to the Philips Wing, except for the painting The Night Watch. This means that the visitors have to know the way to the Philips Wing. They have to be informed about the exhibition and the changing of the place of the paintings in the museum. To work according to their strategy, the Rijksmuseum wants to make the visit of the visitors as most pleasant and easy as possible. Because of that, there was decided to design temporary signage from the rooms where the paintings of Rembrandt were hanging (e.g. from Gallery of Honour and room 2.8) to the Philips Wing. This is done by providing leaflets in boxes and a small text on the wall with information about the exhibition on the sides of the room 2.8 and in the Gallery of Honour. Accordingly, round stickers of Rembrandt are being placed on the sides of the entrances of various rooms in the museum. The stickers can be seen in Appendix 5. According to the Rijksmuseum, the purpose of the placement of the stickers and the leaflets aimed to have an effect on the visitors and will help them find their way more easily.

As stated previously the Rijksmuseum finds it important to give the visitors a pleasant visit. If the wayfinding and signage in the Rijksmuseum lacks efficiency, problems may arise and this might affect the visitors' experience. This is why this study is relevant specifically in the context of the Rijksmuseum. Moreover, it is relevant to examine wayfinding and the factors that influence wayfinding, since wayfinding is an aspect of everyday life that comes back in almost all activities individuals do (Symonds, 2017). It is of importance to know how individuals behave in/move through complex buildings and on crowded places (Wijermans, Conrado, Van Steen, Martella & Li, 2016; Peponis, Zimring & Choi, 1990). Knowledge on this, and how to develop a good wayfinding and signage can decrease/prevent the occurrence of problems that have to do with safety and customer experience, which is why this study is socially relevant to conduct. Moreover, with good wayfinding and signage individuals will feel that they are in control and understanding the environment, which will reduce fear, stress and anxiety (Passini & Arthur, 1992; Wijermans, et al., 2016; Peponis, et al., 1990). Moreover, a good wayfinding and signage is expected to have positive indirect effects on the organization itself, such as employees being able to focus on their work instead of answering questions about the signage, and a

growing number of visitors (Rijksmuseum, 2017). The information/strategies proposed in this research can also be useful for other crowded places.

Besides offering practical insights into wayfinding and signage for the Rijksmuseum, the results of the current research would also offer theoretical insights on a broader level. Wayfinding is a subject that has been researched for over fifty years (Symonds, 2017), however there are some gaps in the literature that need to be filled. Recent literature about wayfinding and signage do exist (Symonds, 2017; Fewings, 2001; Farr, et al., 2012; Soh & Smith-Jackson, 2004), however most existing literature on the topic of wayfinding and signage is not contemporary. Up to date literature is thus missing, but is needed since buildings are designed and set up in a more modern way and it is likely that new techniques on signage are developed. Besides, wayfinding and signage are often not examined together. Most literature is about wayfinding in general, also in combination with crowd management (Raubal & Worboys, 1999).

Secondly, besides missing literature on this topic, literature on wayfinding and signage in museums specifically also show a gap. Research is done on wayfinding in other organizations or on public places (e.g. Dogu & Erkip, 2000; Fewings, 2011; Frankenstein, et al., 2012; Leib, et al., 2012; Porter, 1938), however literature and case studies on wayfinding in a museum is very limited. There is one case study in the Louvre, however that is focusing on mapping the customer behavior and does not include advices or strategies on wayfinding and signage in museums (Yoshimura, Girardin, Carrascal, Ratti & Blat, 2012).

Thirdly, literature on wayfinding is mostly conducted in the field of psychology (and sometimes architecture), and not on sociology (Symonds, 2017), which means that the complete picture of individuals using space is missing. Therefore, the sociological part of wayfinding needs more attention. Symonds (2017) showed that sociology and the socio-cultural context in wayfinding is of importance, since socio-cultural aspects influence wayfinding.

The gaps mentioned above show that it is scientifically relevant to do research on wayfinding and signage in the Rijksmuseum. This research in the Rijksmuseum can be seen as an exploratory research and case study that can give insights in the importance of wayfinding and signage in complex buildings. A case study on wayfinding and signage in a museum can contribute to existing literature and can be valuable to other museums and other places where a large number of people are present.

To conduct this study and answer the research questions a mixed method approach will be used. The data collection starts with observations, and then expands with data gathered through surveys. The data collected through these methods will together provide answers to the research questions by analysing the observations, performing some statistics on the survey data and coming up with an advice based on data and literature.

2. Methods

In conducting this study data was gathered by using a mixed method strategy. The data was gathered in the Rijksmuseum in the period from beginning of February 2019 until half of June 2019. The methods that are used are observations and a survey.

When examining the behavior of individuals and applying this in public policy the framework BASIC can be used (Hansen & Schmidt, 2018). BASIC stands for behavior, analysis, solution, intervention and continuation. In the case of the Rijksmuseum, the behavior of the visitors will first be observed and data will be collected on their experiences by using a survey. This data will be analysed by looking for patterns, causes, consequences, and mapping the problems. As an answer to the policy advice question possible solutions and advice for interventions will be given.

2.1 Observations

From the 4th of February 2019 until end of March 2019 and a week in the end of May 2019 data is gathered by doing observations in the Rijksmuseum. Observations have taken place on different points in time and on different locations in the museum. The main focus was on the visitors of the museum, on the signage and wayfinding of the museum and the design of the building itself. There was chosen to use the method of observation, because by observing people and the environment one can understand the phenomena under study (Kawulich, 2005). Therefore, according to the BASIC framework (Hansen & Schmidt, 2018), observing is an important step in examining behavior of, in this case, visitors of a museum. When observing there are four different observation stances that the researcher can take, namely complete participant, participant as observer, observer as participant and complete observer (Kawulich, 2005). In this study there is being chosen for a complete participant stance. This means that the researcher is a member of the group that is being studied. When observing, the researcher looks

like a visitor of the Rijksmuseum, with no signs of being a staff member. The group being observed (the visitors of the Rijksmuseum) does not know about the research, which might be an ethical issue (Kawulich, 2005). However, since the visitors cannot be traced back to their identities, they are completely anonymous. Hence, the visitors cannot change their way of behaving when they do not know about the research, which makes the data more reliable and ecologically valid. The observations are done as objective as possible; the observer was not known with the organization of the Rijksmuseum when the observations started and made field notes by detailed descriptions of what the observer saw, without too much interpretation. To start by observing; the environment, the building and the phenomena under study can first be understood, before asking concrete questions to the visitors.

When observing, attention was paid to the expressions of the visitors, the choices that visitors make/the route that they walk, if visitors ask employees of the museum for the way, if visitors talk to each other about the route/destination, the non-verbal communication of the visitors, etc. Detailed field notes were being written of everything that has been observed and some actions were being counted for 15 to 20 minutes on one location. Information about the gender, age-category, and the group with whom they visit the museum were also written down to be able to analyze the data more precisely. Considering observations were done without the visitors knowing, the visitors are not asked about their age. Since this is the case, categories of age are made and being used, which are the following: children (0-10), older children (10-18), young adults (19-30), middle-aged (31-50), older (51-65), elderly (66-100). The age of the visitors is being estimated, so age in the observations are an indication and not a fact.

2.1.1 Temporary signage exhibition

The temporary signage of the temporary exhibition “All the Rembrandts” will be examined by doing observations on the temporary signage with two different layout of the signage. The goal of these observations are to examine if the temporary signage to the Philips Wing reaches its goal and is useful or if adaptations are needed. There will be observed in the museum from 18th of February until the 4th of March, in which there has been observed on different days and different times to make the data more representative for the visitors of the Rijksmuseum. The observations took place in two circulation areas on both sides of The Night Watch room, in the circulation area on the first floor in tower 6, in room 2.8, where The Young Rembrandt usually is located,

and room 2.4 and in the circulation area on the ground floor next to room 0.6 (see the map of the Rijksmuseum in Appendix 3). When observing, attention is paid to the visitors' (non-verbal) behavior; if visitors see/use/read the stickers, leaflets and texts, if visitors talk about the stickers to each other, if visitors take the leaflets with them, etc. From these observations detailed field notes were taken, which can be found in Appendix 1.

On 9th of May 2019, after a wrap-up of observations of the first layout of the sticker that is used to help the visitors in finding their way to the Philips Wing, the layout of the stickers for "All the Rembrandts" is changed. The new sticker has been observed from 13th of May until end of May. The exact same way of observing and taking field notes is used, with the purpose of examining if the layout of a sign (in this case the stickers to the Philips Wing) has an effect on the visitor behavior and on the way in which the visitors find their way to the exhibition in the Philips Wing. The results-section will show if there will be any differences observed.

2.2 Survey

The next step during, but mostly after observing is the collection of data by using a survey. The survey was done in the Rijksmuseum on a few locations from 25th of March until 22nd of May. The survey was conducted among 66 visitors of the museum. The visitors in the museum were asked if they would participate by filling in a questionnaire on an iPad for a research that is done about the wayfinding and signage in the Rijksmuseum. A random sampling technique is used, since all visitors are randomly asked and the choice to participate is the full choice of the visitor himself/herself, which means that the visitors voluntarily participated in the survey. Most visitors prefer to fill in the survey themselves, however some visitors prefer the researcher to ask the questions. Since most visitors prefer to fill in the survey themselves, this will partly reduce social desirability (Neuman, 2014). Next to that, the visitors are completely anonymous, since the only individual information that is asked are; their gender, age and country. Often, next to the questions, the researcher has a talk with the visitor about the topics of the questions.

The survey is chosen as a method because it provides more information on how visitors think and experience their visit and the wayfinding/signage in the museum than observations. Besides that, by collecting data via surveys there is less to no interview bias, because the visitor answers the questions, which are stated on the iPad, without an interviewer that might lead the visitor into a certain direction. Thirdly, the response rate is higher with a face to face survey than

with an online survey, and the researcher can provide explanations when needed (Neuman, 2014). The survey data is gathered in the two circulation areas next to The Night Watch room (see map in Appendix 3). The survey was made in Dutch as well as in English. A test of the survey made it clear that having all the questions in one survey takes too much time for the visitors, which would negatively affect the response rates. Therefore, 2 variants of the survey were made, in which the first part (10 questions) is identically. The second part of each variant consists of 8 questions, which differ per variant. The survey ends with one question that is the same for both variants of the survey (see Appendix 2). Approximately half of the sample were given variant A and the other half were given variant B.

The first part of the survey are demographic questions (gender, year of birth, country). After that some general questions about the visit of the visitor are asked (how many times did you visit, with how many people are you visiting, with who are you visiting, grade your visit, grade finding your way, grade finding a specific piece of art). In the last part of the survey the questions are about the specific signs (survey 1; facility signs and room number signs, survey 2; map on the wall and years per floor on the wall) and what they think about the wayfinding and signage and how they think the wayfinding and signage can be improved. The complete survey (split in two smaller surveys) can be found in Appendix 2.

Demographics. To make clear how the variables that are used are measured, some of the variables are operationalised below. The questions about the respondent's gender, year of birth and country can be found in Appendix 2. For the variable *Gender*, the answer option *"Other"* is given to make sure that every person that fills in the questionnaire feels accepted and belonging to a category. Furthermore, men are coded as 0, and women are coded as 1. The variable *Age* is calculated by subtracting the year of birth from 2019 (this year). The variable *Country* is made by splitting up the answer options into Dutch visitors and foreign visitors. Dutch visitors are coded as 0, and visitors from foreign countries are coded as 1.

General experience of museum visit. After the questions about demographics there are some general questions asked about the visit and the museum, such as *"With how many people did you visit the Rijksmuseum today? (including yourself)", "With whom are you visiting the Rijksmuseum today? (more answers possible)", "How often did you visit the Rijksmuseum? (this visit included)"*. The variable *Frequency of visiting* has the following 5 answer options: *"This is the first time"* (1)*, "2 times"* (2)*, "3-5 times"* (3)*, "6-10 times"* (4) and *"More than 10 times"*

(5). Thereafter the respondents are asked to give a score on an 10-points scale on the following three questions. The first question measures the variable *Overall experience*; *"How would you rate your visit at the Rijksmuseum today on a scale from 0 to 10?"*, where the lower the grade, the less satisfied, and the higher the grade, the more satisfied. Secondly, the following questions measure *Wayfinding Experience*: *"How did you experience finding your way in the museum during your visit today on a scale from 0 to 10?"* and *"How easy/difficult was it for you to find the pieces of art you wanted to see in the Rijksmuseum, on a scale from 0 to 10?"*, where, for both questions, a lower grade equals more difficult and a higher grade equals more easy. Visitors give a grade from 0 to 10, where 10 in each case means the best. Since two questions of the survey are combined to make one scale and measure the experience the visitor has with the wayfinding in the Rijksmuseum, the validity and reliability have to be tested. By executing a factor analysis it can be checked if these two questions can be merged into a more meaningful and smaller set of factors (Allen, Bennett & Heritage, 2014). In this case it will be tested if the two questions that measure wayfinding experience can be put together into one factor that measures wayfinding experience. The assumptions of interdependency (every respondent can be found only once in the dataset) and sample size (more than 5 respondents per variable) for performing a factor analysis are being met. The assumption of normality is, according to the Shapiro-Wilk test, not met. The Shapiro-Wilk test is significant for both questions, which means that the data are not normally distributed. When looked at the Q-Q plots and histograms it seems that the data are normally distributed. Since a factor analysis is robust, it will not be a problem if the data is not completely normally distributed (Allen, et al., 2014). A factor analysis with Principal axis factoring and without rotation is executed. The factor analysis shows that the questions are significantly correlated, that multicollinearity is not at stake and that there is one underlying factors for the two items (see Table 1).

Table 1. *Promax Rotated Factor Structure of two items about wayfinding in the Rijksmuseum*

Item	Loadings
1. *How did you experience finding your way in the museum during your visit today on a scale from 0 to 10?*	0.846
2. *How easy/difficult was it for you to find the pieces of art you wanted to see in the Rijksmuseum, on a scale from 0 to 10?*	0.846
Percentage of Variance	71.66%

N = 64

To test the reliability of this scale, a Cronbach's Alpha is performed. The test shows a Cronbach's Alpha of 0.84 for the two questions about wayfinding. This value of Cronbach's Alpha means that the reliability is high and that these two items can be put together into one scale. To make one variable out of the two items, the mean grade on these two items is calculated and this makes an 10-points scale, where the lower the number, the less good experience with the wayfinding, and the higher the number, the better experience with the wayfinding.

Signage at the museum. The next questions are more specified to the various signs in the Rijksmuseum. A question is asked: *"In which way(s) did you find your way through the Rijksmuseum (more answers possible)?"*, with the following answer categories: *"Facility signs (restrooms, tickets, café, shop, etc.)", "Room numbers signs", "Text on the wall when entering a new floor (years per floor)", "Map on paper", "Map on the wall", "Following other visitors", "I walked through the museum how I wanted, without a specific route", "I asked the employees when I did not know the way"* and *"Other, namely..."*. This question is split up in 9 dummy variables that show if the respondent used a sign/means of wayfinding or not. 0 means "No", and 1 means "Yes". To compute the variable *Amount of signs used* the respondents' answers on the dummy variables mentioned above are added. If the respondent has a 1 on *Map on paper* and on *Facility signs*, then the respondent will get a code of 2 on the variable *Amount of signs used.*

Thereafter the survey splits up in two variants of the survey. The survey variant A contains questions about the facility signs and the room numbers, while the survey variant B contains questions about the map on the wall and the years per floor. With all these questions a picture of the signage is provided to make it clear for the visitors what is meant by the question. For all four signs that are asked about, the questions asked are the same. Here, the questions

about the facility signs are taken as an example; *"Did you see the signs for the facilities in the museum?",* with answer options *"Yes"* and *"No"*, *"To what extent did you use the facility signs during your visit today to find your way through the Rijksmuseum on a scale from 1 to 5"*, where 1 is "totally not" and 5 is "all the time", *"How useful do you find the facility signs to find your way through the Rijksmuseum on a scale from 1 to 5?"*, where 1 is "totally not useful" and 5 is "very useful", and "*Do you think the facility signs (restrooms, tickets, café, shop, etc.) can be improved? If yes, how?"*, with the answer options "*Yes, namely…", "No"* and *"I do not know".*

The last question in the survey is the following: "*What is, do you think, missing in the wayfinding and signage of the Rijksmuseum?"*. This is an open question, where the visitor can fill in any recommendation/remark/positive aspect/negative aspect or anything he/she wants to write. This question gives the real opinion of the visitors, without leading them in any direction possible.

