Master Facility & Real Estate Management

Title assignment	: Research report
Name module/course code	: Thesis / BUIL-1230
Name Tutor	: Joris Verwijmeren
Name student	: Twan Bouwhuis
Full-time / Part-time	: Full-time
Greenwich student nr.	: 001140106
Saxion student nr.	: 421207
Academic year	: **2020-2021**
Date	: 22 July 2021
Word count	: 17,305

An experiment about the contribution of the physical environment towards a more effective police interrogation

Summary

Police interrogations tend to be very stressful which comes at the expense of the effectiveness of interrogations as stressed suspects and witnesses provide less extensive and accurate statements. To study the contribution of the interrogation room towards this problem, an experiment using the four-group design was performed. This experiment examined if wall colour and seating comfort have an impact on the level of stress, self-disclosure and accuracy of information of participants who took the role of witnesses. In a neutral room, stress levels of participants (N = 52) were measured, and their abilities to describe a suspect in quality (details) and quantity (time and amount of words). After moving to the experimental room, participants were facing a blue or red wall and were sitting on a comfortable chair or an uncomfortable stool. They performed a stress test and repeated the same measurements as in the neutral room by filling in a stress questionnaire and describing a suspect. Results showed no evidence that colour or seating comfort influences stress, self-disclosure or accuracy of information. Therefore can be concluded that interrogations are not being affected by wall colour and seating comfort. This is also applicable for other organisations as this study shows that users are not being affected by wall colour and seating comfort in terms of stress and disclosing information. However, although these conditions have no effect on performances the literature review and experiment indicate that colour affects mood of people. Future research is required to exclude other variables which might influence the effectiveness of police interrogations in the Netherlands or influence levels of stress and self-disclosure among users of a building.

Keywords: colour, seating comfort, stress, self-disclosure, accuracy of information, police interrogation

Foreword

I would like to present to you my master thesis ‘An experiment about the contribution of the physical environment towards a more effective police interrogation’. This thesis has been written in the context of graduating from the Master of Facility and Real Estate programme of the University of Greenwich and Saxion University of Applied Sciences and was inspired due to the information request of the Dutch Police Academy. I started working on the thesis in February 2021, performed the experiment in June of the same year and finished writing the thesis at the end of July 2021.

I would like to thank my tutor Joris Verwijmeren for his guidance in framing the research subject, his practical advice in performing the experiment and for sharing his knowledge in writing the research report. I would also like to thank Brenda Groen for sharing her extensive knowledge in helping me understand certain specific topics, directing me in the right direction and setting up the questions of surveys. Moreover, I would like to thank Ruth Pijls-Hoekstra for sharing her experiences in conducting manipulation checks, performing experiments and analysing data. Furthermore, I would like to thank Minou Meulenkamp for her useful input during discussions and it was a pleasure to be able to communicate with someone who performed an experiment as well. Also, I would like to thank Koen Geijsen for allowing me to perform a study in the interest of the Police Academy as he helped me a lot by providing me with insights into the police interrogation process and sharing his experiences in performing experiments. Other than the contributions described above, the enthusiasm of these persons and their willingness to help me motivated me a lot during the thesis period.

I also would like to thank everyone who participated in the manipulation checks and the experiment. Their enthusiasm in the subject, willingness to participate in a stressful experiment and interest in the study was great which enables me to look back at a pleasant period.

Finally, I would like to thank my friends and family. Their interest and willingness to listen to the progress of the experiment made me enthusiastic and even gave me new insights. I am very thankful for their support. In particular, I would like my parents John and Ciska and my sister Anouk. They helped me by coming up with practical ideas, assisting in setting up the rooms for the experiment and creating the experimental conditions.

The thesis report is, except where stated otherwise, based on my own work.

I am very glad to present to you my first ever performed experiment and hope you enjoy reading it just as much as I did while working on it.

Twan Bouwhuis
Twello, July 2021

Table of contents

1 Introduction

1.1 Background information

Decades ago, police interrogators were aiming to convict suspects by using several psychological methods (Leo, 1996). Nowadays, this purpose has shifted as interrogators aim to collect as much accurate information as possible, despite the role of the person within the alleged crime (Shepherd & Griffiths, 2013; Rispens & van Amelsvoort, 2016; Dekker & Feigenson, 2020). However, suspects still experience high levels of stress during police interrogations which influences the case in a negative manner (Gudjonsson, 2003). As a result, suspects might struggle in providing details about the alleged crime (Morgan III et al., 2004; May, Gewehr. Zimmermann, Raible & Volbert, 2021), respond in a defensive way (Verschuere, Meijer & de Clercq, 2004) or even conduct a false confession (Kassin & Kiechel, 1996; Klaver, Lee & Rose, 2008; Vrij, 2008).

Although it seems unimaginable to confess to a crime that a person did not commit, it happens frequently. One reason is the urge to escape the pressure and stressful situation of the interrogation itself (Vrij, 2008). Vrij (2008) advocates that one solution to reduce false confessions is lowering pressure during a police interrogation.

On top of that, reducing stress is also valuable during interviewing witnesses. Despite their different role in comparison to suspects, stress may affect witnesses as well. Experts within the field of neuroscience mapped the different forms of memory of which conditioning is a part (Gazzaniga, Ivry & Mangun, 2013). They explain that conditioning refers to a stimulus that organisms become/ are associated with, which results in certain behaviour. Think of Pavlov (2010) who showed in 1927 that dogs could associate hearing a bell with receiving food. Other examples are getting negative emotions in the waiting room of the dentist (Wessel & Wolters, 2010) or the negative feeling witnesses get during a police interview.

Recently, this subject caught the attention of the Dutch Police Academy. According to them, interrogators are experienced and supported by psychological coaches. The room itself though is designed in a way that guarantees safety for all persons but does not contribute to the atmosphere of the interrogation. Recent studies regarding the effect of the physical environment stimulated their curiosity. These studies were conducted in several disciplines, for instance within hospitals and psychiatric environments. However, research in the context of police interrogations is very limited as only three recent studies were found (Dawson, Hartwig, Brimbal & Demisenkov, 2017; Hoogesteyn, Meijer & Vrij, 2019; Kelly, Dawson & Hartig, 2019).

The limited findings regarding the physical environment within police interrogations and the rising need of the Dutch Police Academy regarding this subject form the motivation for this research. This thesis focuses on the effect of the physical environment by measuring stress, self-disclosure and accuracy among participants.

These variables were tested in an experiment, by influencing the colour of the walls and seating comfort. These variables are chosen as they have the biggest impact within the dimensions of assessing the environment; dimension of warmth and dimension of seating distance. The colours blue and red were applied, as theory shows that blue is seen as a calm colour and red as the opposite as it increases stress. The researcher chose two contradicting colours to increase the chance of finding an effect. The seating comfort is chosen as it is part of seating distance and several studies focussed on seating comfort which could be used as fundamentals for this study.

1.2 Objectives, questions and hypotheses

Main objective

The objective of this thesis is to increase the effectiveness of police interrogations by the contribution of the physical environment of the room.

Main question

How can the physical environment of a room contribute to the effectiveness of police interrogations?

Research objective

To identify what factors of the physical environment influence the level of stress, self-disclosure and accuracy of information within a police interrogation.

Hypotheses

H1 Participants facing a blue wall experience less stress than participants who are facing a red wall.

H2 Participants who experience comfortable seating experience less stress than participants who are experiencing seating that is not comfortable.

H3 Participants facing a blue wall indirectly disclose more information in comparison to participants who are facing a red wall.

H4 Participants who experience comfortable seating indirectly disclose more information in comparison to participants who experience seating that is not comfortable.

H5 Participants who experience comfortable seating indirectly disclose more details in comparison to participants who experience seating that is not comfortable.

H6 Participants facing a blue wall indirectly disclose more details in comparison to participants who are facing a red wall.

1.3 Relevance

This thesis provides relevant insights for multiple fields. First of all, the Dutch Police Academy is involved as they wish to gain insights into physical factors which may be supportive during interrogations by reducing stress and stimulating self-disclosure and accuracy of information. This is helpful for all stakeholders within the police interrogation room as instead of psychological skills only, the room itself contributes as well to the effectiveness of the investigation. Effectiveness of the interrogation refers to getting the most accurate and detailed information possible from suspects and witnesses.

Furthermore, adaptations within the interrogation room can also be beneficial for suspects and witnesses themselves. If by research approved factors are being implemented in interrogation rooms, suspects and witnesses are likely to experience less stress. This results in cognitive improvements, as suspects who experience less stress are better capable of providing accurate information and take a more forward attitude.

Moreover, this thesis is relevant for the FREM field as well. Influencing and measuring stress is comparable to the opposites of hospitality, which is one of the values of the Facility branch. Therefore, this thesis might provide factors that prove to affect stress. As the physical environment is connected to the Real Estate world, this thesis may create awareness among FREM managers and the impact of the physical environment at the level of comfort of users.

This thesis is also relevant within the scientific field. The three other studies focussing on the influence of the physical environment during police interrogations examined several aspects among which stress, self-disclosure and accuracy. However, none of these studies tested all three of these dependent variables. Therefore, this study contributes to the scientific field as these variables have never been studied before in the same experiment within the police interrogation context.

2 Literature review

The purpose of the literature review is to gain relevant insights into the subject of the research (Saunders, Lewis & Thornhill, 2019). This research tends to be deductive instead of inductive as the literature review forms the core of this study. Based on the literature review, research questions are formulated which were answered by conducting research (Saunders et al., 2019). Furthermore, this thesis uses hypotheses which is a characteristic of deductive research.

First, the literature review zooms in on the context of police interrogations. After that, the dependent variables stress, self-disclosure and accuracy are illustrated. Thereafter, information about the physical environment is shown with the independent variables colour and seating comfort. The conceptual model and operationalisation are shown at the end of the literature review.

2.1 Police interrogation

The purpose of police interrogations has changed over time. Definitions are shown in the table below and mentioned in chronological order to illustrate the shifted goal of police interrogations.

Source	Description
Leo, 1996, p. 284	"Police interrogation involves only one stage of the larger criminal process through which an individual may be convicted and ultimately incarcerated. The detective's primary goal during interrogation is to gather enough incriminating evidence to convince the prosecutor to file criminal charges against the suspect".
Vrij, 2008	The goal of police interrogation is to collect information about a crime and, on top of that, to find out if the suspect was involved as a perpetrator or co-perpetrator[1].
Shepherd & Griffiths, 2013	The purpose of an investigative interview is to obtain as much accurate information as possible.
Rispens & van Amelsvoort, 2016	The goal of an interrogation is to gain the most reliable statement possible from the interviewed person, irrespective of their role as witness or suspect[2].
Dekker & Feigenson, 2020, p. 171	"The goal of police interrogations in the Netherlands (in contrast to the prevalent practice in the United States …) is supposed to be finding the truth rather than obtaining a confession".

Table 2.1: Definitions police interrogation

The oldest definition shows that police interrogators tried to convict a suspect which increases the chance of conducting false confessions. More recent sources advocate that policemen nowadays have a different purpose during interrogations. The definitions show that (Dutch) police interrogations focus on finding out what happened during an alleged crime, instead of convicting a suspect. On the other hand, this shifted purpose from gaining a confession towards finding out what happened is very recent and possibly still shifting, which means that some interrogators may still mainly aim for a confession.

[1] The original Dutch definition is: "De politie verhoort verdachten om meer te weten te komen over een misdrijf dat is gepleegd en in het bijzonder om uit te vinden of verdachten er als dader of medepleger bij betrokken waren" (Vrij, 2008, p. 723).
[2] The original Dutch definition is: "Het doel van een verhoor is het verkrijgen van een zo betrouwbaar mogelijke verklaring van de te verhoren persoon, ongeacht of dit een getuige of verdachte is" (Rispens & van Amelsvoort, 2016).

2.1.1 Process

When someone is arrested, that person is first being searched and identified. Thereafter, the suspect is brought to a cell in which the person can be detained for a maximum of six or nine hours or even longer, depending on the alleged crime (Politie, 2021). When the interrogation is about to start, the suspect is being transferred to the interrogation room. The time length of interrogation can differ as well. This process is different for witnesses as they enter by invitation. During the interrogation, the suspect or witness answers the questions of the interrogator(s) who types at the same time a transcript based on the answers to create a chronological story of the event that happened. After the interrogation, the suspect or witness can read the transcript and agree with it or reject certain parts of it (K. Geijsen[3], personal communication, March 12, 2021).