2.3 Analysis

First the field notes from the observations were analysed by looking for patterns and recurring topics. Before the survey data was analysed all respondents with one or more missing values on the variables that are used in the analysis are removed from the data. Only the respondents with valid values on these variables will be used. This is done by making a variable that counts the amount of respondents with and without missing values. Afterwards, this computed variable is used as a filter to filter out all respondents with a missing value on the variables. When this filter is used the sample consists of 64 respondents. Filtering respondents with a missing value out of the data can cause problems. It could be that a certain group with the same characteristics is filtered out, however that is not the case here, since it is only 2 respondents that are filtered out of the data. Afterwards the data of the surveys were analysed to produce descriptives and correlations.

To test various relationships, three multiple linear regression analyses are performed. With a multiple linear regression analysis the influence of various dependent and control variables on the independent variable can be predicted. The first regression analysis tests if the *Wayfinding experience* (independent variable) and the use of various specific signs/means of wayfinding (independent variables: *Facility signs, Room number signs, Years per floor, Map on paper, Map on wall, Following other visitors, Walking own route* and *Asked employees*) have an

influence on someone's overall experience (dependent variable). This will show if the wayfinding in the Rijksmuseum is of importance for the visitor's experience of the visit. The second regression analysis tests if the use of various specific signs (independent variables) has an influence on someone's wayfinding experience (dependent variable). This will give insights in the effectiveness of the signs in the Rijksmuseum and if using a specific sign influences the easiness of moving through the museum. The third regression analysis tests if the amount of signs that are used (independent variable) has an influence on someone's wayfinding experience (dependent variable). This will show if the combination of more signs is helpful or needed to make the wayfinding more easy for the visitor. In these multiple linear regression analyses G*ender, Age, Country* (NL vs. foreign country), *Group size* and *Frequency of visiting* are used as control variables. These regression analyses will give insights in if and how signs, wayfinding and experience affect each other.

3. Results

3.1 Observations

The next section will show the results of the observations in the Rijksmuseum.

3.1.1 Atrium

The observations show that the Atrium (area where visitors come when they enter the museum-building) could possibly be improved on a few points. In the first place, the main entrance to the art collection, where the tickets are scanned, leads to a wall. The visitor immediately has to choose to turn either left or right. However, there is no clear signage that shows the visitor where they go when they choose to either turn left or right. When the visitors turn left they are close to the Philips wing with the temporary exhibition(s), which is not clearly shown by a sign or the building layout. When the visitors turn right, they see the desk for the multimedia tours, however it is not clear that after they pass that desk, another part of the exhibition starts. Next to that, the observations show that some visitors have problems with finding another entrance to the collection (on the side of the Atrium). Besides the main entrance to the art collection, visitors can enter the museum by another entrance, however this entrance is only visible when the visitors are in the area of the restrooms and lockers. Visitors also seem to not be able to find the restrooms in the Atrium easily. This might be, because the signs for the restrooms are not visible from all

points in the Atrium. Finally, many visitors do not know where to exit the building after their visit. This is a question that is frequently asked to the employees of the Rijksmuseum. However, the observations suggest that the rest of the Atrium is clear for the visitors. As such, observations suggest that while it seems clear to see where to buy tickets, where to bring jackets/bags, and where the tours start, it takes visitors more effort to determine where the restrooms and entrances to the exhibitions are.

3.1.2 The building and layout

By experiences of the researcher walking through the museum and by observing, it can be said that the building of the Rijksmuseum is complex to walk through. A few examples of this are given below.

In Gallery 2 (A2 on the map) it is not clearly shown what the visitor is going to see when going downstairs to enter Gallery 2. Moreover, it is not clear if this Gallery has another entrance/exit or if the visitor has to walk back to where they entered. However, the map on paper shows that there is no other way to continue the visit through the museum than exiting where they entered. Some visitors seem a bit confused and they were doubting to go downstairs to the Gallery.

The museum is split up in two parts (the east- and the westside) that are connected in the entrance hall (Atrium) and on the second floor. Because of the outside biking-road that is located under/between the east- and westside of the museum, the visitors cannot move from the westside to the eastside, or the other way around, when on the ground floor and first floor. The observations show that visitors do not know this and ask staff how to go from one side to the other side of the museum. Moreover, some visitors do not even know that the eastside exists, which is observed, since the eastside of the museum is less crowded than the westside.

3.1.3 Circulation areas

Observations show that in the circulation areas on the first and the second floor visitors grab their paper maps, look at the map on the wall or the board with the years per floor on the wall. Next to using those means to find their way, observations show that the visitors discuss where they want to go. In these areas visitors are also often observed to look around confused. Even though many visitors use the signs and maps, they still do not always get to know where to go when wanting to

reach their destination. Sometimes visitors start walking and come back, because they think they took the wrong direction. Besides that, the visibility and clarity of the stairs and elevators is not always good. Visitors think that the elevator is the entrance to the stairs or they do not see the stairs because it is behind a wall and they cannot see them when entering the circulation areas.

3.1.4 Signs

It is observed that visitors do not look or do not notice the numbers of the rooms that are shown in the doorways of the rooms. When visitors walk through the rooms they seem to walk from one room to the next without following a specific route. Often, confusion is observed when looking for or following the signs for the restrooms. This also is a frequently heard question that visitors ask staff (heard when observing). The signs like the map on the wall and the board with the years per floor on the wall, which are hanging in the circulation areas, are frequently used by the visitors, however often confusion is observed. The map on the wall seems not clear. Visitors look for a long time and point at the map, however still sometimes walk away without knowing where they are exactly or where they want to go.

3.2 Observations temporary signage to the Philips Wing

The movement of the pieces of art that are moved to the temporary exhibition in the Philips Wing can be a challenge for the visitors to understand, which is why the Rijksmuseum decided to place stickers, leaflets and a text on the wall where the pieces used to hang, to guide visitors to the Philips Wing (Appendix 5: pictures of these stickers, leaflets and texts). Below the main results of the temporary signage are presented.

3.2.1 Circulation areas

Looking at the temporary signage as a whole it stands out that, from the visitors that talk to each other about the exhibition and look or point at the stickers, most are located in the circulation areas on the second and first floor. Interpreting this, it seems like a logical explanation that these circulation areas are the areas where the visitors make decisions in where to go and how to continue their visit through the museum. There are also many visitors that continue their route/way without noticing and looking at the stickers, but in general the stickers seem reasonably visible at these locations in the museum. More or less 1 out of 3 visitors look at the

stickers in the circulation areas. It is often observed that visitors give a quick superficial glance at the sticker. A couple of visitors walk to the sticker or point to the sticker. Sentences that are most often said by visitors, when they see the sticker, are; “Yes, look, there are All the Rembrandts”, by which the visitors take the stairs down to go to the exhibition, or “There, All the Rembrandts. That is where we are going to soon”.

The observations show a difference between different places in the museum where the stickers are hanging. The visitors look more and talk more about the stickers in the circulation areas than in other room where the stickers are hanging.

3.2.2 Room 2.8 (where The Young Rembrandt is usually located) + route from room 2.8 to The Night Watch room

In room 2.8 almost all visitors read the text on the wall about The Young Rembrandt when entering the room. An extra piece of text about the replacement of this painting to the exhibition in the Philips Wing is placed below the standard text. The observations made clear that many visitors seem to stop reading the text after they read the text about The Young Rembrandt. This means that these visitors miss an important part of the text, which is the replacement of the painting to the exhibition. Moreover, the observations show that in room 2.8 more or less 1 out of 5 visitors grab a leaflet from the box and read it. After reading, almost all visitors place the leaflet back in the box.

Concerning the sticker in the sides of doorway: there were no visitors observed that looked at the sticker or that used this sticker to go to the exhibition according to the route the stickers guide you in. Likewise, the stickers between the rooms 2.9/2.7, 2.5/2.4 and 2.3/2.1 are not noteworthy noticed and looked at.

Two possible routes were observed at the location of room 2.8 in the museum. First, visitors can enter room 2.8 from room 2.9. The visitor often first reads the text on the wall (about The Young Rembrandt) and might grab a leaflet to read. When they leave room 2.8 they continue their route to room 2.7. They do not see a sticker, because the sticker is placed between room 2.8 and 2.9. They seem to continue walking “their” route through the museum. Secondly, visitors can enter room 2.8 from room 2.7. This route logically proceeds to room 2.9. Even if visitors see the sticker in the doorway between room 2.8 and room 2.9, they are not adapting their route by seeing this. The aforementioned observations show that the sticker on the side of

the doorway between room 2.8 and room 2.9 could be considered as not very useful. These observations mean that visitors seem to not change their route through the museum when they are in a room with pieces of art, only in the circulation areas.

3.2.3 Leaflets + text on the wall (Gallery of Honour and room 2.8 compared)

The leaflets about the exhibition "All the Rembrandts" are taken by the visitors relatively more frequently in the Gallery of Honour on the place where the Jewish Bride used to hang than in room 2.8 where the Young Rembrandt used to hang. However, the text on the wall is being read more in room 2.8 than in the Gallery of Honour. Visitors regularly read the leaflets, but often put them back in the bin after reading.

3.2.4 After changing the layout of the sticker

According to the observations mentioned above, the layout of the sticker was changed to examine if this makes the sticker more visible and clear. Observations after the changing of the layout did not show much difference than prior to the installation. In room 2.8 the sticker is still not noticed by the visitors and also on the route from room 2.8 to the circulation area between room 2.1 and The Night Watch room no visitors are seen that follow the stickers. This means that the changing of the layout of the sticker did not improve the visibility of the sticker, however it might have somewhat improved the clarity of the sticker. In the circulation areas it is namely seen that visitors might understand the sticker a bit better, so fewer questions are asked to the staff, which is a positive consequence.

3.3 Survey

The survey is used as a complementary method for data collection. The information gathered by this survey complement the findings of the observations as they give insights into the reported experience of the visitors themselves. Since this is an exploratory study, these insights can show how the visitors themselves experience their visit to the Rijksmuseum, how they think about the wayfinding and some specific signs and what, in their opinion, can be improved. First the descriptive statistics of the most important variables are being shown, since this gives the first information about the visitor's experience and some demographics of the visitors. The descriptive statistics are presented in Table 2 below.

Table 2 shows that women are overrepresented in this sample, since 77% of the sample consists of women and only 23% of men. The variable *Age* shows that the youngest respondent is 12 years old and the oldest respondent is 72 years old, with a mean age of 30.7 years. 82.81% of the respondents are from a foreign country, while 17.19% of the respondents is from the Netherlands. Table 2 also shows that some visitors visited the museum alone, where the maximum groups-size of the respondents is 44 people. On average the respondents in this sample visit the Rijksmuseum with 6 people in total including themselves. Most respondents visited the Rijksmuseum for the first time or second time, with some respondents visiting for 3rd to 5th time. The descriptive statistics of the variable *Overall Experience* shows that the lowest grade for today's visit given by the respondents is 6, and the highest grade given is 10. The mean overall experience grade given by the respondents is 8.38 (with a standard deviation of 1.11), which can be seen as a high grade that shows that the visitors' experience of the visit is good. The variable *Wayfinding Experience* however, scores lower than the overall experience. The lowest grade given by the respondents on the wayfinding in the museum is 2, however the highest grade given is 10. The mean grade for the wayfinding is 6.71, with a standard deviation of 2.00. The amount of signs that are used are maximum 4 out of 5. Also, some visitors report to not have used any of the signs in the museum. Table 2 shows that most visitors used around 2 signs during their visit.

Table 2. *Descriptive statistics*

	N	Minimum	Maximum	Mean	Std. Deviation
Gender *(Woman = 1)*	64	0	1	0.77	0.43
Age	64	12	72	30.69	14.53
Country *(Foreign country = 1)*	64	0	1	0.83	0.38
Group size	64	1	44	5.98	9.13
Frequency of visiting	64	1	3	1.31	0.61
Overall experience	64	6	10	8.38	1.11
Wayfinding experience	64	2	10	6.71	2.00
Amount of signs used	64	0	4	1.88	1.18
Valid N (listwise)	64				

Besides the descriptive statistics, more insights can be gained from looking at correlations. Also here, the most important variables regarding intercorrelations are being presented. Before looking at correlations and doing the multiple linear regression analyses it is important to test if the assumptions of independence, normality, linearity and homoscedasticity are met (Allen, et al., 2014). First, since each participant only participated once in the survey, the assumption of independence is met. Secondly, the Shapiro-Wilk test is used to test the assumption of normality. This test is used since the sample is small (Allen, et al., 2014). The test shows a significant Shapiro-Wilk for all variables, except for the variable *Wayfinding experience.* This means that the assumption of normality is met, except for the variable *Wayfinding experience*. When looking at the normal Q-Q plots it can be seen that all variables seem normally distributed and linear, however some stem-and-leaf plots show extreme values. When looking at the boxplots, some outliers are present, however these extreme values in the stem-and-leaf plots and outliers in the boxplots can be explained due to the answer categories of the variables where these outliers are seen. The variable *Gender* shows outliers, which can be explained because of the overrepresentation of women in the sample, which makes men outliers in the boxplot. Since the variable *Gender* is a dummy, and thus measured on an ordinal level, and the effect of gender will be examined in this study, it is decided to keep both genders in the data. *Age* shows a few small outliers, which are older respondents and *Country* shows outliers, since Dutch visitors are underrepresented in the sample. The variable *Group size* shows outliers that can be explained because of some respondents visiting the museum with bigger groups, while the mean group size is 6 people (see Table 2). This is the same for the variable *Frequency of visiting.* Since the outliers on the variables *Age, Country, Group size* and *Frequency of visiting* are an accurate reflection of the reality, it is decided to keep the outliers in the data. For the variable *Overall experience* there are 3 respondents that gave a grade below 6, which is seen as an outlier, but since the overall experience of each visitor can be different and is of equal importance in this study, it is decided to keep these 3 outliers in the data. Some of the variables about a specific sign or means of going through the museum show outliers, such as the variables *Map on wall, Following others* and *Ask employees.* Those are dummy variables, and thus measured on an ordinal level, which is why outliers on these variables will not have a strong effect (Allen, et al., 2014). Moreover, those outliers can be explained, because for these specific signs/means of wayfinding most respondents did not use these signs/means of wayfinding. Since the outliers on

the variables mentioned above are explained, the decision is made to keep them in the analyses, since the goal is to represent the population of visitors, so also the ones that might have a distant value on one of the variables.

After testing the assumptions the correlations between various variables will be shown. Because the assumption of normality is not met for all the variables, Pearson's *r* will not be used to look at the correlations (Allen, et al., 2014). Therefore, Kendall's Tau-b will be used. Table 3 shows which variables are significantly correlated. Only the most important significant correlations for the current study will be explained in the text below, however, most variables do not correlate significantly. For all the intercorrelations of the variables, see Table 3.

Table 3 shows that there is a positive significant correlation between overall experience and wayfinding experience ($\tau b = 0.334$, $p < 0.01$). This correlation is medium and means that when one of these experiences is rated higher, the other experience is also rated higher. Besides that, there is a negative and small correlation between wayfinding experience and group size ($\tau b = -0.187$, $p = 0.049$), which means that when the group is smaller the wayfinding experience is better, and vice versa.

When looking at the positive, significant correlations that include the sign variables the following can be explained. The room number signs are more often used by visitors that visit the Rijksmuseum more frequently ($\tau b = 0.261$, $p = 0.033$), when visitors walk their own route, the group size increases ($\tau b = 0.220$, $p = 0.049$), when visitors are walking their own route, they follow others, and vice versa ($\tau b = 0.346$, $p < 0.01$), and when age increases the use of the map on paper increases ($\tau b = 0.285$, $p < 0.01$), and employees are asked more ($\tau b = 0.277$, $p < 0.01$).

When looking at the negative, significant correlations that include the sign variables the following can be explained. When age increases, the map on the wall is more often reported to not be used ($\tau b = -0.245$, $p = 0.020$). Besides that, when visitors use the map on paper the group size is decreases ($\tau b = -0.341$, $p < 0.01$), visitors are less often reporting to follow others ($\tau b = -0.367$, $p < 0.01$) and less often reporting to walk their own route ($\tau b = -0.300$, $p = 0.017$).

The amount of signs used correlates with various variables which will be explained. Visitors who use the facility signs or the room number signs or the years per floor or the map on paper, have a higher value on the amount of signs they use in total (respectively: $\tau b = 0.486$, $p < 0.01$; $\tau b = 0.542$, $p < 0.01$; $\tau b = 0.576$, $p < 0.01$; $\tau b = 0.466$, $p < 0.01$). When visitors find their

way through the museum by following other visitors, the amount of signs they use decreases (τb = -0.232, p = 0.042).

Table 3. *Correlations*

	Gender	Age	Country	Group size	Freq. visit	Overall exp.	Way finding exp.	Facility signs	Room number signs	Years per floor	Map on paper	Map on wall	Following others	Own route	Ask employees	Amount of signs used
Gender	-															
Age	-0.013	-														
Country	0.139	0.073	-													
Group size	0.098	-0.227*	-0.260*	-												
Freq. visit	-0.209	0.134	-0.630**	0.131	-											
Overall exp.	0.064	0.083	0.119	-0.171	-0.068	-										
Wayfinding exp.	-0.008	-0.006	0.155	-0.187*	-0.091	0.334**	-									
Facility signs	0.072	0.119	-0.013	0.065	0.140	-0.070	-0.069	-								
Room number signs	-0.106	-0.060	-0.215	0.028	0.261*	-0.035	-0.067	0.108	-							
Years per floor	0.124	0.034	0.096	0.076	0.078	0.062	-0.072	0.275*	0.224	-						
Map on paper	0.089	0.285**	0.084	-0.341**	0.106	0.207	-0.058	0.088	0.236	0.057	-					
Map on wall	-0.139	-0.245*	-0.122	-0.035	0.062	0.132	0.032	-0.236	0.024	-0.011	-0.168	-				
Following others	-0.112	-0.123	-0.099	0.040	-0.067	0.036	-0.021	-0.191	-0.092	-0.124	-0.367**	0.206	-			
Own route	0.072	-0.093	0.054	0.220*	-0.234	0.030	-0.178	-0.077	0.058	0.009	-0.300*	-0.054	0.346**	-		
Ask employees	0.045	0.277**	0.057	0.117	0.014	-0.051	-0.070	0.224	0.106	0.029	0.133	-0.154	-0.077	0.163	-	
Amount of signs used	0.037	0.068	-0.052	-0.067	0.223*	0.098	-0.117	0.486**	0.542**	0.576**	0.466**	0.161	-0.232*	-0.127	0.136	-

**. Correlation is significant, p<.01

*. Correlation is significant, p<.05

N = 64

Next to the assumptions of normality and outliers, it is important to examine if multicollinearity is at stake when executing a regression analysis. Multicollinearity means that the variables used in the analyses correlate strongly. The regression analysis has two measures for multicollinearity, which are Tolerance and VIF. If the Tolerances for the predicting variables are smaller than 0.1, then multicollinearity is at stake for one or more predicting variables (Allen, et al., 2014). If Tolerances are smaller than 0.2 further inspection on high correlations are needed. Predicting variables with VIFs higher than 10 show that multicollinearity is present for

one or more predicting variables. All Tolerances are higher than 0.2 and the VIFs are not higher than 10, and not even higher than 5, which means that multicollinearity is not a problem.

The assumption of normality, linearity and homoscedasticity of residuals is checked for the regression analyses that are performed. For all three regression analyses, the *Normal P-P Plot of Regression Standardized Residuals* shows that the residuals are normally distributed. The scatterplot shows that any clear patterns in the spread of points are absent, which means that the assumptions of normality, linearity and homoscedasticity have been met. Besides, for the first regression, the Maximum Mahalanobis Distance (30.379) is not larger than the critical chi-square value for *df* (36.123) at $\alpha = 0.001$, which means that there are no multivariate outliers present in the data. For the second and the third regression, the Maximum Mahalanobis Distance is larger than the critical chi-square value for *df* at $\alpha = 0.001$, which means that there are multivariate outliers in the data. However, after looking at these outliers, it is decided to keep them in the data for the same reason mentioned before. This research is a case study in the Rijksmuseum, and the real population of visitors will be shown. Moreover, the outliers can be explained, since many variables are dummy's and some groups are overrepresented, which makes SPSS see certain datapoints easily as outliers.

Table 4 shows the unstandardized regression coefficients, and standard error for the first regression analysis. The first regression analysis that is performed tests if and how much wayfinding experience predicts overall experience and if the use of various specific signs/means of wayfinding influence the overall experience. The control variables G*ender, Age, Country* (NL vs. foreign country), *Group size* and *Frequency of visiting* are included in Model 1. However, model 1 is not significant ($R^2 = 0.087$, F (5, 58) = 1.111, $p = 0.365$). After adding the predicting variable *Wayfinding experience* in Model 2, 24.6% of the variance in overall experience can be explained ($R^2 = 0.246$, F (6, 57) = 3.093, $p = 0.011$). The variable *Wayfinding experience* explains an additional 15.8% of the variance in overall experience, after controlling for gender, age, country, group size and frequency of visiting, which is a statistically significant contribution (R squared change = 0.158, F change (1, 57) = 11.959, $p = 0.001$). In Model 2, *Wayfinding experience* is statistically significant (b = 0.225, t = 3.458, $p = 0.01$). This means that if the wayfinding experience grade increases with 1, the overall experience increases with 0.225 on an 10-points scale. The control variables do not show statistically significant effects. In Model 3 the dummy variables for 8 signs or means of wayfinding are included. 40.7% of the variance in

overall experience can be explained by all the variables that are included in Model 3 (R^2 = 0.407, F (15, 48) = 2.197, p = 0.020). The 8 dummy variables explain an additional 16,1% of the variance in overall experience, however this contribution is not significant. *Wayfinding experience* remains statistically significant (b = 0.274, t = 4.170, $p < 0.01$). *Map on paper* shows a statistically significant effect (b = 0.898, t = 2.685, p = 0.010). This means that when visitors use the map on paper, their overall experience increases with 0.898 on an 10-points scale. Besides that, *Own route* also shows a positive significant effect (b = 0.658, t = 2.049, p = 0.046), which means that when visitors walk their own route through the museum, their overall experience increases with 0.658 on an 10-points scale.

Table 4. *Unstandardized regression coefficients, and Standard Error for each predicting variable in a Regression Model Predicting Overall experience*

	Model 1	**Model 2**	**Model 3**
	b	b	b
Constant	8.047*** (0.821)	6.686*** (0.849)	5.401*** (0.938)
Gender	0.324 (0.338)	0.358 (0.310)	0.291 (0.317)
Age	0.000 (0.010)	0.003 (0.009)	0.002 (0.011)
Country	0.221 (0.490)	-0.031 (0.455)	-0.103 (0.456)
Group size	-0.033 (0.016)	-0.030 (0.015)	-0.017 (0.016)
Freq. of visiting	0.076 (0.312)	0.018 (0.286)	0.089 (0.304)
Wayfinding experience		0.225 *** (0.065)	0.274 *** (0.066)
Facility signs			0.035 (0.280)
Room number signs			-0.251 (0.332)
Years per floor			0.320 (0.277)
Map on paper			0.898 ** (0.334)
Map on the wall			0.586 (0.365)
Following others			0.303 (0.376)
Own route			0.658 * (0.321)
Ask employees			-0.203 (0.335)
R^2	0.087	0.246	0.407

* $p \leq 0.05$. ** $p \leq 0.01$. *** $p \leq 0.001$.

N = 64

The second regression analysis that is performed tests if and how much the use of various specific signs predicts the wayfinding experience in the museum. The control variables G*ender, Age, Country* (NL vs. foreign country), *Group size* and *Frequency of visiting* are included in Model 1, however Model 1 is not significant (R^2 = 0.043, F (5, 58) = 0.522, p = 0.759). After adding the predicting dummy variables *Facility signs, Room number signs, Years per floor, Map on paper, Map on the wall, Following others, Own route* and *Ask employees* in Model 2, 12.2% of the variance in wayfinding experience can be explained, however the regression model as a whole is not significant (R^2 = 0.122, F (14, 49) = 0.485, p = 0.930).

The third regression analysis that is performed tests if and how much the amount of signs that are used predicts the wayfinding experience in the museum. The control variables G*ender, Age, Country* (NL vs. foreign country), *Group size* and *Frequency of visiting* are included in Model 1, explaining 4.3% of the variance in wayfinding experience. However, Model 1 is not significant (R^2 = 0.043, F (5, 58) = 0.522, p = 0.759). After adding the predicting variable *Amount of signs used* in model 2, 6.3% of the variance in wayfinding experience can be explained, however the regression model as a whole is not significant (R^2 = 0.122, F (14, 49) = 0.485, p = 0.930).

3.3.1. Signs

Next to the results showed above, more in depth results about four types of signage are shown below. The results on the first two types of signage (survey A), the facility signs and the room number signs, are collected among 32 respondents. These signs directly show the direction to a room or for example the restrooms. The results on the two last types of signage (survey B), the map on the wall and the years per floor on the wall, are collected among 37 respondents. These signs do not show direct routes, but give more of an overview of the museum as a whole. Each sign will be discussed separately and subsequently the direct signs will be compared, and the overview signs will be compared.

3.3.1.1 Facility signs

Among the 32 respondents 31 visitors reported that they saw the facility signs in the Rijksmuseum. From these 31 respondents 28 reported that they used the facility signs. From those 28 respondents only a few used the facility signs not so much, 16 respondents reported that

they used the facility signs often or all the time. 3 respondents said they saw the facility signs but did not use them at all. From the 28 respondents that used the facility signs 23 found these signs useful to very useful and 12 respondents would not change anything about the facility signs. However, 5 respondents think that the facility signs can be improved. Some improvements that are mentioned are the following: *"lift and exit signs are needed", "restrooms signs can be improved", "use brighter colours or make the signs bigger. At first I did not see them"* and *"make more signs"*. These results show that the facility signs are visible to the visitor and that they are used often. Some improvements that can be made have to do with the amount of signs and the size of the facility signs. In conversations with the visitors it is heard that mostly the signs for the restrooms are unclear and overlooked.

3.3.1.2 Room numbers

Thirty-two respondents answered the questions about the room number signs, from which 27 report to have seen these signs. From those 27 respondents 3 visitors did not use the room number signs and 16 visitors used those signs many times or even all the time. From the 24 respondents that used the room number signs, 18 think these signs are (very) useful, however also 8 respondents think that the room number signs can be improved by making the room number signs bigger and more visible, also some report that more signs are needed. Also two respondents state that the highlights need to be mentioned in those signs, for example: *"Specify what kind of paintings can be found and where"* and *"More description of the periods, more signs"*. Six out of those 24 respondents report that the room number signs do not need to change, and 10 respondents think they can improve, but do not know how. These results show that the room number signs are seen by some visitors, however only half of the respondents uses the signs frequently. This means that the room number signs have to be more visible and/or appealing. Besides that, they need more detailed information about the paintings and periods of time.

Figure 1. *The comparison of visibility between facility signs and room number signs.*

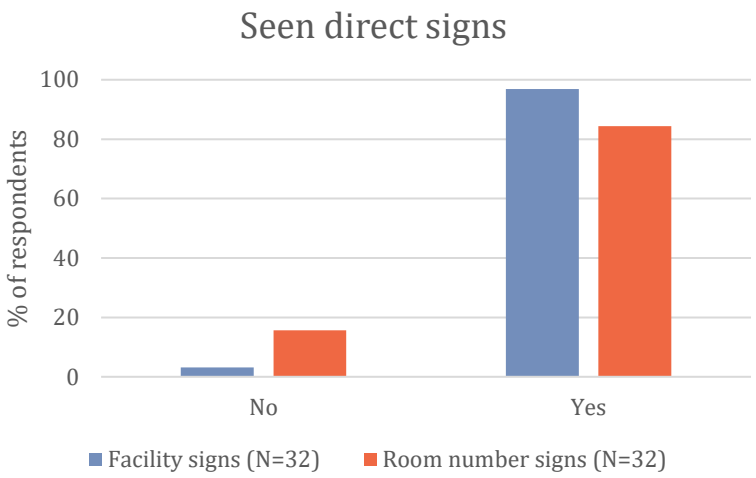


Figure 2. *The comparison of usage between facility signs and room number signs.*

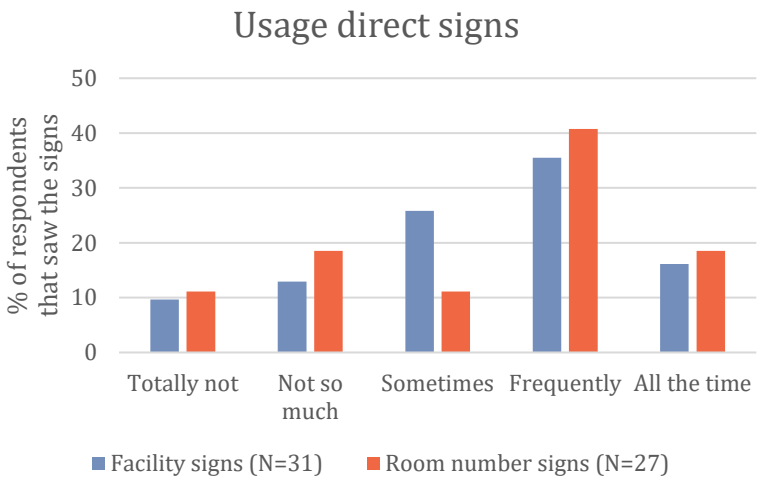
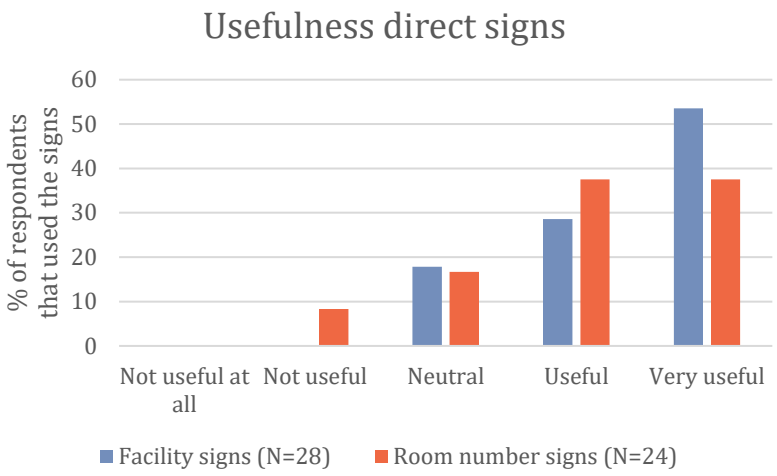


Figure 3. *The comparison of usefulness between facility signs and room number signs.*



3.3.1.3 Map on the wall

Thirty-seven respondents answered questions about the map on the wall as a means to find the way through the Rijksmuseum. From those 37 respondents, only 23 respondents report that they saw the map on the wall. From those 23 respondents, 10 reported that even though they saw the map on the wall, they did not use it. Only 5 respondents used the map regularly or all the time. From the 13 respondents that used the map on the wall when going through the museum, 8 respondents say that they see the map on the wall as (very) useful. 2 out of 13 respondents state that the map on the wall can be improved by saying: *"Improve with famous painting icons"* and *"Show better where the entrances to different parts of the building are (the two sections I mean)"*. These results show that the map on the wall is not visible for the visitors, and even if they see the map on the wall it is mostly not used or barely used. First of all the map on the wall has to be more visible and more attractive to use. Secondly, to improve the content of the map on the wall the different parts of the museum-building (east and west) need to be made clear and the famous painters need to be shown on the map.