2.2 Stress

There are many definitions of stress in different contexts. This literature review focuses on the stress from life-changing events (figure 2.1). Researchers advocate that going to jail is, except for three other events, the most stressful event that can occur to a human, (Holmes & Rahe, 1967; Dohrenwend, Askenasy, Krasnoff & Dohrenwend, 1978). The definition of stress regarding these events is defined on the next page.

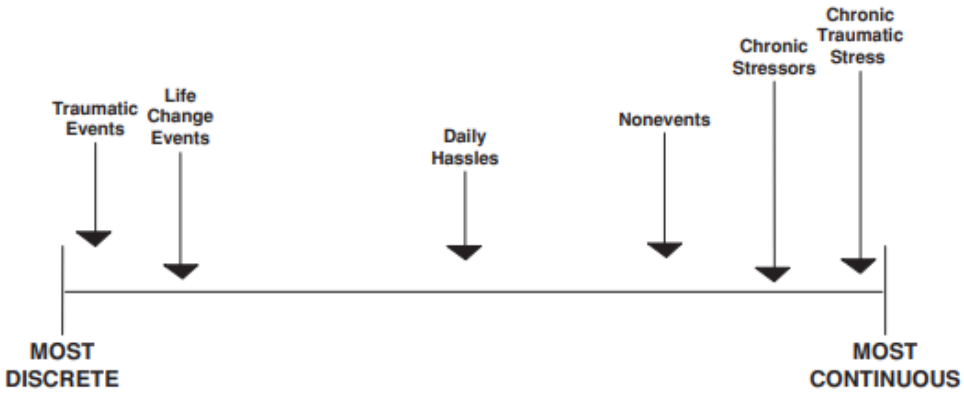


Figure 2.1: The stress continuum (Wheaton & Montazer, 2010)

According to Ofshe and Leo (1996), the interrogation process in America is designed in a way that provokes anxiety among interviewed persons. They add that many techniques and parts of the interrogation process result in distress and induced anxiety of the interrogated person. In the Netherlands, this is partly the same. Dutch police interrogators are currently aiming to lower stress and anxiety among, especially, suspects (K. Geijsen, personal communication, March 12, 2021). This stress process of stressors, stress and distress is related to the framework of Wheaton and Montazer (2010), shown in figure 2.2.

[3] K. Geijsen is a scientific researcher at Team Research of the Police Academy of the Netherlands.

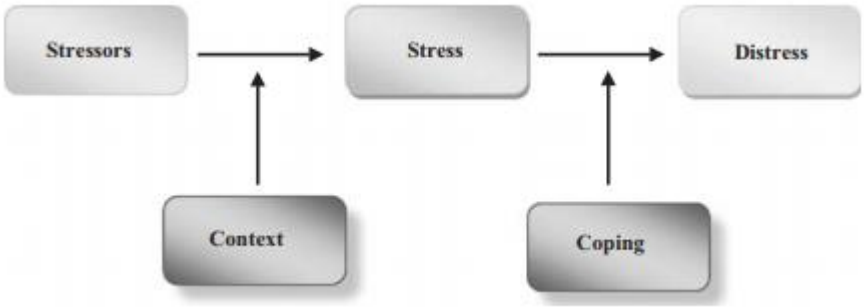


Figure 2.2: Stressors, stress and distress (Wheaton & Montazer, 2010)

The framework in figure 2.2 provides a better understanding of the statements of Ofsche and Leo (1996). They explain that suspects are already stressed before the interrogation by the context of the alleged crime. This stress is likely to result in distress, as the interrogation room increases the stress level of suspects. In the interrogation room, suspects are in a setting they are not familiar with, have no social support and lack the feeling of having control as the investigators have full control over the process (Schrantz, Nesmith, Lime-Mclean & Vanhoy, 2021). Ofsche and Leo (1996) conclude that this results in anxiety and distress.

2.2.1 Definition

Distress is defined by several experts:

Source	Description
Wheaton & Montazer, 2010, p. 171	"The behavioural response to stressful conditions, manifest in the form of a mixture of depression and anxiety".
Nevid, Eathus & Greene, 2016	"Suffering physically, mentally or emotionally"
Newport Academy, 2019	Distress is mostly caused by an event in the future that causes anxiety. These events may create challenges in which people do not own the skills to react well to those challenges, which creates distress.
Nirider, Davis & Leo, 2021	Distress within police interrogation refers to the many stressors a suspect experiences before and during the interrogation process.

Table 2.2: Definition distress

During the process, suspects experience stress before the interrogation itself due to the stressors and the context of the case, as illustrated in figure 2.2. Coping refers to how suspects react to the interrogation as this differs per person, influenced by several aspects as explained within the previous page and referred to multiple times in the definitions of table 2.2. Currently, the physical environment of the interrogation room does not contribute to supporting suspects to cope with the situation.

2.2.2 Effects

In contrast to the changed purpose of police interrogations, the process perceived by the suspect did not change that much as distress still applies to people who are being interrogated. The effects of distress during police interrogations are listed below.

Self-disclosure

- Defensive responding (Verschuere et al., 2004)
- Feeling insecure and anxious[4] (May et al., 2021)

Accuracy information

- High stress showed that witnesses provide stories with less accuracy. Low stress supported them in telling what happened (Morgan III et al., 2004).
- Concentration difficulties (May et al., 2021)

2.2.3 Measuring stress

The possibilities in measuring stress are illustrated in the two tables below. Table 2.3 shows the psychological measurements and table 2.4 the physiological measurements.

Source(s)	Psychological measurements
Kassin & Fong, 1999	Rating stress on a 10 point scale
Wolpe, 1969; Lund, Reider, Whiting & Prichard, 2010	The Subjective Units of Distress Scale
Mendes, Gray, Mendoza-Denton, Major & Epel, 2007	Acute stress appraisals, including a pre-questionnaire and post questionnaire

Table 2.3: psychological measurements

Source(s)	Physiological
Schubert et al., 2009; Perciavalle et al., 2017	Heart rate
Carroll et al., 2001; Hughes, 2005	Blood pressure
Van Holland, Frings-Dresen & Sluiter, 2012; Perciavalle et al., 2017)	Cortisol in saliva[6]
Jacobson, 1938; Shah, Trivedi, Diwan, Dixit & Anand, 2009	Tighten muscles
Perciavalle et al., 2017	Breathing
Mao et al., 2019	Dry mouth
Arck & Paus, 2006	Scratching, caused by itching feeling due to stress
Pedrotti et al., 2014	Pupil diameter
Kassin & Fong, 1999	Body language can be measured via observation by psychological experts

Table 2.4: Physiological measurements

[4] May, Gewehr. Zimmermann, Raible and Volbert (2021) do not mention feeling anxious, but “fearful”. However, anxious fits better according to the author of this thesis.

[5] Level of cortisol in saliva refers to negative tension. The contrary of cortisol is adrenaline, which measures positive tension (Van Holland, Frings-Dresen & Sluiter, 2012)

[6] Level of cortisol in saliva refers to negative tension. The contrary of cortisol is adrenaline, which measures positive tension (Van Holland, Frings-Dresen & Sluiter, 2012)

2.3 Self-disclosure

2.3.1 Definition

Source(s)	Definition
Strassberg, Roback, D'Antonio & Gabel, 1977, p. 31	"The process of communicating highly personal material about one's self to another individual (or individuals)".
Moon, 2000, p. 323).	"Any personal information that a person communicates to another. Intimate self-disclosures are defined herein as those that contain high-risk (as opposed to low-risk) information that makes the discloser feel vulnerable in some way".
Schug, Yuki & Maddux, 2010, p. 1472	"The revelation of sensitive personal information to another".
Forgas, 2011, p. 449	"Verbally communicating personal information about the self to another person".

Table 2.5: Definition of self-disclosure

Although the most recent definition of self-disclosure is older than a decade, the definition did not change over time. The definitions formulated in 1977 and 2011 are comparable and therefore still relevant nowadays. Furthermore, recent research still used these definition(s) which highlights its relevance (Schlosser, 2020). The core of the definition shows that self-disclosure is about communicating sensitive/ personal information to another person. This is applicable within police interrogations, as they often require sensitive information.

2.3.2 Measuring self-disclosure

The paper of Moon (2000) describes that self-disclosure is often measured within two dimensions; depth and breadth. Depth refers to the quality of disclosed information, which is mostly measured by independent judges. On the other hand, breadth measures the quantity of the answers and is mostly measured by counting words or time (Altman and Taylor 1973; Collins and Miller 1994). Accuracy of information is not explained further in the literature review, as it is comparable to depth of information.

Depth

- Self-Disclosure Index (Miller, Berg, & Archer, 1983)
- Completeness, self-reference and intimacy of the answer being assessed by a behavioural scientist (Omarzu, 2000; Joinson, 2001; Okken, van Rompay & Puyn, 2012)
- Intimacy, variety, concreteness and valence of the answer being assessed at a 10-point scale by two trained judges (Moon, 2000; Forgas, 2011)
- Coding subject-related details (Hoogesteyn, Meijer & Vrij, 2019)

Breadth

- Word count and duration of answer (Omarzu, 2000; Joinson, 2001; Okken, van Rompay & Puyn, 2012; Hoogesteyn, Meijer & Vrij, 2019)

2.4 Physical environment

2.4.1 Police interrogation

Similar to the definition of stress, the physical environment can be very holistic. The context of the physical environment within this study refers to physical factors within Dutch police interrogation rooms. The room itself has a basic appearance. The interrogator sits behind the desk with a computer and a landline which are the only loose objects in the room due to safety measures. The suspect or witness sits at the other side of the desk, as shown in the image below. In this illustration, the chair is screwed to the floor which is often not the case. Interrogation rooms do not contain bright colours, but a mixture of white and grey so the interviewee is not distracted by the room. Windows are barred and it differs per location if the windows are blurred. Furthermore, the interrogator sits closest to the door (K. Geijsen, personal communication, March 12, 2021).

Figure 2.3: A Dutch police interrogation room (Trouw, 2018, October 22)

2.4.2 Physical environment influencing stress, self-disclosure and accuracy

The physical environment influences stress, self-disclosure and accuracy of information. In chapter 2.2 of this paper, this has been highlighted briefly by figure 2.2 of Wheaton and Montazer (2010). The illustration below (figure 2.4) shows a comparable beginning as figure 2.2 as stressors lead to stress (Cohen, Kessler & Gordon, 1997). These stressors include the event of going through the police interrogation process but also environmental factors. In addition to stress, the model shows that negative responses affect the behaviour of people which is connected to self-disclosure and accuracy. Assessing the environment is generally done by five dimensions (Knapp, Hall & Horgan, 2013):

- **Familiarity** of the environment, people are being cautious in a less familiar environment. People do so to understand the norms of the new environment and therefore will slow down. Therefore, the interviewed person during an interrogation is likely to hold back and accept the lead of the police interrogator.
- **Constraint** perceptions, feeling of freedom within the environment influences level of comfort. This is highly applicable during police interrogations as suspects experience a major restriction of freedom.
- **Warmth** perceptions, psychological feeling of the environment. Colour and lightning affect the feeling of warmth within rooms. Restaurants for instance aim to create a warm feeling, however, the room should not be distracting during police interrogations.
- Perception of **privacy** influences behaviour of people as they are more willing to reduce the sitting distance and disclose more personal information in contrast to rooms with less privacy. The feeling of privacy can be influenced by an enclosed environment, only a few people and a minimal chance of entering other people or people who overhear the conversation in the room.
- Behaviour is also affected by **seating distance**. This can be physically distant. For instance, distance in meters, but also psychological distance which can be influenced by the chairs facing the same direction or facing each other. On the other hand, this can also refer to the psychological distance which can (unconsciously) be influenced by taking a forward attitude or leaning backwards (Thomas & Tsai, 2012).

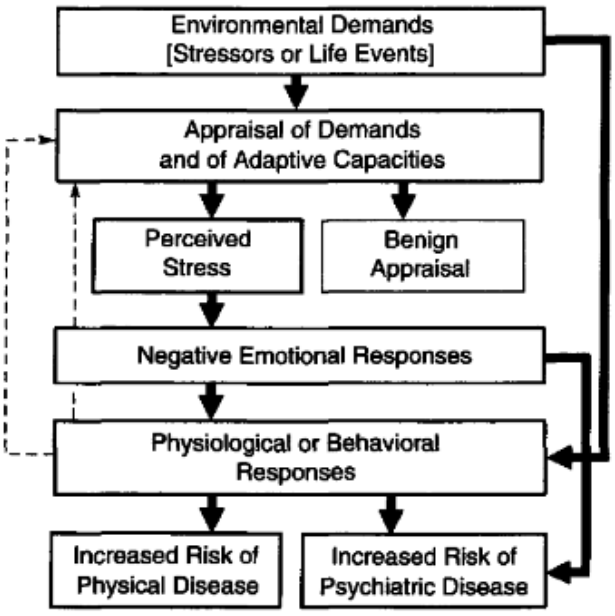


Figure 2.4: The stress process (Cohen et al., 1997)

2.4.3 Factors influencing stress. self-disclosure and accuracy

Studies regarding the effect of the physical environment of (police) interrogation rooms are limited. Only three studies were found that performed research within this context (table 2.6). Other studies focused on affecting self-disclosure within interrogations, however, by using priming as variables instead of the physical environment (Dawson, Hartwig, & Brimbal, 2015; Davis, Soref, Villalobos & Mikulincer, 2016).