3.3.1.4 Years on the wall

Thirty-seven respondents gave their opinion about the years per floor of the museum that are placed on the wall. Of these 37 respondents, 29 reported to have seen the years per floor on the walls of the museum. Of those 29 respondents, 8 did not use this means to find their way, while

12 respondents used it regularly to all the time. From the 21 respondents that used the years per floor on the wall, 18 state that this sign is (very) useful. 3 respondents gave their opinion on how to improve this means of signage, namely: *"With a brief introduction of features maybe", "more detail - names of the artists/styles"* and *"At first I thought they were room numbers. Could be a bit clearer that they are dates/centuries"*. They results on this sign are suggesting that the years per floor on the wall are frequently seen and used by the visitors, and they think the sign is useful. Not so much improvement is needed, however the sign can be made more visible and attractive, so even more visitors would see and use it. With that, the sign can be made more detailed, so visitors know better what to expect per floor and where they want to go.

Figure 4. *The comparison of visibility between the map on the wall and the years per floor.*

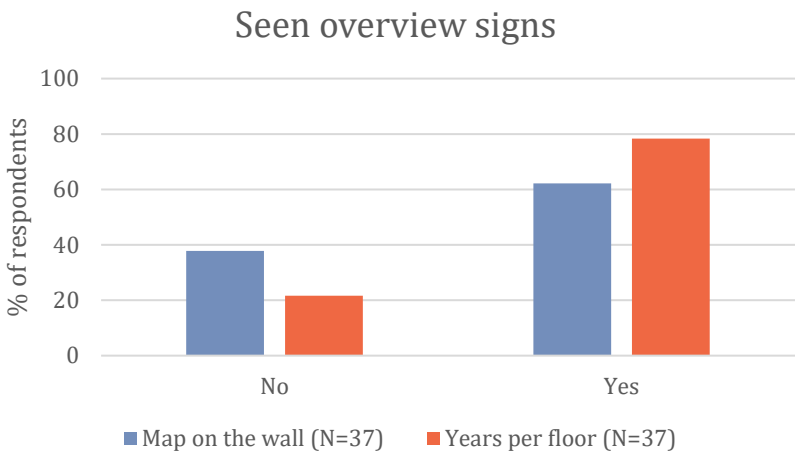


Figure 5. *The comparison of usage between the map on the wall and the years per floor.*

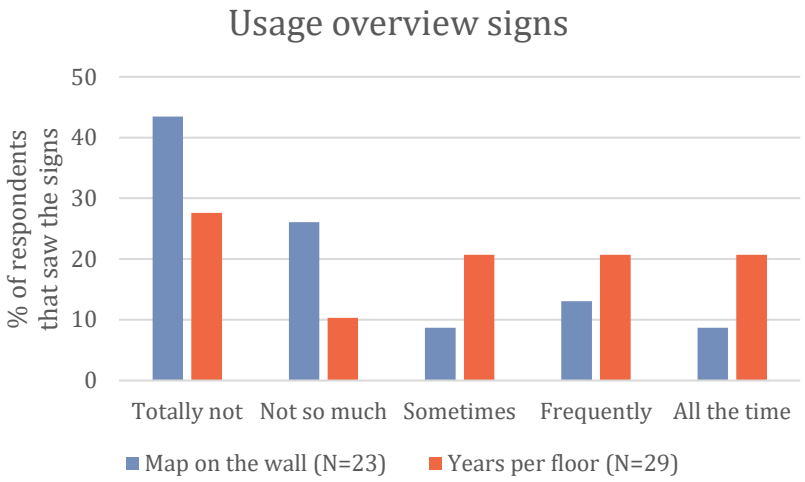
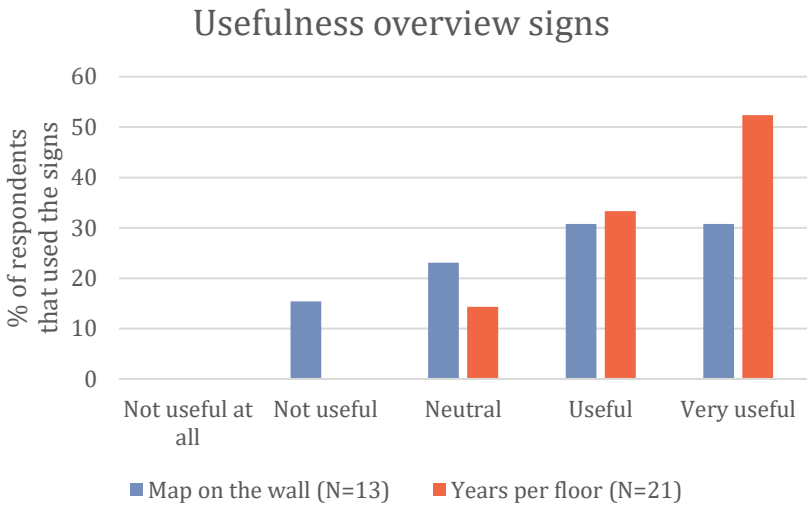


Figure 6. *The comparison of usefulness between the map on the wall and the years per floor.*



3.3.2 General points of improvement

All 64 respondents gave their opinion about what they think the Rijksmuseum can improve regarding the wayfinding and signage. The improvements that are mentioned most will be discussed below. First of all, some recurring points of improvement that are mentioned by the respondents are that there need to be more signs, the signs need to be bigger and on eye-level, and more clear and visible, for example by given them a brighter colour and adding arrows. Specific signs that are often mentioned are the signs for the restrooms and the room numbers.

The restrooms are hard to find and are not located on every floor, and the room numbers are too small, unclear and do not add something to the understanding of the museum or wayfinding. Besides, a route with the highlights is something visitors would like to see. The Rijksmuseum has a flyer with a map of where the highlights can be found, however either this is not known by the visitor, or this is not a specific route, which the visitors would like. Another point of improvement is that it is not clear where the stairs are located in the building, and it is not visible enough to know on which floor the visitor finds oneself. A big number per floor might be added, and the floor plan on the wall needs to be more clear. Other points of improvement that are regularly mentioned are about the lacking information of the years per floor, the artists and what can be seen in what parts of the museum. Give a theme per room, make hanging signs and signs above the entrance of a room. Besides, it is said that words say more than numbers. An improvement that is mentioned by mostly Asian visitors is that they miss, for example, a map in other languages, like Japanese, Chinese, Korean, etc.

4. Discussion and Advice

The goal of the current study is to achieve a better understanding of the wayfinding, signage, and the visitor experience in the Rijksmuseum, and to explain visitor behavior by doing a mixed method research which consists of observations and a survey. To discuss the results the three research questions of this study will be answered. The first research question is the following:

Q1: What are the general experiences with the wayfinding and signage of the visitors of the Rijksmuseum?

The first research question can be answered by discussing the results about the visitors' experiences with the wayfinding and signage in the Rijksmuseum. Most of the visitors report that the wayfinding and signage in the Rijksmuseum could and should be improved. The overall experience of the visitor is rated higher than the wayfinding in the Rijksmuseum. Moreover, referring to the results of the regression model that examined the predictors of overall experience, the wayfinding in the museum has an effect on the visitor's overall experience. This means that if the wayfinding in the Rijksmuseum would be improved, that the overall experience of the visitors would also improve. This is in line with the literature that shows that a better

wayfinding leads to less disorientation and confusion, which leads to a better visitor/customer experience (Farr, et al., 2012). Moreover, the general value principal supports this, by stating that when the costs (effort and time in finding the way) are decreased, which can be done by improving the wayfinding, the visitor experience will improve (Bitgood, 2006). This means that by improving the wayfinding, the Rijksmuseum can reach their goal of making the visit as nice as possible and increase the customer experience.

In contradiction with most existing literature, in the visitor experiences on wayfinding in the Rijksmuseum no difference is seen in gender, age, culture (Netherlands vs. foreign countries). This result regarding gender is in line with Soh and Smith-Jackson (2004), who state that there is no difference between men and women. However, most literature found that men have better wayfinding performance than women (Chen, et al., as cited in Farr, et al., 2012; Contreras, et al., as cited in Farr, et al., 2012; Lawton & Kallai, 2002;), which goes against the findings in the current research. A possible explanation for the fact that there are no differences seen in gender, age and culture could be that the sample size is relatively small.

The visitors' general experiences with the signage are that most signs lack visibility, are not informative enough, and are not easy enough to use. This is seen for the permanent signs, as well as for the temporary signs to the temporary exhibition. This can be considered as a problem, since literature states that signage should optimize and increase efficiency of the wayfinding and should improve the wayfinding performance, which is the case if signs are visible and informative (Dogu & Erkip, 2000; O'Neill, 1991; Best, as cited in O'Neill, 1991). Since the signs in the Rijksmuseum are not visible and informative, literature suggests that these signs will rather cause confusion and frustration (Soh & Smith-Jackson, 2004).

The second research question in the current study is mentioned below:

Q2: Are there specific barriers/problems in the wayfinding and signage in the Rijksmuseum, what are the underlying reasons and how can they be solved?

To answer this question the visitor's experience is of importance, as well as the observations of (non-verbal) visitor behavior. This will be discussed starting with the Atrium and the layout of the building, then the circulation areas, followed by the art rooms.

In the Atrium the restrooms and locker signs are not visible enough for the visitors, and after going through the main entrance to the art collection, the route and signs are not present and not clear. Moreover, the layout of the building as a whole is confusing for the visitors. The building is complex, with many rooms and floors and a lack in visible and informative signage, which is in line with research of De Jesus (1994). De Jesus (1994) states that in this case individuals will be confused, which is in line with the results in the current study. Visitors do for example not know how to come from the westside of the museum to the eastside, or the other way around. Some visitors do not even know that there is an eastside of the museum that they can visit. This shows that the Rijksmuseum is a complex building, and wayfinding through a complex building can be challenging (Farr, et al., 2012). It will take visitors more time to find their way and can cause frustration, which is why good wayfinding and signage is needed if the museum wants to improve the visitor experience (Farr, et al., 2012).

The visitors seem to experience most confusion at decision points, which are mostly the circulation areas in the museum. Visitors look around, at their paper maps, at the map on the wall, at the sign with the years per floor, and they talk to each other about where to go. Literature suggests that decision points need simplified, visible and informative signs to increase wayfinding performance (Soh & Smith-Jackson, 2004; Best, as cited in O'Neill, 1991; Corlett, Manenica & Bishop, as cited in O'Neill, 1991). The Rijksmuseum provides visitors with signs at decision points, however, those signs seem to not always meet the three criteria that are stated in the literature. The map on the wall and the sign with the years per floor are often not clear enough to the visitors. They are often not seen and/or used by visitors, which means that these signs need to be more visible and more clear/informative. More visibility can be created by making the signs to blend in less with the building (Soh & Smith-Jackson, 2004). This can be done by changing the colour (Soh & Smit-Jackson, 2004), so the signs will have more contrast with the colour of the walls of the Rijksmuseum.

In the art rooms the visitors seem to follow the structure of the building. They enter through one of the doorways and leave the room through the other doorway. In these rooms visitors are not paying attention to the signs, like the room numbers. It is not the case that the signs are not visible, not used or not seen as useful. This phenomenon is in line with the literature that suggests that visitors try to understand the building when moving through it, and rely less to signs, but move through the building according to the layout by taking the same route as the

other visitors (Peponis, et al. 1990). It seems that a reasonably amount of the visitors do not need a change in the signs in the art rooms. However, when specifically asked if these signs need improvements, visitors mention ways to make the signs more visible, and informative to use.

The results also show that the visitor's overall experience is rated higher when the visitors use the paper map when moving through the Rijksmuseum. This means that the map on paper is a means of wayfinding that has a positive effect on the visitors' experience.

The last research question in this study is the following:

Q3: How can the wayfinding and the signage in the Rijksmuseum be improved, based on a literature review and the answers on Q1 and Q2?

Visitors see various possibilities for improvements in the Rijksmuseum regarding the wayfinding and signage. They would like more signs, bigger signs and brighter signs. The signs need to be visible and more prominent. Moreover, the visitors are of the opinion that the current signs and the signage in the museum as a whole lacks information and clarity. They would like detailed signs with more information about the years, artists and styles, and what can be found in each room. Literature on signage, as mentioned previously in the discussion, is in line with the results since it states that signs need to be placed on decision points, and need to be visible and informative (Soh & Smith-Jackson, 2004; Best, as cited in O'Neill, 1991). However, literature also argues that signs need to be simplified to prevent/decrease the time spend on finding a destination/route (Corlett, Manenica & Bishop, as cited in O'Neill, 1991), which is not in line with the results of the current research. Visitors namely argue that the signs are too simplified, without useful information about artists and paintings, which is in line with research of Soh and Smith-Jackson (2004), who state that the information given can be not sufficient, which can be again time consuming for the visitors when trying to understand the signs.

Next to improvements on signs in the Rijksmuseum, nudging techniques can be used to make it easier for visitors to move through the building. A nudge is defined as *"any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives"* (Thaler & Sunstein, as cited in Lin, Osman & Ashcroft, 2017). The results of the current study support the idea that visitors do not spend deliberate effort in finding their way through the museum when they are moving through

the rooms (they follow the "natural flow" of the path/layout, according to the way the rooms are structured). This kind of behavior is in line with research that suggests that people make decisions and behave in ways that are mainly consequential of System 1 processes, also called the automatic system (intuitive, automatic, require least effort, and vulnerable to environmental influences), as opposed to System 2 processes, also called the reflective system (rule-based, analytical, slow, deliberate, effortful, and conscious) (Sunstein, 2016; Lin, et al., 2017). Nudging interventions, which mainly work with System 1 processes, would therefore be potentially helpful in guiding behaviors and movements of visitors (Lin, et al., 2017). Those nudges change the choice context, to adjust behaviour, but in a way that the decision-maker does not see any difference between the nudged choice and the choice he/she would make based on his/her general value-system (Lin, et al., 2017). Nudging techniques that can be used to guide behaviors and movements of visitors include footprints on the floor and signs (Lin, et al., 2017; Mont, Lehner & Heiskanen, 2017).

The current research adds to already existing literature, because the sociology aspect of wayfinding is examined. Moreover, case studies in museums were missing in existing literature, but are needed to examine that effective wayfinding and signage is needed and how to establish this.

4.1 Advice

This research leads to several points that the Rijksmuseum might improve. Therefore, an advice will be given. This advice is based on results of visitors, observations, existing literature, and consists of nudges, like signs, to improve the wayfinding in the Rijksmuseum.

First of all, I would advise the Rijksmuseum to increase the amount of signs, however only on points were the visitors need them (Hansen, 2001), which means at decision-points and the signs to the restrooms. Moreover, make the signs more visible by changing the colour. Besides, the signs could be made bigger, and the height on which the signs are placed should be higher (on eye-level). This is mostly important for the signs to the restrooms and the room number signs.

Secondly, I would advise to give more detailed information in the doorways when entering a room. Also the map on the wall and the board with the years per floor need more detailed information. It is suggested to mention what can be seen in the room and where the

pieces of art of various famous artists/painters can be found. With this, focus mostly on the decision points, which are the circulation rooms in the Rijksmuseum.