The three studies showed that the physical environment could affect self-disclosure and accuracy but stress was not measured within these studies. Similar research has been conducted in other branches which might provide useful insights regarding factors that might influence the stress level and/ or self-disclosure and accuracy during police interrogation (table 2.7).

Author(s)	**Description of effect**	**Stress effects**	**Self-disclosure effects**
Dawson et al., 2017	Open setting increased disclosure among participants.	-	shared more information $p = 0.2$, $d = .46$ more critical details $p = 0.1$, $d = .48$ more forthcoming attitude $p = 0.3$, $d = .47$
Kelly et al., 2019	Interrogation room that feels more spacious, increases level of comfort	Comfortable experience[7] $p = 0.25$, $d = .33$	-
Hoogesteyn et al., 2019;	Interrogation room that feels more spacious, increases the level of comfort	Level of comfort[7] $p = .013$, $d = 0.42$ affective experience[7] $p < .001$, $r = .694$	Perceived spaciousness influences self-disclosure $p = .000$, $r = .544$
Hoogesteyn et al., 2019;	No effect was found between seating distance and disclosure. However, the researchers expect that testing bigger differences might increase disclosure	-	No effect on words count, units of information or crime-related units was found.

Table 2.6: Physical factors within interrogations

[7] Increased comfort and experience might result in a lower level of stress. However, this is not examined in both studies but is mentioned for its relevancy within this thesis.

Author(s)	Description of effect	Context
Karlin & Zeiss, 2006	Exposure to nature reduces stress *based on reviewing existing studies*	Psychiatric hospitals
Dijkstra, Pieterse & Pruyn, 2006	The well-being of patients increased due to sunlight, windows, odour and seating arrangements. However, findings in sound, nature and spatial layout were inconsistent as they depend on differences in characteristics *based on reviewing existing studies*	Hospitals
Okken et al., 2012	Open setting increased self-disclosure *small effect, not significant*	Interviews on intimate lifestyle-related topics
Kwallek, Woodson, Lewis & Sales, 1997; Liu, Ji, Chen & Ye, 2014	Blue is seen as the preferred colour by all generations Among other benefits, it reduces blood pressure. Furthermore, green is preferred by young adults Red applies to dysphoria (feeling unhappy, uneasy or dissatisfied*)*	In general
Van den Berg, Wesselius, Maas & Tanja-Dijkstra, 2017	Green walls showed to improve attention *small effect, not significant* and had a positive effect on the evaluation of participants regarding the classroom *analysed by comparing frequencies*	Primary schools

Table 2.7: Physical factors within other disciplines

2.5 Information gap

2.5.1 Dimensions of assessing the environment

In determining the two variables of the experiment, the five dimensions of Knapp et al. (2013) were useful as the variables aim to contribute to one of these dimensions to lower stress and therefore stimulate self-disclosure and accurate information.

Dimensions	Information gap
Dimension of familiarity	Influencing familiarity is difficult but possible. The room can be made more familiar by implementing physical factors that people recognise from other environments. However, it is questionable if this will have an effect and is challenging to recreate during an experiment.
Dimension of constraint	Reducing the feeling of lost freedom is likely to decrease the level of stress. However, this is very challenging as suspects do not only have the feeling of lost freedom but they could really lose their freedom as they may face charges. Furthermore, participants of this study will not have the feeling of lost freedom.
Dimension of warmth	Currently, the interrogation rooms are very neutral. A colour might influence the level of stress as several studies suggest in table 2.7. In an experiment, this is achievable although it is important to create two opposites as the chance exists of no significant effect.
Dimension of privacy	The current process is already quite private. The amount of people in the room is limited and most interrogations are not being recorded. Therefore, little progress is likely to be made within this dimension.
Dimension of distance	Currently, seats do not have a standard distance during police interrogations. The effect of the comfort of seats is not studied yet within police interrogations.

Table 2.8: Information gap

2.5.2 Choice of independent variables

Considering the information gap of the five dimensions of Knapp et al. (2013), the dimensions of familiarity and constraint are challenging to study and the dimension of privacy is sufficient. The most progress can be made within the dimensions of warmth and seating distance.

Dimension of warmth: colour

Colour affects mood and can therefore create a warm feeling (RiosVelasco, 2010). Within this respect, progress can be made as police interrogations rooms are very neutral as walls contain a mixture of a white/ grey colour which does not contribute to this dimension. This variable is highly applicable for the context of the study as the adjusting wall colour does not affect the safety measures but could influence mood. Also, attention to wall colour is not uncommon within other fields. Think of hospitals (Dijkstra et al., 2008), offices (Kwallek et al., 1997) and schools (Van den Berg et al., 2017).

Dimension of seating distance: seating comfort

Lam, Chan, Fong and Lo (2011) advocate that seating distance together with the seating quality determines the seating comfort by the user. Manipulating seating distance is challenging for this thesis considering the required presence of a jury or interrogator(s). The experiment of Hoogesteyn et al. (2019) used seating distance but no effect was found. Therefore, seating comfort is estimated to be more achievable to manipulate than seating distance and therefore more applicable for this thesis.

2.6 Independent variables

2.6.1 Colour

In general, the colour blue is related to calmness and relaxation while red is distressing and increases heart rate (Liu et al. 2014; AL-Avash, Kane, Smith & Green-Armytage, 2016). The colour blue that was rated as the preferred colour in the study of Liu et al. (2014), is shown in figure 2.5 (RGB: 0, 201, 255). In their experiment, they focused on finding the optimal calm colour for counselling rooms led to the colour solution that is illustrated in figure 2.5.

Despite these theories, further research is necessary to find out the effect of colour on suspects and witnesses during police interrogation. For instance, the experiment of Weller and Livingston (1988) showed that participants were more comfortable reading a violent crime from a pink paper than a blue one, which contradicts the general theory regarding the effects of colours.

Figure 2.5: The optimal colour solution (Liu et al., 2014)

Figure 2.6: Most stressful colour solution

The most distressing colour is red, supported by many studies among which the experiment of Liu et al. (2014). Using blue as a calm colour and red as an intense colour has been performed in other experiments to increase the chance for an effect (Kwallek et al.,1997). The red colour in figure 2.6 has the colour combination RGB: 255, 0, 0. There is no scientific evidence which red hue is the most distressing, in comparison to the blue colour which has an adjusted hue based on the preferences of people. Therefore, the regular colour combination of red is illustrated, with the same intensity and (maximised) brightness as the blue colour.

An important note to take into account is that colour preference can be generalised to a certain limit. On a large scale, most people would likely agree that the colour blue is calming and the red one relates to stress. However, this can differ significantly as some people might prefer the red colour as they prefer a more arousal environment (Dijkstra et al., 2008).

2.6.2 Seating comfort

There is currently no study performed regarding seating comfort within police interrogations. That is remarkable as studies in other disciplines show that seating has an influence on feeling comfortable, which is the opposite of feeling stressed. Pijls-Hoekstra, Galetzka, Groen and Pruyn (2019) examined this within a restaurant by manipulating a comfortable chair and non-comfortable stool. The study of Krahé, Lutz and Sylla (2018) shows that people who are feeling relaxed, which could be related to feeling comfortable, declines a frustrating feeling and therefore less anger and aggression. They studied this by focussing on the seating position of people by comparing a forward-leaning position and a backwards-leaning position.

This study used the same chair and stool as Pijls-Hoekstra et al. (2019) for two reasons. Firstly, because of the difference in comfort. Feeling not comfortable can lead to feeling stressed which is highly applicable within this study. Secondly, people on the chair are likely to take a leaning position as the chair has a backrest. The stool, however, has no backrest which stimulates to sit in a forward position. This would meet the study of Krahé et al. (2018) in a relaxed feeling for people sitting on the chair and discomfort, and even frustration, for people sitting on the stool.

2.7 Conceptual model

The conceptual model refers to the domain of information that the researcher aims to investigate (Miles & Huberman, 1984; Leshem & Trafford, 2007). The stress level of, in this case, suspects and witnesses, is influenced by five dimensions of the physical environment. The result of the stress level influences the self-disclosure and accuracy of information. These two dependent variables combined contribute to the effectiveness of the police interrogation, which aim to gain as much (self-disclosure) and accurate (accuracy information) information as possible.

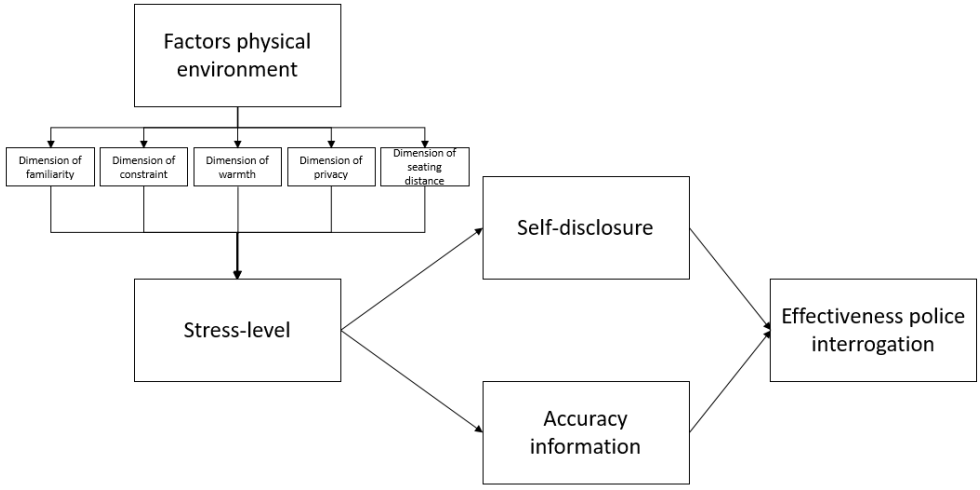


Figure 2.7: Conceptual model

Hypotheses in relation to the conceptual framework

The hypotheses can be applied to the conceptual model, as illustrated on the next page. The first image shows the two dimensions that were influenced during the study, which were expected to influence the level of stress, which influences the other variables. If all the hypotheses can be accepted based on the results of this study, the second image illustrates the process. The two adjusted dimensions lower the level of stress, which increases self-disclosure and the accuracy of information. This increases the effectiveness of the police interrogation.

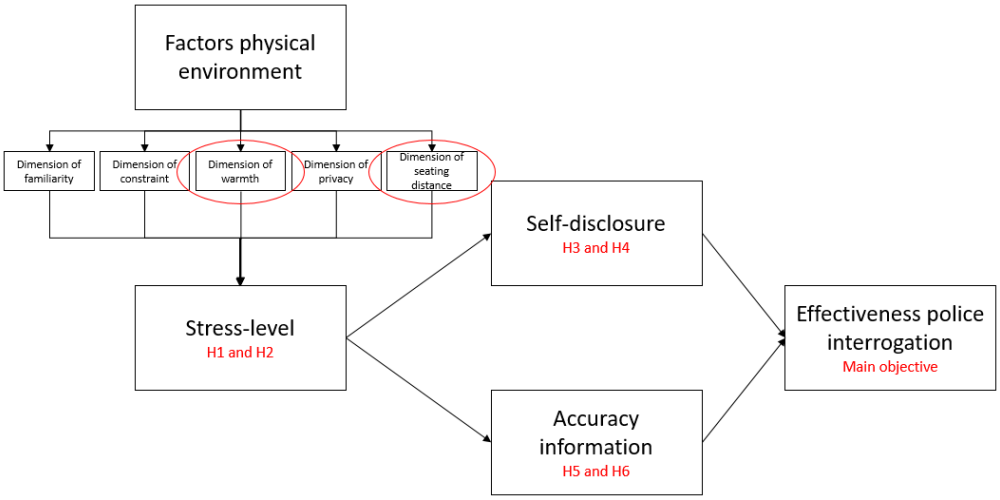


Figure 2.8: Conceptual model: highlighting the hypotheses

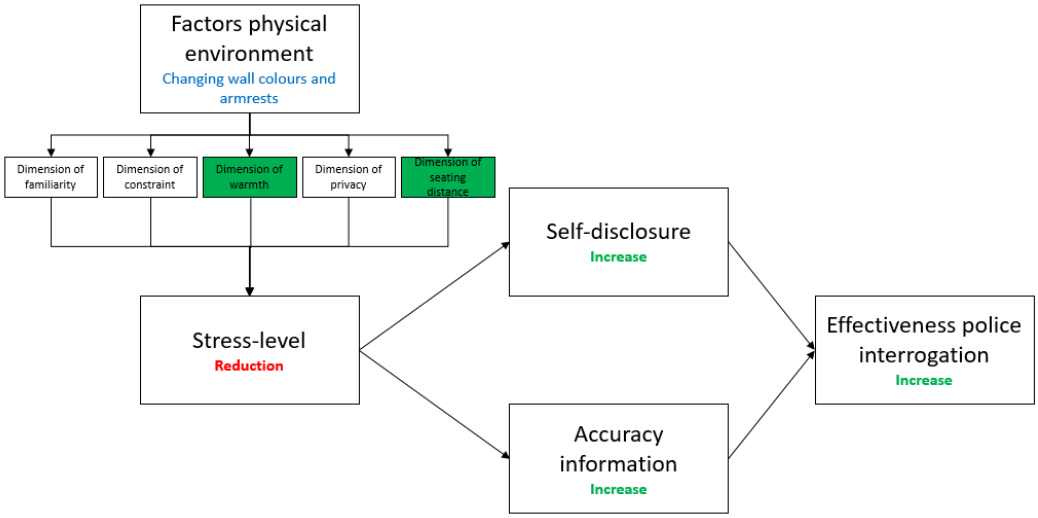


Figure 2.9: Conceptual model: optimal effect

2.8 Operationalisation

The operationalisation translates the key concepts into measurable values (Saunders et al., 2019). The operationalisation is distinguished into three parts (appendix I):

- Effectiveness of police interrogation; measurements to examine if the effectiveness of the interrogation increases or decreases influenced by the level of stress.
- Stress; measurements to indicate the level of stress, influenced by the factors of the physical environment.
- Physical environment; which independent variables can affect the level of stress.

3 Manipulation checks

The literature review provides support for the effects of the two independent variables. This can be supported even further via a manipulation check in which a test determines if the conditions do lead to the expected effects (Hoewe, 2017). Therefore, colour and seating comfort have been examined in a manipulation check.

3.1 Colour

Purpose

The purpose of the manipulation check regarding colour is to examine the intensity and brightness of the blue and red colours. Theoretically, these elements are at the same level as shown in subchapter 2.6.1. However, the manipulation check examines if people interpret these factors as the same which can differ significantly as colour interpretation and emotions are related (Valdez & Mehrabian, 1994). This is important as the influence of colour during the experiment should infer to the colour itself (tint) instead of its brightness or intensity. In addition, checking the effects of Liu et al. (2014) regarding colour is important as there are differences in interpretation of colours among cultures (Adams & Osgood, 1973; Gao et al., 2007).

Procedure

Participants were asked to rate the intensity (from light to dark) and brightness (from bright to grey) of the two colours on a 5-point Semantic Differential scale. Interpretation of colours was asked via the same type of scale, based on the paper of Hanyu (2000) which has also been used by Liu et al. (2014). Several attempts were performed to meet the same level of intensity and brightness. When there were differences, the researcher adjusted the saturation by adding white or black based on colour theory (Agoston, 2013) till there were no differences in interpreting intensity and brightness. The overview of these attempts is displayed in table 3.1 and the survey is shown in appendix IV and V.

Results

Intensity and brightness

A paired-sample t-test was conducted to investigate the intensity and brightness of the blue and red colour. In the final attempt (*N* = 32), there was no significant difference in intensity between blue (*M* = 3,38, *SD* = .50) and red (*M* = 3.25, *SD* = .93; *t* (30) = .473, *p* = .64, two-tailed). The magnitude of the differences in the means (mean difference = .125, 95% *CI*: -.41 to .66) was very small (eta squared = .036). Moreover, there was no significant difference in brightness between blue (*M* = 2.75, *SD* = .856) and red (*M* = 2,44, *SD* = 1.03; *t* (30) = .933, *p* = .36, two-tailed). The coverage of the differences in the means (mean difference = .335, 95% *CI*: -.37 to .99) was, again, very small (eta squared = .036).

				Intensity				**Brightness**			
	Colours			*Blue*		*Red*		*Blue*		*Red*	
	Blue	*Red*	*N*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Check 1	RGB: 0, 201, 255	RGB: 255, 0, 0	61	1.93**	.93	2.41**	1.06	1.90	.86	1.98	.98
Check 2	RGB: 0, 201, 255	RGB: 255, 0, 0	25	3.25*	.62	3.77*	.60	-	-	-	-
Check 3	+10% black	+10% white	32	3.81*	.54	3.06*	.57	2.13	.89	2.75	.86
Check 4	+20% black	+20% white	32	3.38	.50	3.23	.93	2.75	.86	2.44	1.03

*Table 3.1: Colour intensity and brightness, * indicates p <. 05 , ** indicates p <. 01, *** indicates p <. 001*

Effects

The questions regarding effects (37 males, 24 females, mean age 28,3) gave a general view of how Dutch people interpret the colours blue and red. These results are illustrated in the table below which highlights the means of each effect.

N = 61	**Blue**		**Red**		**T-statistic**
Variable	*M*	*SD*	*M*	*SD*	*T*
Pleasant – unpleasant	2.20	1.08	3.02	.99	-4.24***
Exciting – boring	3.36	.82	2.21	.80	7.61***
Relaxing – distressing	2.36	1.10	3.56	.96	-5.49***
Safe – fearful	1.97	.89	3.37	.99	6.73***
Interesting – uninteresting	2.80	1.00	2.51	.94	1.59
Active – inactive	2.87	1.09	2.13	1.06	3.49***

*Table 3.2: Colour effects, * indicates p <. 05 , ** indicates p <. 01, *** indicates p <. 001*

General conclusion and discussion

When 20% black was added to the blue colour and 20% white to the red colour, the intensity and brightness of both colours were perceived the same by respondents. A colour expert linked these adjusted RGB codes to colour codes; 0580-Y90R for the red colour and RAL 5012 for the blue colour. The check provides evidence that people influenced by these colours are influenced by the tint only instead of its intensity or brightness. Moreover, the effects are matching the expectations set by Liu et al. (2014) as blue is more pleasant, safe, interesting and active while red is more exciting and distressing. Only two statements differ from the results of Liu et al. (2014) as participants in this manipulation check assessed red as more interesting while in their paper blue was rated more interesting. Furthermore, they found no difference in active – inactive while in this check participants rated blue as more active in comparison to red. The check shows that blue can be seen as a calm colour while red is more distressing and fearful. This proves that the colours evoke different feelings among Dutch persons.

3.2 Seating comfort and position

Purpose

Conducting a manipulation check ensures that participants perceive and react to the two seats as a comfortable chair and an uncomfortable stool. The choice for these seats is based on the study of Pijls-Hoekstra et al. (2019) but the target group of this experiment differs which forms the reason for a manipulation check. It is valuable to examine the sitting position of respondents as well as sitting in a reclined or forward position has impact on the level of comfort and level of stress (Krahé et al., 2018).

Procedure

Participants tested one of the two seats and did not know about the existence of the other seat. After the participant was sitting, the researcher explained the purpose of the survey and what was expected from the participant. The researcher read thirteen statements from a tablet that displayed the questions randomly, participants reacted to the statements by answering on a 10-point Likert scale in which 1 was strongly disagree and 10 strongly agree. The survey is shown in appendix VI. After doing so, the researcher took a picture from the side which enabled him to calculate the angle of the sitting position. The manipulation check took approximately one to two minutes per participant.

Figure 3.1: Chair with backrest (left) and stool without backrest (right)

Results

Seating comfort

Again, an independent-samples t-test was conducted to compare the comfort of two different seats for two different groups of people. Four statements were tested via this technique and were measured on a 10-point scale. First, there was a significant difference in how comfortable participants rated the chair (*M* = 5.8, *SD* = .92) and the stool (*M* = 2.7, *SD* = 1.6; *t* (18) = 5.22, *p* <. 001, two-tailed). The magnitude of the differences in the means (mean difference = 3.1, 95% *CI*: 1.85 to 4.35) was very large (eta squared = 0.602). Second, there was a significant difference in what extent the chair and stool support the body of participants well. They rated the support of the chair (*M* = 5.6, *SD* = 1.90) better than those who were sitting on the stool (*M* = 2.5, *SD* = 1.90; *t* (18) = 3.65, *p* <. 01, two-tailed). The coverage of the differences in the means (means difference = 3.1, 95% *CI*: 1.32 to 4.88) was also very large (eta squared = 0.425). The third statement, concerning the softness of the two seats, showed a less strong but still significant difference between the chair (*M* = 4.1, *SD* = 2.02) and the stool (*M* = 2.3, *SD* = 1.64; *t* (18) = 2.19, *p* <. 05, two-tailed). The magnitude of the differences in the means (mean difference = 1.8, 95% *CI*: .07 to 3.53) showed a large effect (eta squared = .210). Last, participants assessed the seats regarding what extent they could be sitting on them for hours. The chair (*M* = 5.5, *SD* = 1.58) scored significantly higher than the stool (*M* = 1.9, *SD* = .99; *t* (18) = 6.10, *p* <. 001, two-tailed). The coverage of the differences in the means (mean difference = 3.6, 95% *CI*: 2.36 to 4.84) was, again, very large.

Sitting position

An independent-samples t-test was conducted to compare to what extent participants were feeling relaxed and their positive attitude by comparing the group who sat on the chair with the group who sat on the stool. Regarding the nine statements, only one statement showed a significant difference as participants on the chair (*M* = 6.7, *SD* = 1.06) felt more unstressed than those who were sitting on the stool (*M* = 5.4, *SD* = 1.43; *t* (18) = 2.31, *p* <. 05, two-tailed). Moreover, the relationship between the type of seat (comfortable chair and uncomfortable chair) and back position (angle which has been calculated from pictures of participants) was investigated using the Pearson correlation coefficient. There was a strong, negative correlation between the two variables, r = -.92, n = 20, *p* <. 001, which indicates that the uncomfortable stool is associated with a smaller sitting angle.

Despite no other significant differences, all the nine statements were on average rated higher by participants who sat on the chair in comparison to those sitting on the stool as illustrated in the table below.

N = 20	**Comfortable chair**		**Not comfortable stool**	
Variable	*M*	*SD*	*M*	*SD*
Relaxed	6.9	.88	6.4	1.26
Laid-back	6.6	1.65	5.5	1.84
Unstressed	6.7	1.06	5.4	1.43
Light-hearted	7.4	1.58	5.7	2.16
Amused	6.8	.79	6.0	2.0
Bright	7.4	1.17	7.0	1.89
Cheerful	6.8	1.69	6.7	1.34
Happy	6.6	1.90	6.2	1.81
Pleased	7.2	1.31	6.7	2.54

Table 3.3: Results seating comfort

General conclusion and discussion

The manipulation showed that the comfortable chair was assessed as moderately comfortable while the uncomfortable stool proved to be very uncomfortable. Moreover, participants were sitting in a reclined position on the comfortable chair and those on the uncomfortable stool sat in the frontward position. Despite no significant effects were found regarding the statements of feeling relaxed and positive feeling, all statements were rated higher on average by participants sitting on the comfortable chair. Therefore, this indicates that people on the comfortable chair would be more relaxed and feeling positive than those on the uncomfortable stool. Especially considering that participants in the manipulation check sat on the chair or stool for a maximum of two minutes, which is a lot shorter than participants who sat on them during the experiment for ten to fifteen minutes. Effects described in the literature review match the effects found in this check, which makes the manipulation check successful.

4 Research methods

The methodology refers to how research was being conducted (Saunders et al., 2019). The practical execution of the research is based on the theoretical information from the literature review in combination with the philosophical assumptions of the researcher which shows to be a deductive approach. The literature review shows that only three other studies performed similar research. The graph below shows their research approaches, which are taken into consideration regarding the choices within this research approach.