Thirdly, provide the visitor with more information beforehand. This information can consist of information about the location and topic of the current exhibition, an explanation of the complexity of the building (east- and westside), and the categorization of the pieces of art regarding the years the pieces of art stem from.

Finally, other nudges can be used, apart from the beforementioned sign nudges, to make the visitors move through the Rijksmuseum more easily. An example of a nudge could be footprints on the floor that the visitors will follow. These footprints can be used to guide visitors to the side of the museum that is visited less due to the complexity of the building. Besides, it can also be used to guide visitors to the temporary exhibitions in the Philips Wing. Next to footprints, the Rijksmuseum can also choose to use arrows on the wall on decision points that clearly show where different routes are leading to. Moreover, a banner can be used to put behind the main entrance to make it clear for visitors that they have to go left for the temporary exhibitions and to guide them to the Philips Wing.

4.2 Limitations and future research

A limitation of this research is that the time in which the research had to be done was limited. If more time was spend on this study more observations would be done and the survey would have more respondents. This would make the results more generalizable and more reliable, since the sample of 64 is not so big. However, in the time limit this was the maximum that could have been done. Future research can do research for a longer period of time.

A second limitation is that women are overrepresented in the sample, which can affect the results. This limitation is the consequence of many men not wanting to fill in the survey and, when a men and women were asked together, the women always wanted to fill in the survey. However, future research might be aware of this and use another type of sampling to get a more balanced amount of men and women in the sample.

Thirdly, since the survey was too long to include all four specific signs, it was decided to split the last part of the survey up in two parts. This, however, led to the fact that both the questions about the first two signs and about the last two signs were answered by half of the sample. Future research should take this into account.

Furthermore, future research could be done in other museums to see if the results from this case study in the Rijksmuseum are also seen in other museums. Various case studies together can make the results more generalizable and can make advices and rules for wayfinding and signage in museums more clear. Moreover, future case studies in the Rijksmuseum and other museums should have more time to be conducted.

Finally, the current research used observations and a survey to examine the potential problem, since this is an exploratory research. Nowadays more advanced techniques exist, which exactly locate where and how visitors are moving through the museum. This can make data in future research even more detailed. In this research the researcher was however not able to use such advanced techniques. Therefore, in future research visitors can be tracked to get more information about what visitors do, how they move and the time they spent in certain places in a museum (Yalowitz & Bronnenkant, 2009). Furthermore, future research could focus on a more quantitative approach, like experimental designs to examine the effectiveness of implementations (e.g., signage) that are strategically designed to improve wayfinding.

5. Conclusion

Taking everything into account it can be concluded that the wayfinding, and specifically the signage, in the Rijksmuseum can be considered as a problem, and needs improvement to provide the visitors with a pleasant visit, and thus increase the customer experience. Visitors experience a difference between the wayfinding experience in the Rijksmuseum and their overall experience of their visit. The specific barriers in the Rijksmuseum are mainly focused at decision points, which are the circulation areas in the museum. The signs in the Rijksmuseum need improvement to be more visible and informative and nudging techniques can be applied to make the visitors follow certain directions that are preferred by the Rijksmuseum.

6. References

Allen, P., Bennett, K. & Heritage, B. (2014). SPSS Statistics Version 22: A practical guide. Zuid Melbourne, Australië: Cengage Learning Australia. Allport

Arthur, P., & Passini, R. (1992). *Wayfinding: people, signs, and architecture*.

Bitgood, S. (1995). Visitor circulation: Is there really a right-turn bias. Visitor behavior, 10(1), 5.

Bitgood, S. (2006). An analysis of visitor circulation: Movement patterns and the general value principle. Curator: The Museum Journal, 49(4), 463-475.

Chai, X. J., & Jacobs, L. F. (2009). Sex differences in directional cue use in a virtual landscape. *Behavioral neuroscience*, *123*(2), 276.

De Jesus, S. C. (1994). Environmental communication: design planning for wayfinding. Design Issues, 10(3), 33-51.

Dogu, U., & Erkip, F. (2000). Spatial factors affecting wayfinding and orientation: A case study in a shopping mall. Environment and behavior, 32(6), 731-755.

Farr, A. C., Kleinschmidt, T., Yarlagadda, P., & Mengersen, K. (2012). Wayfinding: A simple concept, a complex process. Transport Reviews, 32(6), 715-743.

Fewings, R. (2001). Wayfinding and airport terminal design. The journal of navigation, 54(2), 177-184.

Frankenstein, J., Brüssow, S., Ruzzoli, F., & Hölscher, C. (2012). The language of landmarks: the role of background knowledge in indoor wayfinding. *Cognitive processing*, *13*(1), 165-170.

Hansen, M. D. (2001). Flight Patterns.

Hansen, P.G. & Schmidt, K. (2018). BASIC - A new framework for applying behavioral insights. Retrieved from: https://www.pelleonline.org/behaviour/basic-a-new-framework-for-applying-behavioural-insights.html

Hatala, M., & Wakkary, R. (2005). Ontology-based user modeling in an augmented audio reality system for museums. User Modeling and User-Adapted Interaction, 15(3-4), 339-380.

Head, D., & Isom, M. (2010). Age effects on wayfinding and route learning skills. Behavioural brain research, 209(1), 49-58.

Hooper-Greenhill, E. (2006). Studying visitors. A companion to museum studies, 362-376.

Kawulich, B. B. (2005, May). Participant observation as a data collection method. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 6, No. 2).

Lawton, C.A., Kallai, J. (2002). Gender differences in wayfinding strategies and anxiety about wayfinding: A cross-cultural comparison. Sex roles, 47(9-10), 389-401.

Leib, S., Dillman, B., Petrin, D., & Young, J. P. (2012). A comparison of the effect of variations to US airport terminal signage on the successful wayfinding of Chinese and American cultural groups. *Journal of Aviation Technology and Engineering*, *1*(2), 6.

Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. Journal of marketing, 80(6), 69-96.

Lin, Y., Osman, M., & Ashcroft, R. (2017). Nudge: Concept, effectiveness, and ethics. *Basic and Applied Social Psychology*, *39*(6), 293-306.

Marquez, J. J., Downey, A., & Clement, R. (2015). Walking a mile in the user's shoes: Customer journey mapping as a method to understanding the user experience. Internet Reference Services Quarterly, 20(3-4), 135-150.

Mont, O., Lehner, M., & Heiskanen, E. (2017). *Nudging a tool for sustainable behaviour?*. The Swedish Environmental Protection Agency.

Neuman, W.L. (2014). Understanding research. Boston: Pearson.

O'Neill, M. J. (1991). Effects of signage and floor plan configuration on wayfinding accuracy. Environment and Behavior, 23(5), 553-574.

Peponis, J., Zimring, C., & Choi, Y. K. (1990). Finding the building in wayfinding. Environment and behavior, 22(5), 555-590.

Porter, M. 1938. The Behavior of the Average Visitor in the Peabody Museum of Natural History. American Association of Museums Monograph New Series No. 16. Washington, DC: American Association of Museums.

Raubal, M., & Worboys, M. (1999, August). A formal model of the process of wayfinding in built environments. In International Conference on Spatial Information Theory (pp. 381-399). Springer, Berlin, Heidelberg.

Rijksmuseum. (2017). Jaarverslag. Retrieved from https://www.rijksmuseum.nl/nl/organisatie/jaarverslagen

Rijksmuseum. (2018, December 17). Succesvol jaar Rijksmuseum. Retrieved from https://www.rijksmuseum.nl/nl/nu-in-het-museum/nieuws/succesvol-jaar-rijksmuseum

Rijksmuseum. (n.d.). Geschiedenis van het Rijksmuseum. Retrieved from https://www.rijksmuseum.nl/nl/organisatie/geschiedenis

Rijksmuseum. (n.d.). Over de verbouwing. Retrieved from https://www.rijksmuseum.nl/nl/verbouwing/over-de-verbouwing

Soh, B. K., & Smith-Jackson, T. L. (2004). Influence of map design, individual differences, and environmental cues on wayfinding performance. Spatial Cognition and Computation, 4(2), 137-165.

Sunstein, C. R. (2014). Nudging: A very short guide. *Journal of Consumer Policy*, *37*(4), 583-588.

Sunstein, C. R. (2016). People prefer system 2 nudges (kind of). *Duke LJ*, *66*, 121.

Symonds, P. (2017). Finding Our Way: A Socio-Cultural Exploration of Wayfinding as an Embodied Experience (Doctoral dissertation).

Symonds, P., Brown, D. H., & Lo Iacono, V. (2017). Exploring an absent presence: Wayfinding as an embodied sociocultural experience. Sociological Research Online, 22(1), 1-20.

Taillade, M., N'Kaoua, B., & Sauzéon, H. (2016). Age-related differences and cognitive correlates of self-reported and direct navigation performance: The effect of real and virtual test conditions manipulation. Frontiers in Psychology, 6, 2034.

Wijermans, N., Conrado, C., van Steen, M., Martella, C., & Li, J. (2016). A landscape of crowd-management support: An integrative approach. Safety science, 86, 142-164.

Xia, J. C., Arrowsmith, C., Jackson, M., & Cartwright, W. (2008). The wayfinding process relationships between decision-making and landmark utility. Tourism Management, 29(3), 445-457.

Yalowitz, S. S., & Bronnenkant, K. (2009). Timing and tracking: Unlocking visitor behavior. Visitor Studies, 12(1), 47-64.

Yoshimura, Y., Girardin, F., Carrascal, J. P., Ratti, C., & Blat, J. (2012). *New tools for studying visitor behaviours in museums: a case study at the Louvre*. Springer-Verlag.

7. Appendices

Appendix 1: Field notes

Observations of the museum layout/building on Tuesday 05-02-2019:

- The multimedia tours are on the right after the entrance where the tickets are scanned. However, only when the visitor turns right he/she sees the desk for the multimedia tours. It would maybe be more helpful to place a sign right after the entrance that the multimedia tours are to the right.
- The information desk in the Atrium may look like a desk to buy tickets for many visitors.
- Some visitors look around. From their facial expression and their looking around it can be observed that they are looking for something. They look a bit confused. When following those visitors, some ask the staff of the museum where to go and others eventually find their destination themselves. Often this confusing is about finding the restrooms or lockers.
- The signs for the tours that are placed on a pole in the Atrium are clear. However, there is a sign with the text: meeting point. But a meeting point for what? It seems a bit non-useful for me.
- When turning left after the entrance there is no sign that the Philips Wing with the temporary exhibitions is that way. I think some visitors may visit the museum at this time, because they are specifically interested in the temporary exhibition. Then it would be helpful to know, apart from the map, to see a sign that leads to the Philips Wing.
- Room Gallery 2 → I had a few thoughts: what is in there? Can I walk further to another place in the museum from there or do I have to walk back? (see observations: visitors seemed confused also, some walked away, some were pointing to the sign that only mentions Room Gallery 2, they were doubting).
- When walking out of room 0.1: you can choose between the exit or to go to floor 1. This was not so clear for me at first. Because in this way you miss the other side of floor 0. This is of course also the case on floor 1. It would be good to mention this somewhere maybe, so the visitors know. I think this is a thing that the visitors do not get and are confused. They maybe cannot walk the route they would like to walk.

- What is the main route through the museum? Is there a main route? Maybe make the best route on a paper in the map? When can you walk further and when is it an ending turn/route?
- When coming on floor 2 between The Night Watch and room 2.15 → no clear sign that The Night Watch is to the right. Maybe an extra sign would be helpful, since a lot of visitors are not using the map constantly. A lot of them walk around without the map in their hands (see observations: visitors walk to the left, and come back in less than a minute to go to the room with The Night Watch).

Observations Tuesday 12-02-2019 between 14.30 and 15.00: stairs next to room 1.12:

- A lot of visitors look at the signs for which room or floor
- Maps are being grabbed and looked at
- Visitors look around confused and a bit lost sometimes. They look at the map of the floors on the wall. They talk about the years and the artists that they want to see, saw and are looking for.
- One woman walks to the map and then back to the stairs. Apparently she is not on the floor where she wants to be? But she did not know this when she came of the stairs
- A young man said: “Are we going to Rembrandt or to Van Gogh?”. In other words: which one do we choose? It sounded like he knew for both artists how to walk there, he just asked his friends to which one to go → does this mean that the routing is clear for him?
    - More visitors said something similar like this to each other: “first this or first to Rembrandt”, for example
- Often there is being pointed to the map on the wall and to the stairs
- Man: “Oh huh, this is something different?” Looks and walks a bit around with his wife in the room you enter when you come from the stairs. Then they walk together back to the stairs. They did not arrive where they wanted to go apparently
- The opening in the wall to the elevator is very often seen as the entrance of the stairs
- 1 boy and 2 girls do not know where to go to. After looking at their map and the map on the wall they still do not know and then decide to go downstairs

- A couple that is middle-aged look at the map on the wall for around 3 to 5 mins and still look confused
- 2 girls: “Did we see everything now? We saw this right?”
- Girl: “oh this is the elevator here..”
- Woman puts arms half in the air, like: I don’t know.. I have no idea..
- Woman shrugs (schouders ophalen) and says: “I don’t know”

Observations Tuesday 12-02-2019 between 15.00 and 16.00: between room 2.15 and room with The Night Watch:

- People walks from the stairs to 2.15 and then back, most probably because they want to see The Night Watch, but did not know that it was to the right after they went from the stairs
- Woman (young) walks into room 2.15 and after 15 seconds back → to The Night Watch room

Part of a mail with comment of a visitor (woman with baby):

I was with my baby and i had struggles with finding a place to feed her. I could not find a good place to sit and could not find the restrooms. Also, I had to run downstairs to get warm water for the food. Altogether, for someone that visits the museum for the first time, it is really not clear. Make more signs to the restrooms and more locations to sit or feed a baby, that would be really nice.

Observations Sunday 03-03-2019 between 16.00 and 17.00: between The Night Watch room and room 2.15:

- Family does not know how to go somewhere. They first walk downstairs, then come back upstairs. They enter room 2.15 and then walk back and go in The Night Watch room. They seem slightly irritated and they are looking at the paper map and at the map on the wall and still seem to not be able to find what they are looking for. The woman says: “yes we want to go there, but I don’t know how”
- When walking from the library at the 1st floor and someone wants to go to Van Gogh there are no signs that tell you how. People told me that they saw this as something that is

missing in the museum. If people go to the right from the library, they come at the stairs and go upstairs and end up in the Gallery of Honour, while they wanted to go to Van Gogh

Observations Thursday 16-05-2019 between 14.00 and 14.35: route from room 2.15 to room 2.22:

- No visitor that looks at the room numbers is observed
- A lot of visitors hold and look at the map on paper when walking through the museum. However, on the other hand, there are also many visitors that do not have a map and seem to walk through the museum how they want to walk without using signage so much
- Man and woman around 60 are in room 2.21. In this room two directions to two different rooms can be chosen, room 2.22 or room 2.23. Man points to both rooms and asks woman: “Where to go?”. Woman says: “Oh, I don’t know. This one? It doesn’t matter, we’ll see”

Observations Monday 03-06-2019 between 15.00 and 16.00: room 2.8 and circulation areas:

- It is observed that many visitors, when they walk in the rooms, are not so much looking where they are walking to or what route to take. They seem to follow ‘the route’ by entering the next room and exiting the room in the other door to enter the next room. They do this until they end up in a room without art or in a room where various directions can be taken. An example of such a place are the circulation areas and the ‘voorhal’ (area on the opposite side of the Gallery of Honour). In these areas in the building the visitors look where to go and often use the map on paper or the map on the wall, they ask the staff or look at the years per floor
- Visitors seem to use the stairs per floor mostly when using the stairs, so when entering a new floor
- Woman (around 50/60 years old) looks at the map on the wall and the map on paper to find her way. She seems to have found her way and walks further
- Man and woman (around 50/60 years old) look at the map on the wall and use the app on the phone. Then they ask a staff member for help to find their way

- Visitors frequently look at the map on the wall in the circulation area between The Night Watch room and room 2.15, but a big part of the visitors do not look at the map on the wall. However, it is observed that the map on the wall, according to the observations, does not look useless or unused
- Young couple looks at the map on the wall for a long time. They are both pointing at things on the map and it looks like they are struggling a little in finding their way. In the end it seems like they found their way and they start walking into a certain direction

Observations temporary signage:

Observations 18-02-2019: temporary new wayfinding/signage to the Philips Wing for the temporary exhibition "All the Rembrandts":

Where are the stickers? (plattegrond online maken met aangegeven waar de stickers hangen en de leaflets liggen):

- 0 floor
    - In the left room from room 0.6
- 1st floor
    - Up the stairs next to room 1.12
- 2nd floor
    - Stickers
        - Room right from The Night Watch above the stairs that go down
        - Room right from The Night Watch on the wall before you enter room 2.15
        - Room The Night Watch right entrance/exit in the doorway
        - Room The Night Watch left entrance/exit in the doorway
        - Room left from The Night Watch in the doorway of room 2.1
        - In the doorway between room 2.1 and room 2.3
        - In the doorway between room 2.4 and room 2.5
        - In the doorway between room 2.7 and room 2.9
        - In the doorway between room 2.9 and room 2.8
    - Leaflets
        - In the Gallery of Honour where the Jewish Bride was hanging

- In room 2.8 where the young Rembrandt was hanging

Observations Monday 18-02-2019 between 11.30 and 12.15: 1st floor at the stairs, left from room 1.12:

- Visitors that go with the elevator cannot see the sticker. They most probably do not see it
- Visitors mostly walk off and on the stairs without looking or paying attention at the sticker of Rembrandt
- It was not always so busy at this point, later more people came…
- Man and woman came from 2nd floor. Man pointed at sticker and says something to his wife. They walk down the stairs
- Man walks upstairs and looks at the sticker for a few seconds
- Older man looks at the sticker when he walks upstairs
- Woman looks at the sticker when she walks upstairs
- Man that walks from 2nd floor downstairs looks short at te sticker
- 2 women and 1 man look at the sticker when they walk downstairs from 2nd floor
- Woman points at sticker when she walks with a man from 1st floor downstairs
- Family at 1st floor. Man says: “Where is the exhibition then?”. I asked him: “Are you looking for the exhibition?”. He said: “Yes”. I told him the way and that there are stickers to guide them, but there had not seen them yet. They saw the stickers when they walked to the stairs to go downstairs
- 2 women middle aged: 1 points and touches the sticker and says something about it
- Man and wife middle aged: both pointing at the sticker

Observations Monday 18-02-2019 between 12.15 and 12.20: in room 2.5:

- Somebody is looking for a painting from Rembrandt and asks a security man. He explains that all the Rembrandts are in the Philips Wing
- Note: Is it clear when you walk from room 2.1, that you have to go through the Gallery of Honour to go downstairs with the other stairs to go to the exhibition in the Philips Wing? Sticker is only in the doorway of Gallery of Honour and not in the room between Gallery of Honour and room 2.1. Is it the case that visitors go downstairs with the stairs between room 2.1 and the Gallery of Honour?

Observations Tuesday 19-02-2019 between 13.52 and 14.45: on 2nd floor, above the stairs between The Night Watch room and room 2.15:

- 2 man look at the sticker plus one is pointing at it (25 years). They walk down the stairs
- Boy and girl point and look at the sticker (25 years). They walk down the stairs
- Daughter asks her dad when they are going to the exhibition of Rembrandt
- Older couple: woman points to the sticker, but they walk inside room 2.15. They first stood by the stairs
- Young couple: boy looks at it at the stairs
- Girl look at both stickers
- Older couple: they walk from 2.15 to The Night Watch, they look a bit confused. Then they see the sticker before room The Night Watch and thy point at it and turn around. Then they see the other sticker(s), point at them again and walk to the stairs
- Older couple: man: “yes, look there are all the Rembrandts” and points at the stickers
- 2 woman middle aged: “there, all the Rembrandts”, “Yes, we go there later!”
- Older couple (65): woman points at sticker and they walk down the stairs
- Man (50) looks and follows the sticker with his eyes (he walked up the stairs)
- Security comes into the room where the stairs are with a woman and the security points at the stairs and stickers to tell her the way
- 4 persons: woman and girl point at the sticker on the wall when they come out of the elevator
- Girl (20) turns around the doorpost to again look at the sticker (from room 2.15)
- Woman and men (50/60): woman points to the sticker at the stairs, man points to the sticker at the doorpost. Woman says: “Here, all the Rembrandts”. And they walk down the stairs

Observations Monday 25-02-2019 between 10.15 and 11.21: 2nd floor, above the stairs between The Night Watch room and room 2.1:

- It is very quiet in the museum at this time and this place
- Not so many people walk here and the most of them walk straight from room 2.1 to The Night Watch room without looking at the sticker

- A lot of people look at the maps here → paper map and map on the wall
- One woman (60) looked at the sticker in doorpost 2.1
- Doorpost The Night Watch: young man and woman look at the sticker on doorpost 2.1 and the woman points at it
- 2 girls (25) look at the sticker in The Night Watch doorpost
- 1 woman (30) looks at the sticker in 2.1 doorpost
- Older woman looks at sticker in doorpost 2.1

Observations Monday 25-02-2019 between 11.23 and 11.45: 2nd floor, in the Gallery of Honour, the place where the Jewish Bride was originally hanging (leaflets and text on the wall):

- The box with leaflets changed places? Before it was were the Jewish Bride originally hangs, but now the box is on the other side of this small room in the Gallery of Honour. Why did this change?
- 1 woman (50) looks at the leaflets
- Older man (60) looks at the leaflets
- Girl (25/30) looks at the leaflets
- Man (40) gets a leaflet, looks at it and puts it back
- Woman (60) reads the text on the wall, points at it and talks about it to her husband, he reads it also
- Woman (40) looks at the leaflets, takes one, reads it and puts it back
- Woman (45) looks at the leaflets
- The same woman that looked at and read the leaflets, also reads the text on the wall quickly
- Maybe use a picture of the Jewish Bride on leaflet or on wall? To get people's attention
- Man (35) reads the text on the wall
- Man (45) reads the text on the wall
- Woman (55) looks at the leaflets
- Man (45) and woman (60) look and take and read a leaflet and put it back afterwards
- Man (50) looks at the leaflets

Observations Tuesday 26-02-2019 between 11.06 and 11.36: in room 2.8:

- Very quiet, almost no people
- Man (65) looks at the text on the wall and walks further soon
- Most people just walk past it without even looking
- Woman (60) walks together with her husband, she looks at the text on the wall while she walks by it. She doesn't even read it
- Girl (25) looks at the box with the leaflets and reads the leaflet from the box without taking it out of the box and walks further
- Woman (35) looks at the text and walks by
- Man (50) looks at the sticker, points the way to walk to his son. They take the paper map and walk in the direction of The Night Watch room and thus maybe the Philips Wing?

Observations Sunday 03-03-2019 between 15.20 and 16.00: between The Night Watch room and room 2.15:

- Very busy
- Woman alone (30) looks at sticker at the stairs
- Man (30) with girlfriend. He looks at sticker on the wall of room 2.15
- Almost nobody looks at the sticker of The Night Watch room
- 2 girls (20) look at the sticker on The Night Watch room. Then they walk back into The Night Watch room
- Man alone (60) looks at sticker on The Night Watch room
- Woman with husband and child walk to sticker on the wall of room 2.15. Woman talks to daughter (6) and points and touches the sticker. Then they walk from the stairs
- Woman (40) walks up the stairs with husband and looks at the sticker by the stairs. They walk into room 2.15
- Man (60) with wife looks very fast at sticker of The Night Watch room while he walks past it
- A lot of people walk straight to room 2.15 from The Night Watch room without even looking at the sticker (or the other way around)
- Why no sticker on the map on the wall?

- Man + woman (60) come from room 2.15 and stand still at sticker by room 2.15. They touch the sticker and talk about it. They seem to decide where they want to go. Then they talk and walk downstairs

Observations Sunday 03-03-2019 between 16.00 and 16.40: in room 2.8:

- Girl (20) grabs leaflet, reads it and walks out of room 2.8
- Woman (30) grabs leaflet, reads it and puts it back in the box. She continues her walk through room 2.8
- A lot of people read the text on the wall when they enter the room
- Woman with husband and child grabs leaflet, reads it and puts it back in the box. They stay in room 2.8
- Man and woman (35) come into room 2.8 and read the text on the wall fast and globally
- Woman (45) reads text on the wall good when entering room 2.8, other woman goes there also and reads it. First woman grabs a leaflet, reads it good and takes it with her when she continues walking in room 2.8
- 2 boys (20) read the text on the wall
- Woman (30) grabs the leaflet and reads the wall. She puts leaflet back in the box
- When people walk into room 2.8 most people come from room 2.9. Mostly they first read the text on the wall of room 2.8 when entering. Some of them grab a leaflet and read it. After that they walk further into room 2.8. I think that after that they do not think about the sticker and don't follow the stickers. A lot of those people already go to room 2.7, since they came from room 2.9 and continu they route logically to room 2.7 and then room 2.6. If they came from room 2.7 and then enter room 2.8 they will follow their route logically to room 2.9, and will also not follow the stickers. Maybe it is an idea to (also) put a sticker in the doorpost between room 2.8 and room 2.7, so people will be remembered. Or a route on the leaflet? Maybe also good to place a sticker on doorpost between room 2.6 and room 2.7. To help people see that they are on the good way, because now it can be a bit confusing
- Some people think the stickers are too small to see them good. They don't grab the attention

- Text is being read a lot. When one person starts reading it more people come stand around it. At one point there were 7 people standing and reading it
- A lot of people read the leaflet also, but then put them back into the box after reading
- Woman (30) and boyfriend. She grabs the leaflet, reads it and takes it with her. They walk through room 2.8

Observations temporary signage after changing the layout:

Observations Monday 03-06-2019 between 14.00 and 15.30: between room 2.8, route to The Night Watch room and circulation areas next to The Night Watch room:

- It is observed that the sticker in the doorpost of room 2.8 is not looked at. During observations of 30 minutes in this room nobody noticed/looked at the sticker
- People enter room 2.8 mostly at the entrance where the sticker is placed, but walk into the room without looking at it
- When observing the route between room 2.8 and the circulation area between The Night Watch room and room 2.1, no visitor is seen that follows the stickers and looks at the stickers
- In the circulation area between The Night Watch room and room 2.15 more people notice the sticker than in room 2.8. Some visitors just noticed the stickers, but also quite a few points to the sticker, talk about it and seem to follow it, by going downstairs
- A man of around 30 years looks at the sticker and tells the girl who he is with about the sticker. Eventually they walk the other way

Appendix 2: Survey variant A and variant B

The following questions were asked interactively via an iPad.

What is your gender?

- Man
- Woman
- Other

What is your year of birth?

…

In which country do you live at the moment?

…

With how many people did you visit the Rijksmuseum today? (including yourself)

…

With whom are you visiting the Rijksmuseum today? (more answers possible)

- Family
- Friends
- Partner
- School
- Alone
- Different, namely …

How often did you visit the Rijksmuseum? (this visit included)

- This is the first time
- 2 times
- 3-5 times
- 6-10 times
- More than 10 times

How would you rate your visit at the Rijksmuseum today on a scale from 0 to 10?

← Not satisfied → Satisfied

0 1 2 3 4 5 6 7 8 9 10

How did you experience finding your way in the museum during your visit today on a scale from 0 to 10?

← Difficult → Easy

0 1 2 3 4 5 6 7 8 9 10

How easy/difficult was is for you to find the pieces of art you wanted to see in the Rijksmuseum on a scale from 0 to 10?

← Difficult → Easy

0 1 2 3 4 5 6 7 8 9 10

In which way(s) did you find your way through the Rijksmuseum? (more answers possible)

- Facility signs (restrooms, tickets, café, shop, etc.)
- Roomnumbers in doorposts
- Text on the wall when entering a new floor (years per floor)
- Map on paper
- Map on the wall
- Following other visitors
- I walked through the museum how I wanted, without a specific route
- I asked the employees when I did not know the way
- Other, namely …

Survey variant A

Did you see the signs for the facilities in the museum?

- Yes
- No

To what extent did you use the facility signs during your visit today to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not All the time →

1 2 3 4 5

How useful do you find the facility signs to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not useful Very useful →

1 2 3 4 5

Do you think the facility signs (restrooms, tickets, café, shop, etc.) can be improved? If yes, how?

- No
- I do not know
- Yes, namely …

Did you see the roomnumber signs in the museum?

- Yes
- No

To what extent did you use the roomnumber signs during your visit today to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not All the time →

1 2 3 4 5

How useful do you find the roomnumber signs to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not useful Very useful →

1 2 3 4 5

Do you think the roomnumber signs can be improved? If yes, how?

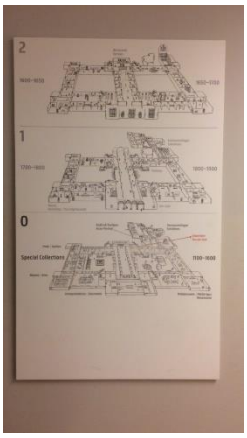
- No
- I do not know
- Yes, namely …

What is, do you think, missing in the wayfinding and signage of the Rijksmuseum?

…

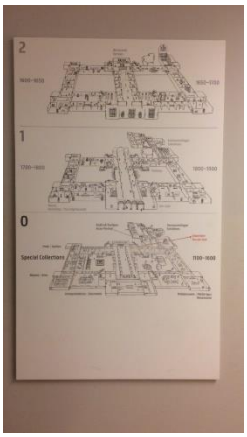
Survey variant B

Did you see the map on the wall in the museum?



- Yes
- No

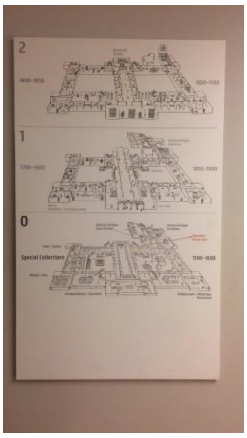
To what extent did you use the map on the wall during your visit today to find your way through the Rijksmuseum on a scale from 1 to 5?



← Totally not All the time →

1 2 3 4 5

How useful do you find the map on the wall to find your way through the Rijksmuseum on a scale from 1 to 5?



← Totally not useful Very useful →

1 2 3 4 5

Do you think the map on the wall can be improved? If yes, how?

- No
- I do not know
- Yes, namely …

Did you see the years per floor on the wall in the museum?

- Yes
- No

To what extent did you use the years per floor on the wall during your visit today to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not All the time →

1 2 3 4 5

How useful do you find the years per floor on the wall to find your way through the Rijksmuseum on a scale from 1 to 5?

← Totally not useful Very useful →

1 2 3 4 5

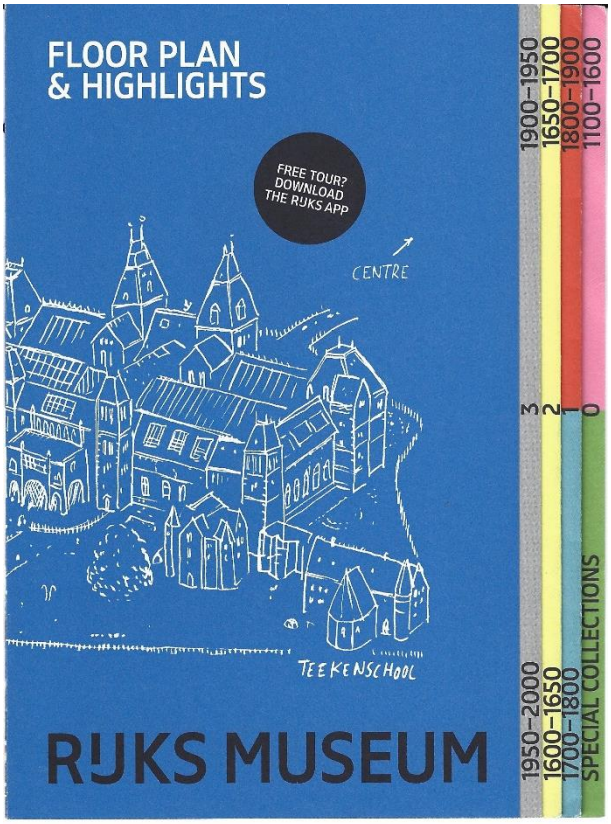
Do you think the years per floor on the wall can be improved? If yes, how?