Author(s)	**Strategy**	**Method**	**Participants**
Dawson et al., 2017	Experiment	Participants were interviewed about a fiction story regarding environmental terrorism. The researchers manipulated a room by creating open en closed feelings within the interview room. In a second experiment, they manipulated the architecture and interiors of both rooms.	Participants signed up online. Study 1: 112 participants who received $20. Study 2: 151 participants who received $25
Kelly et al., 2019	Experiment	The researchers created two rooms. The experimental room aimed at a more comfortable impression where the control room was a standard interrogation room.	Collaboration with the American police department. Participants did not receive a reward. - 77 detectives - 50 witnesses
Hoogesteyn et al., 2019	Experiment	A virtual reality scenario in which participants took the role of suspects and were interviewed. The researchers manipulated the spaciousness of the room and the sitting distance.	139 students who received credits or a €5 voucher

Table 4.1: Research approaches of previous studies in a comparable context

4.1 Research approach

Quantitative approach

This study aimed to identify factors (independent variables) that influence stress, self-disclosure and accuracy of information (dependent variables). To identify these factors, and analyse relations, numeric data was required which can only be collected via quantitative data (Saunders et al., 2019). This matches the deductive approach, as mentioned earlier. The researcher formulated hypotheses, based on the literature review, as existing theories and knowledge form the fundamentals of this study which were used to examine new factors. In addition to that, the three other studies all took a quantitative approach as illustrated in table 4.1.

4.2 Research strategy

Experiment

An experiment was performed to identify the factors. This is the most relevant strategy as the goal of an experiment is to examine if one independent variable influences other dependent variables (Hakim, 2000), which aligns with the research goal of this thesis. The second argument is the fact that other studies within this context all performed an experiment as well (table 4.1). This experimental design differs from theirs as paid participants might be motivated mostly by the financial bonus instead of the experiment itself. This was also not possible for the experiment due to financial limitations. Moreover, involving real witnesses can result in ethical issues. An experiment has more disadvantages, as mimicking a situation that people may not be familiar with.

4.3 Setup of the experiment

Solomon Four-Group Design

In comparison to other methods, the Solomon Four-Group Design covers all seven threats of internal validity (Campbell, 1957; Flannelly, Flannelly & Jankowski, 2018). This is elaborated further in chapter 6. The high internal validity is the main reason for choosing this methodology as other methodologies take less time in performing but also have lower internal validity.

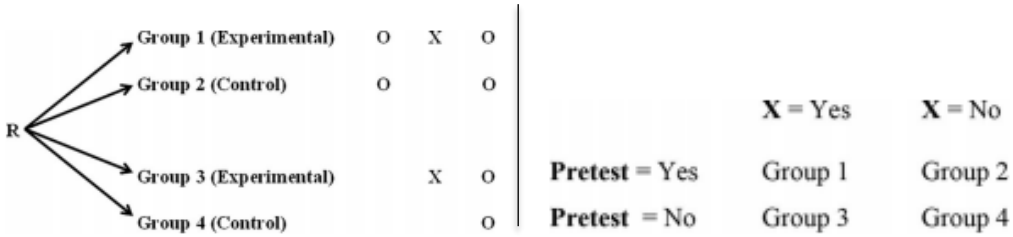


Figure 4.1: Solomon Four-Group Design (Campbell, 1957; Flannelly et al., 2018)

Following the design of Solomon, participants were classified randomly into four groups. The figure above illustrates the different groups and their exposure to the independent variable (X) and the dependent variables (O). The original Solomon Four-Group Design examines both dependent variables together but also independently. This experiment did not, based on two reasons:

- First, testing three dependent variables apart from each other was not possible. If doing so, the experiment should have been conducted twice or maybe even three times which is not achievable due to the reliability and motivation of participants.
- Second, the literature review showed that stress, self-disclosure and accuracy are related to each other.

A pre-test was conducted by all the participants. In the pre-test, the dependent variables of participants were measured to enable the researcher to look for an effect before and after the experiment in stress, self-disclosure and accuracy. This is important as participants differ from each other and some may be more willing to talk in general than others (Verschuren & Doorewaard, 2007). This is also applicable for coping with stress, as the literature review explains. More information about these measurements is provided in chapter 4.4.

The original Solomon Four-group design uses control groups in which the independent variables are not involved. Despite the current wall colour of interrogation rooms, most participants have probably never seen an interrogation room which makes the original colour questionable to be neutral. On top of that, the experiment of Kwallek et al. (1997) showed that white cannot be assumed as neutral as in their experiment, which affected the number of mistakes of participants.

This experiment used two contradicting colours: blue (RAL 5012) and red (0580 Y90R). By using two contradicting colours, as the literature review shows blue as calm and as red stressful, the chance of finding an effect increases. The other variable refers to a comfortable seat and uncomfortable stool.

	Colour of the walls	Comfortable seating	Self-disclosure	Stress	Accuracy
Group 1	Blue	Yes	✓	✓	✓
Group 2	Blue	No	✓	✓	✓
Group 3	Red	Yes	✓	✓	✓
Group 4	Red	No	✓	✓	✓

Table 4.2: experimental design

4.3.1 Design of the experiment

Quasi-experiment

Saunders et al. (2019) distinguish three variations of performing an experiment: laboratory experiment, quasi-experiment and mimic experiment. This experiment has characteristics of all three of these variations. Randomly assigning participants is a characteristic of a laboratory experiment, although the population itself is not fully random as almost everyone was related to Saxion (characteristic of quasi-experiment). The experiment mimicked a witness hearing. But in a classic mimic experiment, no comparable groups are used which contradicts this experiment.

Procedure

The experiment was performed in two rooms of Saxion Deventer which were located next to each other. Participants took place in the neutral room and were asked to read the information letter and consent form. While doing so, the researcher left the room and changed the conditions in the experimental room. When the researcher returned, participants were able to ask questions. Otherwise, the experiment would start with the pre-test. When the pre-test was done and participants had seen the suspect, the researcher took them to the experimental room. The researcher was sitting out of sight while participants were told to face the corner of the room. Then, the stress test was performed. After the stress test, the post-test was conducted which was the last part of the experiment.

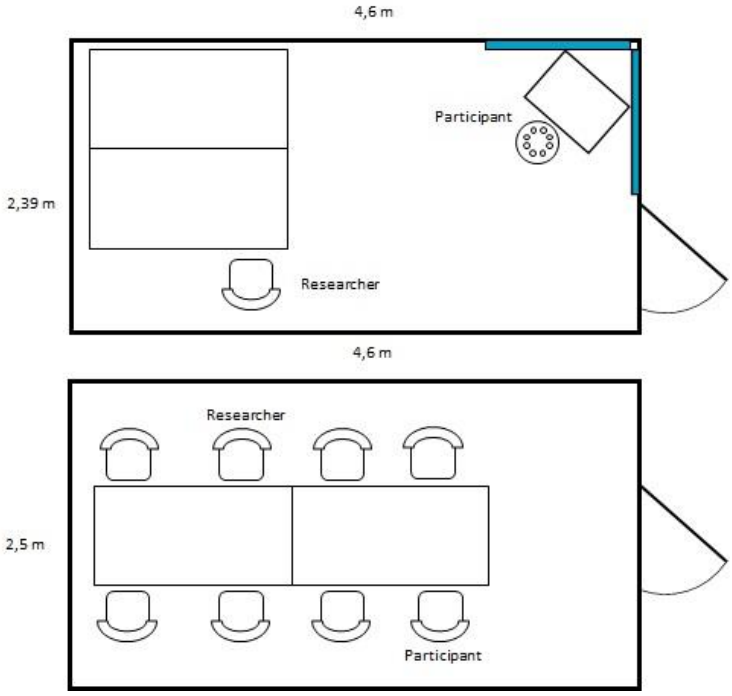


Figure 4.2: Illustration of the neutral room (bottom) and the experimental room (top)

4.3.2 Appearance of the experimental room

One room functioned as a neutral room where the pre-test was being performed. The other room, the experimental room, was used during the experiment itself. Participants were influenced by colour, which was exposed to them via two paintings (75 x 115 cm) in the corner of the room while they were sitting there at an angle of 45 degrees behind a regular school table. The paintings and seats (chair or stool) were switched while participants were reading forms. The painting and seat that were not used were hidden under the table of the researcher. That table was taped off at the front so participants could not see what was underneath. The researcher was in the room to provide instructions. Participants did not face the researcher but faced the two paintings.

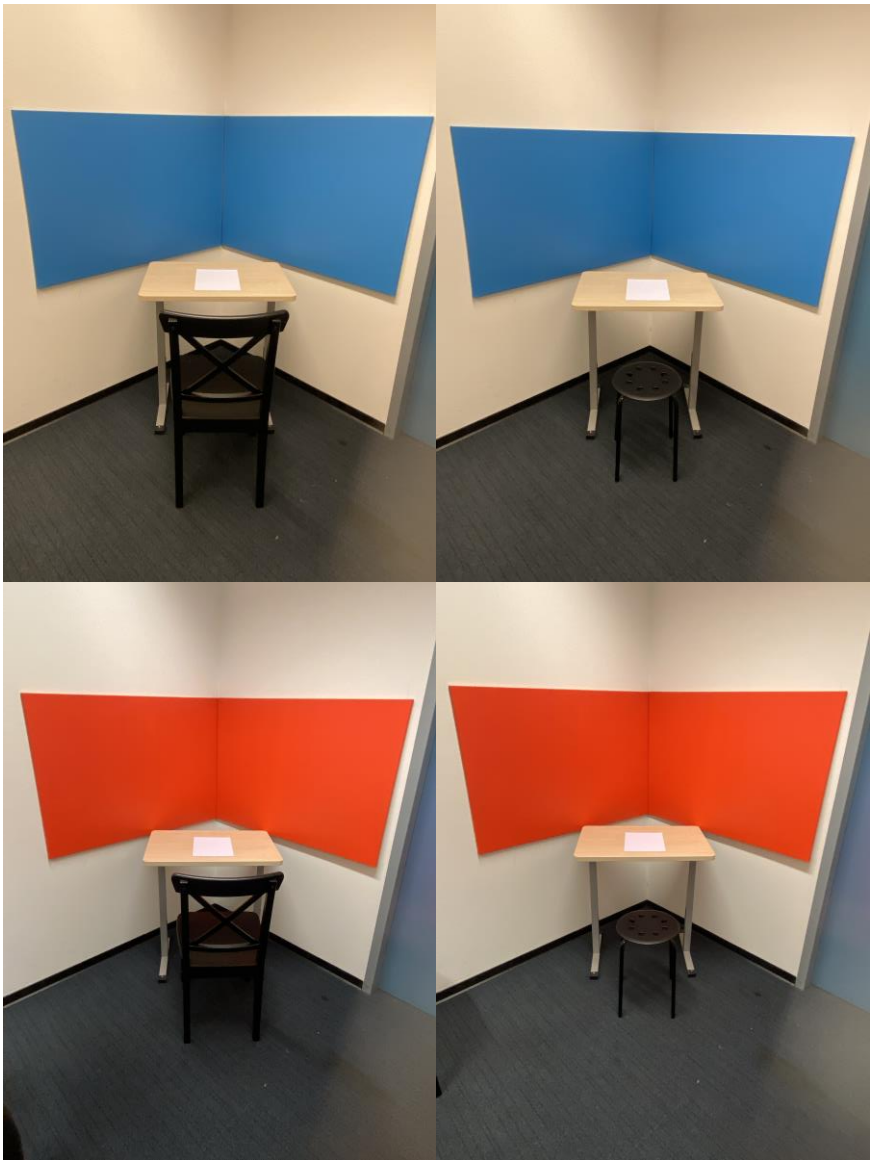


Figure 4.3: Experimental conditions

4.3.3 Trier Social Stress Test

The Trier Social Stress Test is designed to arouse acute stress (Kirschbaum, Pirke & Hellhammer, 1993). The original design was adjusted slightly within this experiment. Participants did not face a jury and there was no videorecording. Considering voluntary participation, the experimental design should not scare potential participants. Moreover, the time was diminished to prevent that the experiment would be too long or induce too much stress. After conducting a pilot, the researcher decided that the three assignments would endure two minutes each.

First, participants were told to prepare a pitch that had to endure two minutes. The use of pen and paper was allowed but could not be used during the pitch itself. After two minutes, the researcher instructed participants to crumple the paper with notes and throw it behind them. Then the two-minute pitch started. Standardised sentences (appendix XI) were used when there was a long silence, see the four cursive sentences below. After completing the pitch, the participant was instructed to subtract 13 from 1,022 as quick and accurate as possible. When mistaken, the researcher said: “that is not correct, start over from 1,022”. After two minutes, the researcher told that the participant succeeded in the assignments.