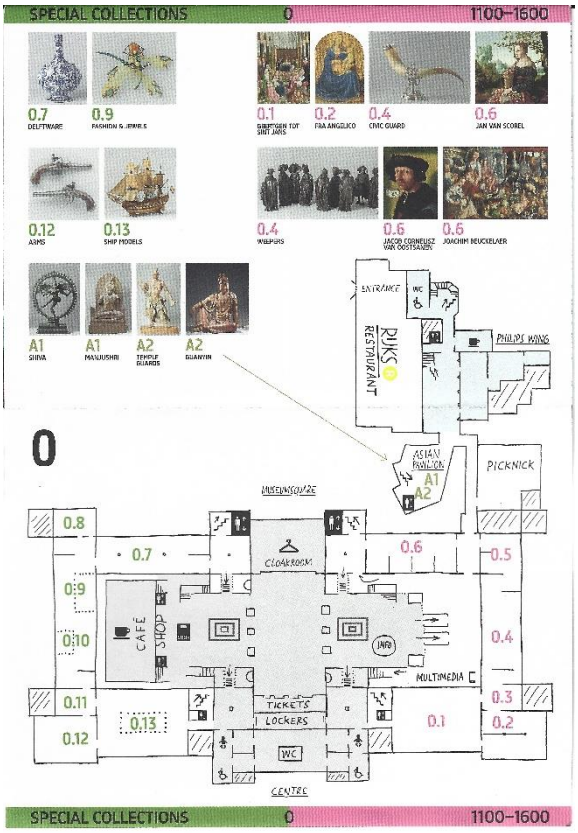
- No
- I do not know
- Yes, namely …

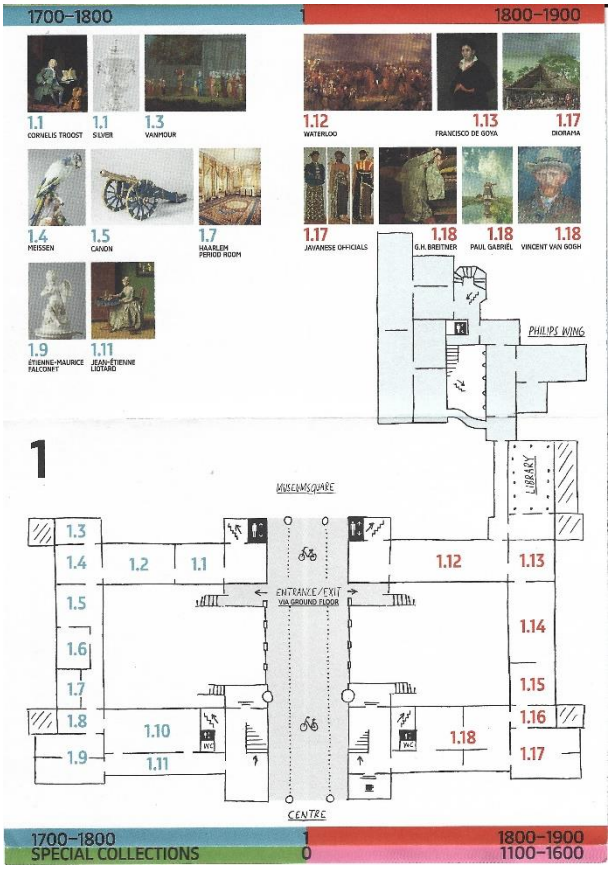
What is, do you think, missing in the wayfinding and signage of the Rijksmuseum?

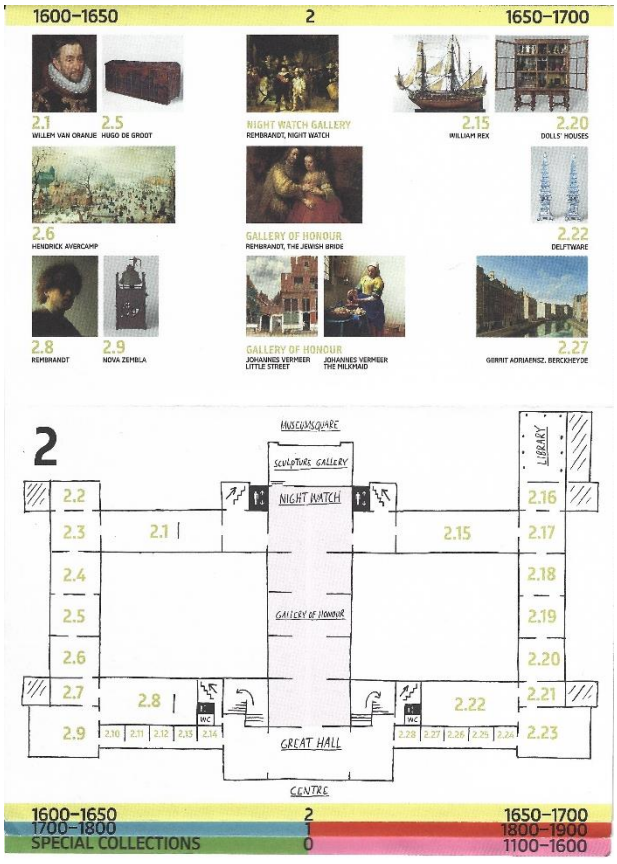
…

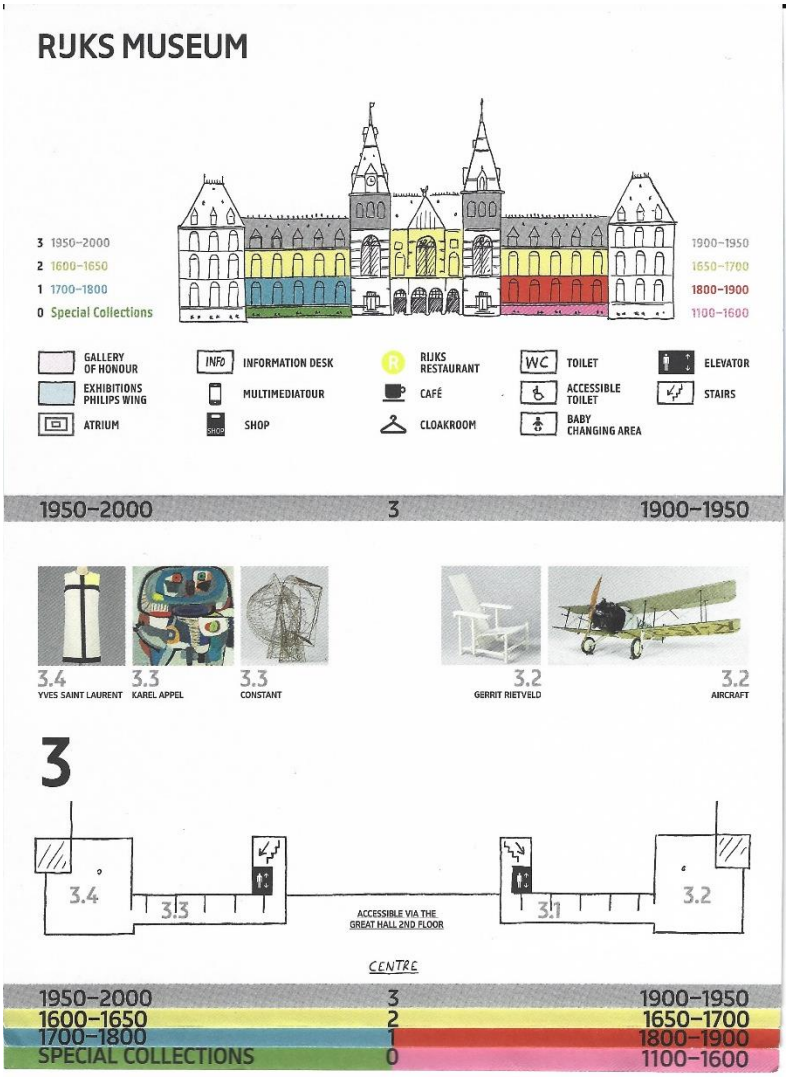
Appendix 3: Map of the Rijksmuseum



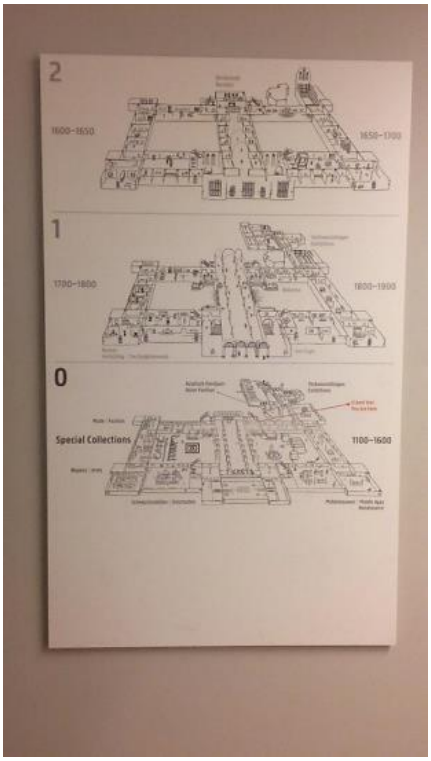


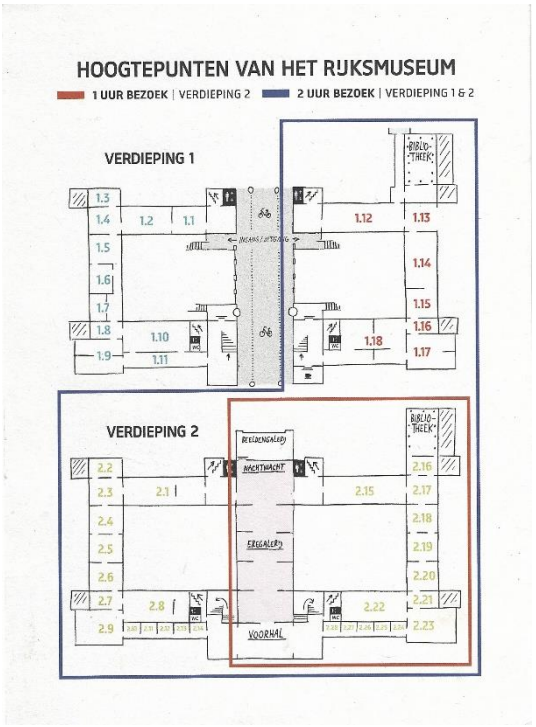




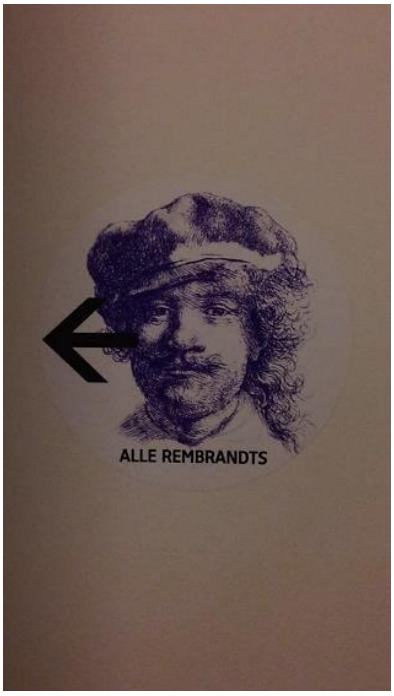

RIJKS MUSEUM
3 1950–2000
2 1600–1650
1 1700–1800
0 Special Collections
1900–1950
1650–1700
1800–1900
1100–1600
GALLERY OF HONOUR
EXHIBITIONS PHILIPS WING
ATRIUM
INFO INFORMATION DESK
MULTIMEDIATOUR
SHOP
RIJKS RESTAURANT
CAFÉ
CLOAKROOM
WC TOILET
ACCESSIBLE TOILET
BABY CHANGING AREA
ELEVATOR
STAIRS
1950–2000 3 1900–1950
3.4 YVES SAINT LAURENT
3.3 KAREL APPEL
3.3 CONSTANT
3.2 GERRIT RIETVELD
3.2 AIRCRAFT
3
3.4
3.3
ACCESSIBLE VIA THE GREAT HALL 2ND FLOOR
3.1
3.2
CENTRE
1950–2000 3 1900–1950
1600–1650 2 1650–1700
1700–1800 1 1800–1900
SPECIAL COLLECTIONS 0 1100–1600

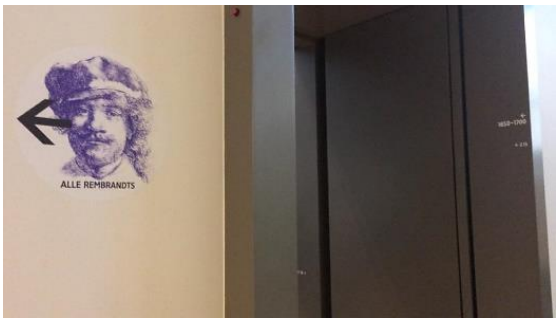
Appendix 4: Pictures of signs in the Rijksmuseum

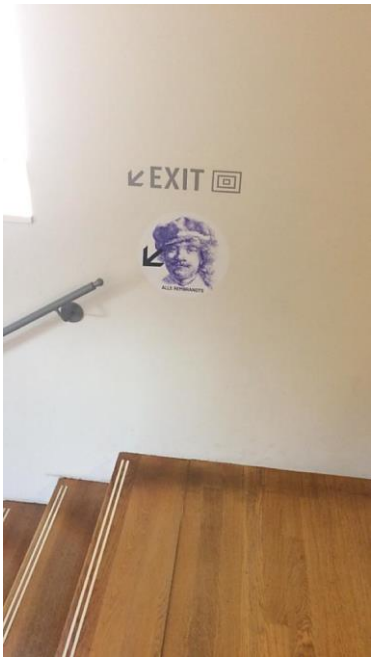


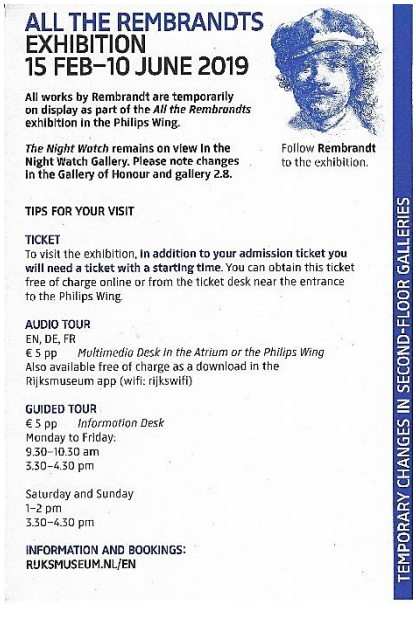


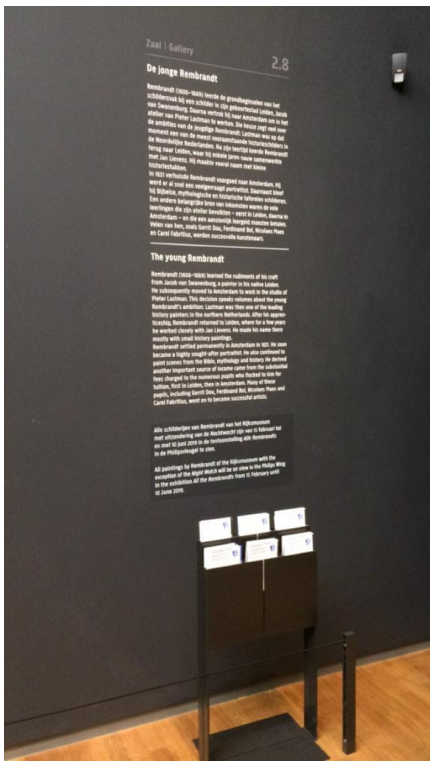
Appendix 5: Pictures of temporary signage