1. *Please continue*
2. *The experiment requires you to continue.*
3. *It is absolutely essential that you continue.*
4. *You have no other choice but to continue.*

4.4 Measurement instruments

4.4.1 Measuring stress

Pre-questionnaire and post questionnaire

The questionnaire of Mendes et al. (2007) is the most relevant instrument. The questions, displayed in a 5-point Likert Scale, differ from each other to prevent participants from filling in the same answer after the experiment as before the experiment (appendix II). Furthermore, the questionnaires distinguish two elements (appendix III). On the one side participants rate the situation and to what extent they feel the pressure of the expected task, on the other side to what extent do people think they can cope with this expected demand. This theory is developed by Folkman, Lazarus, Pimley and Novacek (1987) and is in line with the model of Wheaton and Montazer (2010) in figure 2.2 as the demanding elements apply to stressors and to what extent participants think they can fulfil this demand refers to coping. Therefore, using this measuring tool enables insights into not only the perceived stress but also to what extent the situation influences the stress level in which coping behaviour could be excluded.

The first questionnaire was provided just before the task started when participants already knew what tasks they were facing. The post-questionnaire was provided directly after the tasks. The pre-test questionnaire was provided in the neutral room, while the post-questionnaire was filled out in the experimental room. All questionnaires, the participant information letter and the consent form are shown in the appendices.

4.4.2 Measuring self-disclosure

Word count and answering time

After the stress measurement, participants were asked to elaborate on the image they saw at the beginning of the experiment. The researcher measured self-disclosure by counting the number of words used and the time they used while answering. Hoogesteyn et al. (2019) used this instrument as well. The researcher expected that stressed participants will take less time in providing an answer to escape the situation (Vrij, 2008). To make sure that the data was as accurate as possible, the audio was recorded and transcribed.

4.4.3 Measuring accuracy

Counting details was done to determine the accuracy of the information, as Hoogesteyn et al. (2019) did as well. Accuracy can be measured by making a list of details of the photos. Klare et al. (2014), the paper on which the two photos were inspired, made a detailed list of the 46 most common facial descriptions mentioned by people. When participants mention a specific detail, the accuracy of information rises. The pre-test regarding accuracy and self-disclosure was performed by describing another photo that the researcher showed participants before the stress test. The used photos are illustrated in figure 4.4 in which the left person was shown in the pre-test and the right person in the post-test.

Figure 4.4: The used suspect in the experiment (Klare et al. 2014)

	Stress	**Self-disclosure**	**Accuracy**
Pre-test	Pre questionnaire	Participants described a photo, the researcher measured the number of words and time used	Participants described a photo, the researcher measured the number of details mentioned
Post-test	Post questionnaire	Participants described the photo about the fictive crime, the researcher measured the number of words and time used	Participants described the photo about the fictive crime, the researcher measured the number of details mentioned

Table 4.3: Overview measurements

4.5 Participants

Participants who were at the Saxion building during the time of the experiment were randomly asked to participate in the experiment. The researcher asked people who were studying or walking around in the building. For instance people in the central hall, those who studied in the library or students who worked in small groups. Asking participants because they happened to be nearby to the study during the period of performing the study relates to *convenience sampling*, according to Etikan, Musa and Alkassim (2016).

The experiment took place in Saxion Deventer, in which approximately 8,000 students study (Saxion, 2020). The experiment was performed from 7 June till 20 June. The first week was for most students the last week of following classes before the final exams. The researcher was well on schedule to reach the proposed 60 respondents, but the second week was considerably less busy and therefore more challenging to find participants. In total, 52 participants performed the entire experiment. Considering the non-busy time of the school year, in a period just before the exams and longer duration of the experiment than expected this amount is sufficient. Also, considering the minimum set of 40 participants which the researcher did exceed.

4.6 Methods of data analysis

Collected data is quantitative as data regarding stress levels, amount of words/ details and time is numerical data. This information was processed in SPSS via three methods.

1. *Paired samples t-test*

This method examined if the stress level, self-disclosure and accuracy of participants changed due to the variables within the experimental room. The method examines differences between the pre-test and the post-test.

- Person A: moment 1
- Person A: moment 2

2. *ANOVA*

The ANOVA makes it possible to analyse the differences between two groups. So were the differences between the groups analysed in terms of colour (blue and red) and seating comfort (comfortable chair and uncomfortable stool).

3. *MANOVA*

This method compares multiple groups on the dependent variables. In which the ANOVA examines one dependent variable, the MANOVA tests multiple dependent variables. In this way, the effects of independent variables combined on stress level, self-disclosure and accuracy were measured.

4. *Mediation analysis*

The third method shows the link between dependent variables which, based on the literature review, were expected within the experiment as self-disclosure and accuracy decreases when stress increases.

After applying these three methods, the researcher gained insights into stress levels, self-disclosure and accuracy of participants and if they were being affected by wall colour and seating comfort. Where the t-test compares individuals with themselves, the MANOVA compares the four different groups with each other to see if the different independent variables result in different effects. In addition to that, the ANOVA zooms in on differences between two groups instead of four. The mediation analysis showed if the stress levels of participants are connected to what extent they disclosed information and the accuracy of this information. These three methods combined, enabled the researcher to reject or accept the hypotheses. The results of these techniques are shown in the next chapter.

5 Results

In total, 52 people participated of whom most were students (*N* = 48). Others were employees (*N* = 2) or visitors (*N* = 2). One participant has been excluded due to leaving the experiment prematurely during the stress test while facing the red wall on the comfortable chair. The mean age of participants was 21.8 years and 61.5% were female.

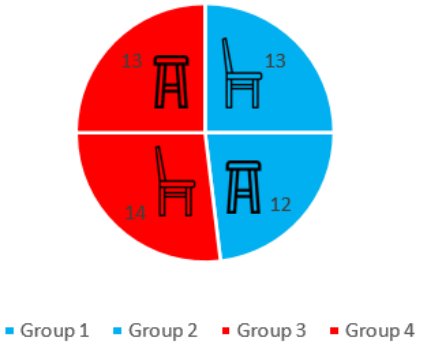


Figure 5.1: Participants distributed over the experimental groups

5.1 Manipulation check

Colour

An independent-samples t-test was performed to compare the effects of the colours. There was a significant difference found between the blue and red wall in pleasantness, exactingness, relaxing and fearfulness. The blue wall (*M* = 2.32, *SD* = 1.07) was assessed as significantly more pleasant than the red wall (*M* = 3.52, *SD* = 1.05; *t* (50) = 4.07, *p* <. 001, two-tailed). The magnitude of the differences in the means (mean difference = -1.20, 95% *CI*: -1.79 to -.61) was very large (eta squared = .249). Moreover, the red wall (*M* = 2.48, *SD* = .96) was significantly more exciting than the blue wall (*M* = 3.16, *SD* = .94; *t* (50) = 2.55, *p* <. 05, (two-tailed). The magnitude of the differences in the means (mean difference = .68, 95% *CI*: .14 to 1.21) was moderate (eta squared = .115). Red (*M* = 3.59, *SD* = 1.12) was also assessed significantly more distressing than blue (*M* = 2.32, SD = 1.03; *t* (50) = 4.26, *p* <. 001, two-tailed. The size of the differences in the means (mean difference = -1.27, 95% *CI*: -1.87 to -.67) was very large (eta squared = .266). The last significant difference was found regarding the safeness of the colours, as red wall (*M* = 3.37, *SD* = .93) were more fearful than the blue wall (*M* = 2.16, *SD* = .75; *t* (50) = 5.16, *p* <. 001, two-tailed). The magnitude of the differences in the means (mean difference = -1.21, 95% *CI*: -1.68 to -.74) was very large (eta squared = .347). There was no statistical difference found in interestingness or activeness between the blue and red wall .

Seating comfort

Only one of the four statements regarding the difference in comfort of the chair and the stool is significant. An independent samples-test showed a significant difference in how well the body is being supported by the chair (*M* = 4.74, *SD* = 2.03) and the stool (*M* = 2.60, *SD* = 1.32; *t* (50) = 4.47, *p* <. 001, two-tailed). The magnitude of the differences in the means (mean difference = 2.14, 95% *CI*: 1.18 to 3.10) was very large (eta squared = .285). Despite the differences in means, none of the three other statements was significantly different. The overview of means is shown in the graph below.

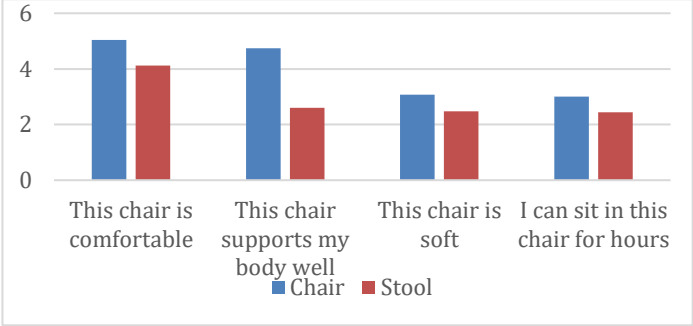


Figure 5.2: Results seating comfort

5.2 Experiment

The first three subchapters show the results of the dependent variables. Thereafter, a reporting section is shown.

5.2.1 Stress

It is crucial for the experiment that participants experienced stress. A paired-samples t-test showed that creating stress was successful as the four questions regarding stress were all significant. The T-statistic indicates the ratio of the mean of the difference to the standard error of the difference. See table 5.1 below for an overview.

N = 52

Before the stress-test			**After the stress test**			**T-statistic**
Statements	*M*	*SD*	*Statements*	*M*	*SD*	*t*
The upcoming tasks are very demanding.	2.60	.80	The tasks were very demanding	3.29	.98	-4,72
I am very uncertain about how I will perform during the upcoming tasks.	2.58	1..04	I am uncertain about how I performed.	3.13	.87	-3.95
The upcoming tasks will take a lot of effort to complete.	2.94	.87	I exerted a lot of effort during the tasks.	4.08	.65	-7.54
The upcoming tasks are very stressful.	2.37	.79	The tasks were very stressful.	3.21	.89	-6.51

Table 5.1: Results experienced stress by participants. All differences were significant with a value of P <. 001

First, a one-way between-groups multivariate analysis of variance was performed to investigate group differences in how well participants could cope with stress and how they perceived stress during the experiment. The independent variable was the experimental group. There were no statistically significant differences found. Thereafter, an independent-samples t-test was conducted between the most comfortable group (1) and the group (4) who faced the most stressful conditions. Again, no statistically significant differences were found. This means that the experiment did not provide evidence for supporting the hypotheses participants facing a blue wall (H1) and those who were sitting on a comfortable seating (H2) experience less stress than participants facing a red wall and sitting on an uncomfortable seat. As third, a paired-samples t-test was conducted to compare the increased stress before and after the stress-test per experimental group. The outcomes are illustrated in the tables below. The cells without T-statistic indicate that there is no significant difference found.

N = 13

Before the stress-test			**After the stress-test**			**T-statistic**
Statements	*M*	*SD*	*Statements*	*M*	*SD*	*t*
The upcoming tasks are very demanding.	2.38	.87	The tasks were very demanding	3.23	1.01	-2.69*
I am very uncertain about how I will perform during the upcoming tasks.	2.15	.90	I am uncertain about how I performed.	3.15	1.07	-3.12*
The upcoming tasks will take a lot of effort to complete.	2.69	1.11	I exerted a lot of effort during the tasks.	4.23	.599	-4.17**
The upcoming tasks are very stressful.	1.92	.86	The tasks were very stressful.	3.00	.91	-4.07*

*Table 5.2: Results perceived stress by participants of group 1. * indicates p <. 05, ** indicates p <. 01*

N = 12

Before the stress-test			**After the stress-test**			**T-statistic**
Statements	*M*	*SD*	*Statements*	*M*	*SD*	*t*
The upcoming tasks are very demanding.	2.42	.79	The tasks were very demanding	3.33	1.23	-3.53**
I am very uncertain about how I will perform during the upcoming tasks.	2.33	.96	I am uncertain about how I performed.	2.83	.94	-
The upcoming tasks will take a lot of effort to complete.	3.17	.72	I exerted a lot of effort during the tasks.	3.92	.79	-2.46*
The upcoming tasks are very stressful.	2.25	.75	The tasks were very stressful.	3.25	.87	-3.32**

*Table 5.3: Results perceived stress by participants of group 2. * indicates p <. 05 , ** indicates p <. 01*

N = 14

Before the stress-test			**After the stress-test**			**T-statistic**
Statements	*M*	*SD*	*Statements*	*M*	*SD*	*t*
The upcoming tasks are very demanding.	3.00	.76	The tasks were very demanding	3.47	.92	-
I am very uncertain about how I will perform during the upcoming tasks.	3.00	1.07	I am uncertain about how I performed.	3.33	.72	-
The upcoming tasks will take a lot of effort to complete.	3.13	.83	I exerted a lot of effort during the tasks.	4.13	.64	-4.18***
The upcoming tasks are very stressful.	2.87	.83	The tasks were very stressful.	3.6	.99	-2.75*

*Table 5.4: Results perceived stress by participants of group 3. * indicates p <. 05 , ** indicates p <. 01, *** indicates p <. 001*

N = 13

Before the stress-test			**After the stress-test**			**T-statistic**
Statements	*M*	*SD*	*Statements*	*M*	*SD*	*t*
The upcoming tasks are very demanding.	2.54	.66	The tasks were very demanding	3.15	.80	-
I am very uncertain about how I will perform during the upcoming tasks.	2.85	1.07	I am uncertain about how I performed.	3.23	.83	-
The upcoming tasks will take a lot of effort to complete.	2.77	.73	I exerted a lot of effort during the tasks.	4.00	.58	-4.79***
The upcoming tasks are very stressful.	2.46	.52	The tasks were very stressful.	2.23	.73	-

*Table 5.5: Results perceived stress by participants of group 3. * indicates p <. 05, ** indicates p <. 01, *** indicates p <. 001*

5.2.2 Self-disclosure

Time

The influence of wall colour and seating comfort on the used time in seconds was evaluated using a paired-samples t-test. For group 1, there was a statistically significant increase in used time from Time 1 (*M* = 34.15, *SD* = 17.50) to Time 2 (*M* = 42.92, *SD* = 19.61), *t* (12) = -2.22, *p* <. 05 (two-tailed). The mean increase in seconds was 8.77[8] with a confidence interval ranging from -17.37 to -.17. The eta squared statistic (.29) indicated a large effect size. For the other three groups, no statistically significant relations were found.

Words

A paired-samples t-test was used to assess the impact of wall colour and seating comfort on the number of words spoken. There was a statistically significant increase in spoken words within all the groups. More words were pronounced in group 1 from Time 1 (*M* = 56.31, *SD* = 35.22) to Time 2 (*M* = 79.15, *SD* = 47.79), *t* (12) = -2.94, *p* <. 05 (two-tailed). The mean increase in words was 22.5 with a 95% confidence interval ranging from -39.78 to -5.91. The eta squared statistic (.42) indicated a large effect size. More words were spoken in group 2 as well, from Time 1 (*M* = 77.25, *SD* = 49.84) to Time 2 (*M* = 115.41, *SD* = 60.15), *t* (11) = -2.41, *p* <. 05 (two-tailed). The mean increase in words was 38.17 with a 95% confidence interval ranging from -72.99 to -3.34. The eta squared statistic (.35) indicated a large effect size. Even a stronger significant effect was found in spoken words within group 3 from Time 1 (*M* = 62.10, *SD* = 29.76) to Time 2 (*M* = 835.14, *SD* = 40.59), *t* (13) = -3.49, *p* <. 01 (two-tailed). The mean increase in words was 23.07 with a 95% confidence interval ranging from -37.36 to -8.78. The eta squared statistic (.48) indicated a large effect size. Lastly, there also was a statistically significant increase in spoken words among participants from group 4 from Time 1 (*M* = 67.54, *SD* = 40.12) to Time 2 (*M* = 104.08, *SD* = 71.24), *t* (12) = 3.23, *p* <. 01 (two-tailed). The mean increase in words was 36.54 with a 95% confidence interval ranging from -61.16 to -11.92. The eta squared statistic (.47) indicated a large effect size. All experimental groups disclosed more information in the experimental setting but the results did not provide support for H3 and H4.

Before the stress-test	**Group 1**		**Group 2**		**Group 3**		**Group 4**	
Statements	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Time	34.15	17.51	43.50	25.77	40.47	15.10	49.69	28.51
Words	56.31	35.22	77.25	49.84	61.13	28.91	67.54	40.12
Details	6.31	1.70	7.58	3.09	7.73	2.28	7.08	2.53

Table 5.6: Results disclosure and accuracy of information before the stress-test

Before the stress-test	**Group 1**		**Group 2**		**Group 3**		**Group 4**	
Statements	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Time	42.92	19.61	55.58	31.35	47.00	14.28	53.54	30.77
Words	79.15	47.79	115.42	60.15	83.93	39.39	104.08	71.24
Details	5.92	1.71	7.92	2.84	8.20	2.81	7.31	1.75

Table 5.7: Results disclosure and accuracy of information after the stress-test

5.2.3 Accuracy of information

After conducting a paired-samples t-test, ANOVA and mediation analysis, no statistically significant difference was found in mentioning details of the suspects while facing a blue or red wall (H5), or sitting on a comfortable chair or non-comfortable stool (H6). An overview of the mentioned details, along with the taken time and spoken words, are displayed in the tables above.

[8] SPSS does not take seconds into account. After calculating this statistic outcome into seconds, this would be 8.46 seconds.

5.2.4 Reporting

An independent-samples t-test was conducted to examine if there are differences between the groups in the pre-test before they were influenced by the experimental conditions. Although there were no significant differences, group 1 used a lot less time in comparison to the other groups.

Thereafter, an independent-samples t-test was conducted to compare the interpretation of colour and seating comfort by participants. Subchapter 5.1 shows that blue was perceived as a more calm colour where red was interpreted as distressing and that there was a significant difference in comfort between the chair and stool.

An independent-samples t-test showed no significant differences in stress, self-disclosure and accuracy of information by comparing the groups who faced the blue wall (group 1 and group 2) and those who faced the red wall (group 3 and group 4). This non-significant difference is also applicable between the groups sitting on the comfortable chair (group 1 and group 3) and the uncomfortable stool (group 2 and group 4). On top of that, a two-way between-groups analysis of variance was conducted to explore the impact of the experimental conditions combined. By comparing the most comfortable group (group 1: blue wall and comfortable chair) with the less comfortable group (group 4: red wall and uncomfortable stool), theoretically, the biggest difference was examined. However, no statistically significant effect was found. The comparison of other groups neither showed any significant effects.

Lastly, the influence of general data as gender and age were examined. The only significant difference was found after conducting an independent-samples t-test by comparing the number of details disclosed during describing the second suspect. There was a significant difference in provided details for males (M = 6.42, SD = 1.89) and females (M = 7.97, SD = 2.62; t (49) = -2.25, p <. 05, two-tailed). The magnitude of differences in the means (mean difference = -1.55, 95% CI: -2.93 to -.16) was large (eta squared = .093).

6 Discussion

This chapter consists of two parts. First, the results of the experiment are discussed and compared with information from the literature review and the results of the manipulation check. The second part refers to the reliability, validity and limitations of the execution of the experiment and its results.

6.1 Discussion of results

Manipulation

Table 6.1 shows a comparison of the manipulation check from the literature review Liu et al. (2014)(*N* = 42) and those conducted by the researcher of this thesis between participants that assessed the colour only (*N* = 61) and the participants that judged them during the experiment (*N* = 52). The outcomes between the Netherlands and China differ slightly but are, in general, comparable. This was expected as multiple papers explained the differences between colour interpretations between different cultures (Adams & Osgood, 1973; Gao et al., 2007). The outcomes of the manipulation check and experiment are highly comparable and are strong proof for the interpretations of Dutch people regarding blue and red.

	N = 42	*N = 61*	*N = 52*	*N = 42*	*N = 61*	*N = 52*
Means	**Blue**	**Blue**	**Blue**	**Red**	**Red**	**Red**
Pleasant – unpleasant	2.8	2.20	2.32	2.5	3.02	3.52
Exciting – boring	3.0	*3.36*	3.16	2.0	2.21	2.48
Relaxing – distressing	2.9	2.36	2.32	4.1	3.56	3.59
Safe – fearful	2.4	1.97	2.16	4.2	3.18	3.37
Interesting – uninteresting	2.3	2.80	3.08	2.6	2.51	2.67
Active – inactive	3.0	2.87	2.80	3.0	2.13	2.33

Table 6.1: Results manipulation checks of the pilot and the experiment

The outcomes of the experiment regarding seating comfort differ more than expected from the manipulation check. During the manipulation check, there was a significantly strong effect that the chair was more comfortable, offered better support and offered better sitting for several hours. The chair was also rated softer, with a less strong but still significant difference from the stool. However, participants from the experiment only rated the supporting function of the chair significantly higher than the stool. This is remarkable as the same questionnaire was used by Pijls-Hoekstra et al. (2019) and the manipulation check of this thesis. Evaluating the experiment, the researcher overlooked one bias.

The researcher avoided the *information bias* by not telling participants, during the manipulation check and experiment, about the existence of the other type of seat. Information bias occurs when people might misclassify information when information is limited (Delgado-Rodriguez & Llorca, 2004). When people would know about the other seat then they would rate their experience by comparing it with the other seat. However, all participants in the neutral room were sitting on a seat from Saxion itself. The researcher did not test this chair but expects that if it was tested it was significantly more comfortable than the chair used in the experiment. This means that participants that were sitting on a comfortable chair might have been comparing that chair with the chair in the neutral room and therefore felt less comfortable than intended by the experimental design. Although the chair was rated as slightly more comfortable than the stool, the results could have been more favourable if this bias was prevented.

Stress
The experimental design was successful in creating stress among participants as all experimental groups perceived stress. In the first perspective, participants were likely influenced in their answering by the stress test as increased stress leads to higher levels of cortisol. Extra cortisol caused by acute stress takes approximately one hour before it is reduced to its normal level (Van Eck, Berkhof, Nicolson & Sulon, 1996). The questionnaire did not show differences in perceived stress, but it could be that there were differences in stress between the group. For instance, Myrtek, Weber, Brügner and Müller (1996) measured stress among students by measuring psychologically and physiologically. The statements of the survey related to stress showed no significant differences between the stress and non-stressed groups. However, there was a significant difference found by measuring heart rate. Moreover, the difference in the comfort of the seats was smaller than expected which was not favourable in creating a comfortable group (1) and a uncomfortable setting (group 4). This is explained further in chapter 6.2.

Self-disclosure
RiosVelasco (2010) concluded that colour influences mood but not performance. She manipulated an office with nine different colours in which mood and performances were influenced but these aspects were not related to each other. This indicates that participants in the experiment were influenced by the experimental conditions, but it did not affect their performance in disclosing information or providing accurate details.

One significant result was found regarding the answering time of respondents in group 1. However, looking at the pre-test which was conducted in the neutral room, group 1 had by far the lowest answer time (42.92) in comparison to the other groups (55.58; 47.00; 53.54). This could be the reason why only the time of this group was significantly different. Moreover, the finding of RiosVelasco (2010) applies to this variable as well as stress was induced, but their performances were not influenced by the colour. The difference in seating comfort was that low that it did not lead to differences in self-disclosure as well. This aligns with the study of Hoogesteyn et al. (2019) who rejected their hypotheses regarding disclosure as well with the room size and sitting distances as manipulations.

Accuracy of information
Dawson et al. (2017) showed that participants in an open setting disclosed more details. However, the experiment of this thesis did not find an effect in disclosing details while being influenced by wall colour and seating comfort. Again, this matches the results of the study of Hoogesteyn et al. (2019) who neither found an effect. One explanation could be that due to the pre-test, participants knew or expected to describe the second suspect as well. Therefore, it is likely that even during the pre-test participants were focussing on remembering the second suspect which made them less influenceable by the experimental conditions.

6.2 Reliability, validity and limitations

6.2.1 Reliability

Reliability applies to what extent the experiment would result in the same results when the experiment would be conducted again within the same conditions (Saunders et al., 2019). The researcher aimed to ensure the reliability of the experiment as high as possible in several ways.

Observer effect

The observer effect refers to the effect on the behaviour of people when they are being observed (Saunders et al., 2019). The researcher reduced this threat by minimal interaction during the experiment. The instructions that were given were provided by the tablet or spoken by the researcher who used standardised sentences during all steps of the experiment. The standardised sentences were kept on a clipboard to avoid deviant sentences. During the pre-test, the researcher made no eye contact, sat in the exact same position and gave no signals during describing the first suspect. Think of nodding or any facial expressions that could stimulate the participants to continue or stop talking. In the experimental setting, this threat was lower as the researcher sat out of sight. It occurred several times that participants asked questions, which the researcher answered by repeating part of the standardised sentences or answering yes or no only. Moreover, this threat also carries the risk of *habituation* which refers to getting used to the variables (Saunders et al., 2019). This was prevented by providing the most instructions in the neutral room. When participants entered the experimental room, the stress test started immediately to prevent that participants would speculate about the experimental conditions and their expected way of behaving.