TENTOONSTELLING
ALLE REMBRANDTS
EXHIBITION
ALL THE REMBRANDTS

Appendix 6: Syntax SPSS

```
* Encoding: UTF-8.

GET
  FILE='C:\Users\janin\Documents\Master Sociology; Contemporary Social Problems\Master '+
    'Thesis\FINAL DATA survey thesis.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.

*Descriptives and missing values of demographic variables.
DESCRIPTIVES gender year_of_birth country amount_people.
MISSING VALUES year_of_birth (9999).
MISSING VALUES country (9999).
MISSING VALUES amount_people (9999).
DESCRIPTIVES gender year_of_birth country amount_people.
FREQUENCIES gender year_of_birth country amount_people.

RECODE gender (1=0) (2=1) INTO gender.
VALUE LABELS gender 0 'Man' 1 'Woman'.
MISSING VALUES gender( ).
EXECUTE.
DESCRIPTIVES gender.
FREQUENCIES gender.

DESCRIPTIVES Which_people_family Which_people_friends Which_people_partner
Which_people_school Which_people_alone Which_people_other.
FREQUENCIES Which_people_family Which_people_friends Which_people_partner
Which_people_school Which_people_alone Which_people_other.

*Define Variable Properties.
*Which people variables: making missings non-missings.
MISSING VALUES Which_people_family( ).
```

```
EXECUTE.
MISSING VALUES Which_people_friends( ).
EXECUTE.
MISSING VALUES Which_people_partner( ).
EXECUTE.
MISSING VALUES Which_people_school( ).
EXECUTE.
MISSING VALUES Which_people_alone( ).
EXECUTE.
MISSING VALUES Which_people_other( ).
EXECUTE.

*Giving value labels to variables.
DESCRIPTIVES Which_people_family Which_people_friends Which_people_partner
Which_people_school Which_people_alone Which_people_other.
VALUE LABELS Which_people_family 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS Which_people_friends 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS Which_people_partner 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS Which_people_school 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS Which_people_alone 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS Which_people_other 0 'No' 1 'Yes'.
EXECUTE.

FREQUENCIES Which_people_family Which_people_friends Which_people_partner
Which_people_school Which_people_alone Which_people_other.
```

```
*Giving variable labels to variables.
VARIABLE LABELS Which_people_family 'Are you visiting the museum with family?'.
VARIABLE LABELS Which_people_friends 'Are you visiting the museum with friends?'.
VARIABLE LABELS Which_people_partner 'Are you visiting the museum with partner?'.
VARIABLE LABELS Which_people_school 'Are you visiting the museum with school?'.
VARIABLE LABELS Which_people_alone 'Are you visiting the museum with alone?'.
VARIABLE LABELS Which_people_other 'Are you visiting the museum with other?'.

FREQUENCIES Which_people_family Which_people_friends Which_people_partner
Which_people_school Which_people_alone Which_people_other.

DESCRIPTIVES Freq_visiting Grade_visit Grade_wayfinding Grade_signs_specificpiece.
FREQUENCIES Freq_visiting Grade_visit Grade_wayfinding Grade_signs_specificpiece.

*Recoding grade variables.
RECODE Grade_visit (1=0) (2=1) (3=2) (4=3) (5=4) (6=5) (7=6) (8=7) (9=8) (10=9) (11=10)
INTO Grade_visit.
RECODE Grade_wayfinding (1=0) (2=1) (3=2) (4=3) (5=4) (6=5) (7=6) (8=7) (9=8) (10=9)
(11=10) INTO Grade_wayfinding.
RECODE Grade_signs_specificpiece (1=0) (2=1) (3=2) (4=3) (5=4) (6=5) (7=6) (8=7) (9=8)
(10=9) (11=10) INTO Grade_signs_specificpiece.

DESCRIPTIVES Freq_visiting Grade_visit Grade_wayfinding Grade_signs_specificpiece.
FREQUENCIES Freq_visiting Grade_visit Grade_wayfinding Grade_signs_specificpiece.

DESCRIPTIVES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall How_followingothers How_ownroute How_askedstaff How_other.

*Define Variable Properties.
*How to find way: making missings non-missings.
MISSING VALUES How_facilitysigns( ).
```

```
EXECUTE.
MISSING VALUES How_roomnumbers( ).
EXECUTE.
MISSING VALUES How_yearsonwall( ).
EXECUTE.
MISSING VALUES How_mappaper( ).
EXECUTE.
MISSING VALUES How_mapwall( ).
EXECUTE.
MISSING VALUES How_followingothers( ).
EXECUTE.
MISSING VALUES How_ownroute( ).
EXECUTE.
MISSING VALUES How_askedstaff( ).
EXECUTE.
MISSING VALUES How_other( ).
EXECUTE.

*Giving value labels to variables how to go through museum.
DESCRIPTIVES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall How_followingothers How_ownroute How_askedstaff How_other.
VALUE LABELS How_facilitysigns 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_roomnumbers 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_yearsonwall 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_mappaper 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_mapwall 0 'No' 1 'Yes'.
EXECUTE.
```

```
VALUE LABELS How_followingothers 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_ownroute 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_askedstaff 0 'No' 1 'Yes'.
EXECUTE.
VALUE LABELS How_other 0 'No' 1 'Yes'.
EXECUTE.

DESCRIPTIVES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall How_followingothers How_ownroute How_askedstaff How_other.
FREQUENCIES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall How_followingothers How_ownroute How_askedstaff How_other.

*Giving variable labels to variables how to go through museum.
VARIABLE LABELS How_facilitysigns 'Did you use facilitysigns when going through the
museum?'.
VARIABLE LABELS How_roomnumbers 'Did you use roomnumbers when going through the
museum?'.
VARIABLE LABELS How_yearsonwall 'Did you use years on the wall when going through the
museum?'.
VARIABLE LABELS How_mappaper 'Did you use map on paper when going through the
museum?'.
VARIABLE LABELS How_mapwall 'Did you use map on wall when going through the
museum?'.
VARIABLE LABELS How_followingothers 'Did you follow other visitors when going through
the museum?'.
VARIABLE LABELS How_ownroute 'Did you walk your own route when going through the
museum?'.
VARIABLE LABELS How_askedstaff 'Did you ask staff when going through the museum?'.
VARIABLE LABELS How_other 'Did you use other things when going through the museum?'.
```

DESCRIPTIVES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper How_mapwall How_followingothers How_ownroute How_askedstaff How_other.
FREQUENCIES How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper How_mapwall How_followingothers How_ownroute How_askedstaff How_other.

DESCRIPTIVES Facilitysigns_seen Facilitysigns_used Facilitysigns_helpful Facilitysigns_improve
Roomnumbers_seen Roomnumbers_used Roomnumbers_helpful Roomnumbers_improve
Wallplan_seen Wallplan_used Wallplan_helpful Wallplan_improve
Yearswall_seen Yearswall_used Yearswall_helpful Yearswall_improve.

*Giving signs variables variable labels.
VARIABLE LABELS Facilitysigns_seen 'Did you see the facilitysigns?'.
VARIABLE LABELS Facilitysigns_used 'To what extend did you use the facilitysings?'.
VARIABLE LABELS Facilitysigns_helpful 'How useful do you find the facilitysigns?'.
VARIABLE LABELS Facilitysigns_improve 'Do you think the facilitysigns can be improved?'.
VARIABLE LABELS Roomnumbers_seen 'Did you see the roomnumbers?'.
VARIABLE LABELS Roomnumbers_used 'To what extend did you use the roomnumbers?'.
VARIABLE LABELS Roomnumbers_helpful 'How useful do you find the roomnumbers?'.
VARIABLE LABELS Roomnumbers_improve 'Do you think the roomnumbers can be improved?'.
VARIABLE LABELS Wallplan_seen 'Did you see the wallplan?'.
VARIABLE LABELS Wallplan_used 'To what extend did you use the wallplan?'.
VARIABLE LABELS Wallplan_helpful 'How useful do you find the wallplan?'.
VARIABLE LABELS Wallplan_improve 'Do you think the wallplan can be improved?'.
VARIABLE LABELS Yearswall_seen 'Did you see the years on the wall?'.
VARIABLE LABELS Yearswall_used 'To what extend did you use the years on the wall?'.
VARIABLE LABELS Yearswall_helpful 'How useful do you find the years on the wall?'.
VARIABLE LABELS Yearswall_improve 'Do you think the years on the wall can be improved?'.

```
FREQUENCIES Facilitysigns_seen Facilitysigns_used Facilitysigns_helpful
Facilitysigns_improve
Roomnumbers_seen Roomnumbers_used Roomnumbers_helpful Roomnumbers_improve
Wallplan_seen Wallplan_used Wallplan_helpful Wallplan_improve
Yearswall_seen Yearswall_used Yearswall_helpful Yearswall_improve.

*Compute variable age.
COMPUTE age = 2019 - year_of_birth.
DESCRIPTIVES age.
FREQUENCIES age.

DESCRIPTIVES Grade_wayfinding Grade_signs_specificpiece.

*Testing if 2 questions about wayfinding can be made in 1 scale.
CORRELATIONS
  /VARIABLES=Grade_wayfinding Grade_signs_specificpiece
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

EXAMINE VARIABLES=Grade_wayfinding Grade_signs_specificpiece
  /PLOT HISTOGRAM NPPLOT
  /STATISTICS NONE
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

*Factor analysis.
FACTOR
  /VARIABLES Grade_wayfinding Grade_signs_specificpiece
  /MISSING LISTWISE
```

```
  /ANALYSIS Grade_wayfinding Grade_signs_specificpiece
  /PRINT INITIAL CORRELATION SIG DET KMO AIC EXTRACTION ROTATION
  /FORMAT SORT BLANK(.30)
  /PLOT EIGEN ROTATION
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(25)
  /ROTATION NOROTATE
  /METHOD=CORRELATION.

*CRONBACHS ALPHA.
RELIABILITY
  /VARIABLES=Grade_wayfinding Grade_signs_specificpiece
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL.

*Compute wayfinding variable.
COMPUTE Wayfinding_experience=MEAN(Grade_wayfinding,Grade_signs_specificpiece).
EXECUTE.

DESCRIPTIVES Wayfinding_experience.
FREQUENCIES Wayfinding_experience.

DESCRIPTIVES gender age country Amount_people Which_people_family
Which_people_friends Which_people_partner Which_people_school Which_people_alone
Which_people_other Freq_visiting Grade_visit Grade_wayfinding Grade_signs_specificpiece
How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall How_followingothers How_ownroute How_askedstaff How_other
Facilitysigns_seen Facilitysigns_used Facilitysigns_helpful Facilitysigns_improve
```

```
Roomnumbers_seen Roomnumbers_used Roomnumbers_helpful Roomnumbers_improve
Wallplan_seen Wallplan_used Wallplan_helpful Wallplan_improve
Yearswall_seen Yearswall_used Yearswall_helpful Yearswall_improve Wayfinding_experience.

*Make N equal.
COMPUTE NOMISS2 = nmiss(gender, age, country, Amount_people, Which_people_family,
Which_people_friends, Which_people_partner, Which_people_school,
Which_people_alone, Which_people_other, Freq_visiting, Grade_visit, Grade_wayfinding,
Grade_signs_specificpiece, How_facilitysigns, How_roomnumbers,
How_yearsonwall, How_mappaper, How_mapwall, How_followingothers, How_ownroute,
How_askedstaff, How_other) = 0.
FREQUENCIES NOMISS2.
FILTER BY NOMISS2.
EXECUTE.

*Difference between overall experience and wayfinding experience variable computed.
COMPUTE difference_overall_wayfinding = Grade_visit - Wayfinding_experience.
DESCRIPTIVES difference_overall_wayfinding.
FREQUENCIES difference_overall_wayfinding.

DESCRIPTIVES country.
FREQUENCIES country.

RECODE country (1=0) (2 THRU 27 = 1) INTO NL_int.
DESCRIPTIVES NL_int.
FREQUENCIES NL_int.
VARIABLE LABELS NL_int "Netherlands vs. International countries".
VALUE LABELS NL_int 0 'NL' 1 'International Countries'.

*Compute amount of signs used.
```

```
COMPUTE amount_signs = How_facilitysigns + How_roomnumbers + How_yearsonwall +
How_mappaper + How_mapwall.
DESCRIPTIVES amount_signs.
FREQUENCIES amount_signs.

*Descriptive statistics.
DESCRIPTIVES gender age NL_int country_Amount_people Freq_visiting Grade_visit
Grade_wayfinding
Grade_signs_specificpiece Wayfinding_experience amount_signs.

*Check for normality for correlation variables.
EXAMINE VARIABLES=Gender Amount_people Freq_visiting Grade_visit How_facilitysigns
How_roomnumbers
    How_yearsonwall How_mappaper How_mapwall How_followingothers How_ownroute
How_askedstaff age
    Wayfinding_experience NL_int amount_signs
  /PLOT BOXPLOT STEMLEAF NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

*Correlations.
NONPAR CORR
  /VARIABLES=gender age NL_int amount_people Freq_visiting Grade_visit
Wayfinding_experience How_facilitysigns
How_roomnumbers How_yearsonwall How_mappaper How_mapwall How_followingothers
How_ownroute How_askedstaff How_other amount_signs
  /PRINT=KENDALL TWOTAIL NOSIG
  /MISSING=LISTWISE.
```

```
*Regression wayfinding exp and use of specific signs on overall exp.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Grade_visit
  /METHOD=ENTER Gender age NL_int Amount_people Freq_visiting
  /METHOD=ENTER Wayfinding_experience
  /METHOD=ENTER How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall
    How_followingothers How_ownroute How_askedstaff How_other
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID)
  /SAVE MAHAL COOK.

*Regression using sings on wayfinding experience.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Wayfinding_experience
  /METHOD=ENTER Gender age NL_int Amount_people Freq_visiting
  /METHOD=ENTER How_facilitysigns How_roomnumbers How_yearsonwall How_mappaper
How_mapwall
    How_followingothers How_ownroute How_askedstaff How_other
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID)
  /SAVE MAHAL COOK.
```

```
*Regression amount of signs used on wayfinding experience.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Wayfinding_experience
  /METHOD=ENTER Gender age NL_int Amount_people Freq_visiting
/METHOD=ENTER amount_signs
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID)
  /SAVE MAHAL COOK.

*Information about sign specific variables.
DESCRIPTIVES Facilitysigns_seen Facilitysigns_used Facilitysigns_helpful
Facilitysigns_improve.
FREQUENCIES Facilitysigns_seen Facilitysigns_used Facilitysigns_helpful
Facilitysigns_improve.

DESCRIPTIVES Roomnumbers_seen Roomnumbers_used Roomnumbers_helpful
Roomnumbers_improve.
FREQUENCIES Roomnumbers_seen Roomnumbers_used Roomnumbers_helpful
Roomnumbers_improve.

DESCRIPTIVES Wallplan_seen Wallplan_used Wallplan_helpful Wallplan_improve.
FREQUENCIES Wallplan_seen Wallplan_used Wallplan_helpful Wallplan_improve.

DESCRIPTIVES Yearswall_seen Yearswall_used Yearswall_helpful Yearswall_improve.
FREQUENCIES Yearswall_seen Yearswall_used Yearswall_helpful Yearswall_improve.
```