Size of the group of participants

The experiment counts 52 participants which is sufficient in perspective of the quiet school period in which the experiment was conducted and the financial limitations which prohibited the researcher to offer compensation. However, comparable experiments (table 4.1) had a considerably higher number of participants (N = 112; 151; 127; 139). The collected data is highly reliable as participants were randomly assigned to the experimental groups in which the gender ratio was taken into account by having two separate boxes while assigning participants. The only pitfall is the size of the group, as a larger group participants could have shown effects that are not visible due to the small magnitude.

Measuring instruments

The questionnaire regarding stress is very reliable. It has been used by more than ten studies and designed to measure stress and cope with stress with additional questions so participants would not remember their first answers (Mendes et al., 2007). During the experiment, these questions were also randomised to lower the chance of remembering and comparing previous answers. This worked well as all groups experienced stress according to this measurement. Moreover, measuring time and words is fully reliable as well. The researchers transcribed all audio and could see the spoken time via the audio as well. He did this at the end of the experiment, without knowing in which group the participants participated. This is also applicable for the details. However, other experiments like Dawson et al. (2017) and Hoogesteyn et al. (2019) outsourced this to experts while in this experiment the researcher did it himself. Since he did not know which group the participant was in, he was fully objective. On the other hand, an expert might have executed this measurement with more accuracy.

6.2.2 Internal validity

The validity refers to the accuracy of the collected data and the accuracy of the results of the study, which can be divided into internal validity and external validity. Test validity was added as that is highly applicable within experiments.

First internal validity, which applies to what extent the results from the research enables the researcher to draw conclusions (Verhoeven, 2014). The experiment tackles all the seven threats regarding internal validity (Campbell, 1957; Flannelly et al., 2018).

History refers to experiences caused by external events. Participants were not exposed to any distractions as all the windows were taped. Moreover, the experiment endured a maximum of twenty minutes in which during that time no external events influenced the participants. The second threat refers to bodily changes and is called *maturation*, which means that your body acts or feels different during different times on a day. A famous example is an experiment by Danziger, Levav and Avnaim-Pesso (2011) which showed that judges were less favourable in sentencing before a food break in comparison to after a food break. This experiment avoided that threat as participants were assigned randomly. So if this occurred during the experiment, this would apply to all groups. Instrumental decay did not happen during the experiment so *instrumentation* is not applicable. *Regression toward the mean* applies when individuals score extremely high or low which makes the next time of measuring more likely to be closer to the average. This threat is reduced by the pre-test, although it could not be completely avoided. For instance, group 1 had a much lower answering time in the pre-test while the second test was more regressed to the mean which resulted in a significant effect.

The threat of *selection* did not occur as most participants were students which were not deviating much from the mean age. Moreover, genders were almost equally divided over the experimental groups. The drop-out rate, *mortality*, was only applicable for one participant who voluntarily left the experiment during the stress test. This shows that, despite the adjustments, the stress test was successful in generating stress among participants. Lastly, the threat of *testing* could not be fully reduced. Testing refers to participants who know they are being measured which influences their performances. This probably did not apply to the stress measurement as the survey is designed with the purpose to tackle this threat. On the other hand, participants probably were expecting to describe the second suspect which made them aware to remember the details during the stress test. One participant even confessed after the experiment to have drawn the suspect during the preparation of the pitch to remember him instead of preparing the pitch.

Single-blind study

On top of the seven threats to the internal validity, the characteristic of the experiment relates to a single-blind study. In a single-blind study, only the researcher knows to which group participants are assigned while the participants themselves do not know, which is the case for this experiment. In a double-blind study, the external validity would be even higher as the researcher would not know to which group participants were assigned but that was not possible in this experiment. However, the researcher increased the validity by analysing the data after the experiment without knowing to what group participants were assigned.

If participants knew to what groups they were being assigned to, it would harm the results. In this experiment, it could be that participants would take more time and disclose more information if they knew the purpose of the experiment. The researcher prevented this in several ways. First, only small groups of people were asked to participate and were asked at the end of the experiment not to share any information. Moreover, they did not see the other paintings and seating which prevented them from knowing that the conditions changed per participant. However, the wall colour as an experimental condition was obvious according to participants but they did know what the purpose of that colour was. Some participants were even surprised when the end of the survey asked statements about the chair or stool.

Not only participants could influence the results, but the researcher could also express influence as he knew to which experimental groups the participants were assigned and what the demanded results of the measures were. The researcher tried to prevent this as much as possible by not deviating from the standardised sentences and not expressing any facial expressions in which the expressions are highly applicable for the neutral room. During the experiment, participants did not face the researcher which reduces that risk.

6.2.3 External validity

External validity applies to the relevancy of the sample (Verhoeven, 2014). The results are representative as participants were randomly assigned, most of them were students with comparable age, comparable educational level and gender was divided. The results of the experiment can be assumed as applicable for all people in the world who have a similar profile. The only sidenote to take into account is that people in other regions of the world might have a different perception of colour.

Ecological validity

To what extent the results can be generalised for, in this case, real police interrogations is what ecological validity refers to (Saunders et al., 2019). Participants of the experiment took the role of witnesses in a fiction crime. These participants experienced stress, according to the results, which can be generalised to a certain extent for witnesses during police interrogations. For suspects, this could be different as they may experience a different kind of stress (life-changing events) in comparison to the acute and temporary stress of the participants in the experiment. On the other hand, stress is universal so in that perspective, the results are applicable for all kinds of stress during police interrogations (and other fields as well). Also, participants during the experiment tried to provide as many details as possible about the suspects. During real police interrogations, this might differ as participants had no interest in the case which is likely to be different among witnesses and, especially, suspects.

Relevance of the sample

Moreover, other characteristics of the sample relate to the external validity as well. Participants were relatively young (mean age = 21.8) which proves to be relevant to the sample as people worldwide from the age of 18 to 22 commit more crimes in comparison to any other age group (Hirschi en Laub, 2002). On the other hand, participants were all well-educated while there is a strong relation between educational level and criminality. Higher educated people have better chances at the labour market and a therefore a better chance of earning capital (Blom, Oudhof, Bijl & Bakker, 2005; Bovenkerk & Fokkema, 2015). Also, differences in culture should be taken into account. The perceptions of the participants regarding, especially, colour can differ significantly with participants from other cultures.

6.2.4 Test validity

Test validity refers to what extent the test measured which had to be measured (Wainer & Braun, 2013). The chosen variables during the test are based on existing literature. So are the colours based on literature and specified via a manipulation check to test the expected outcomes. Moreover, the seats are based on a previous study and tested via a manipulation check of which the results matched. The dependent variables stress, self-disclosure and accuracy of information are based on previous experiments in combination with theory regarding police interrogations. Therefore, the *criterion validity*, which refers to the chosen criteria and what the expected outcomes are based on, is very high.

The colour effect was measured via a validated survey, which has been used by another study to understand the effects of certain colours. The questions for measuring seating comfort were copied from the study that used the same chair and stool. This ensures a high *construct validity*, which refers to the measurements and to what extent the measurements were successful in demanded data (Verhoeven, 2014). Also, *content validity* applies which refers to what extent the measures took all required information into account. The copied questions ensure that this validity is high as well as the questions were designed to measure the colour effects, colour levels and seating comfort. Because the researcher did not adjust these questions, the *face validity* is high which applies to the subjectivity of measurements.

Focussing on the dependent variables, stress can be measured physiologically via measuring changes in heart rate, blood pressure and cortisol levels. This was not possible for this thesis so

measuring stress was performed via an acknowledged survey that has been created to measure stress. Measuring time and words could directly be performed and the details could be measured by comparing them with acknowledged details from literature. The *construct validity* would be higher if the stress was measured physiologically and the time, word and details counting was performed by an external expert. *Content validity* showed to be relatively high as the stress questionnaire took coping with stress into account. The measurements of time, words and details were counted directly which increased the *content validity*. Also, a validated scale of details was used to count the details. However, the researcher counted these details by himself which goes at the expense of the *face validity* as determining details could be performed subjectively.

6.2.5 Limitations

Several limitations must be taken into account regarding the results of this study. The limitations describe the problems which the researcher could not solve, avoid or became aware of during or after the experiment (Verhoeven, 2014).

Firstly, the experimental design carries the same limitations as the experiment of Hoogesteyn et al. (2019) as this experiment was conducted in a university which is an environment in which students are familiar. This might have limited the ecological validity as the feeling of a police interrogation was not fully mimicked, which means that the results are not fully representable. Think of the dimensions of Knapp et al. (2013) in chapter 2.4.2. in which the dimension familiarity refers to people being cautious in a less familiar environment which is highly applicable for police interrogations. This dimension differed a lot for participants in the experiment. This could have been avoided as the police academy offered a place to perform the experiment in their building. However, due to the feasibility of recruiting participants and the unsuitability of the experimental rooms the experiment was conducted at the university.

Secondly, the representativity of the participants has its limitations. In comparison to comparable studies, as explained within the reliability section, the sample size is considerably smaller. Moreover, most participants were students and were high-educated. It is questionable if the results are representative for other age groups and other educational levels. This could not be prevented during the experiment but should be taken into account when interpreting the results.

Thirdly, some practical limitations occurred during executing the experiment. Although the researcher asked not to display any details of the experiment to other participants, it could not be checked if participants did not share experiences of the experiment. If this is the case, it would limit the external validity. However, this could not be prevented. Another limitation within this respect refers to wearing watches during the experiment. The stress test was challenging because, among other elements, participants did not have any perception of time during the two-minute tasks. However, the researcher did not ask participants, if applicable, to take off watches. On the other hand, the researcher could see the participants and did not observe any participant checking the time. This could have been avoided easily by asking to take watches off.

Fourthly, this experiment aimed at manipulating colour and seating comfort. Despite the successful manipulation check, the difference in seating comfort was not significant like the manipulation check was. This could have influenced the results as participants in the comfortable setting also perceived the chair as uncomfortable. The researcher estimates this is caused by the seating in the neutral room, which was probably more comfortable than the manipulation comfortable chair. For future research within this experimental condition, this could be prevented by using a chair in the neutral room that is less comfortable than the experimental comfortable chair but more comfortable than the unconformable stool used in the experiment. This can be tested via a manipulation check.

Lastly, stress is only measured on a psychological scale, not physiologically. Participants of all groups pointed out to have experienced stress. However, measuring physiologically could differ from the psychological measurement like the study of Myrtek et al. (1996) indicated. Perhaps via a heart monitor, the results would have been different. However, this experiment did not choose to measure physiologically due to ethical challenges.

7 Conclusion

This study attempts to contribute to increasing the effectiveness of police interrogations by focussing on the physical environment of the police interrogation room. An experiment was performed to examine if wall colour (blue and red) and seating comfort (comfortable chair and uncomfortable stool) influence stress levels, self-disclosure and accuracy of information of people in a police interrogation. Participants took the role of a witness while being manipulated. Six hypotheses were formulated:

H1 Participants facing a blue wall experience less stress than participants who are facing a red wall.

H2 Participants who experience comfortable seating experience less stress than participants who are experiencing seating that is not comfortable.

H3 Participants facing a blue wall indirectly disclose more information in comparison to participants who are facing a red wall.

H4 Participants who experience comfortable seating indirectly disclose more information in comparison to participants who experience seating that is not comfortable.

H5 Participants who experience comfortable seating indirectly disclose more details in comparison to participants who experience seating that is not comfortable.

H6 Participants facing a blue wall indirectly disclose more details in comparison to participants who are facing a red wall.

A manipulation check has examined the experimental conditions by testing the intensity, brightness and effects of blue and red. After several adjustments, both colours were perceived by respondents without any differences in intensity and brightness which means that results are fully depending on the tint of the colours. The effects of the colours were matching the information from the literature review as blue was perceived as calm while red was assessed as distressing. The manipulation check provided evidence that the chair used in the experiment was significantly more comfortable than the uncomfortable stool.

Participants (N = 52) conducted a test in a neutral room in which their memory was tested and their stress levels were measured. They had to remember a suspect which they would describe at the end of the experiment. In the experimental room, participants were facing a blue or red wall and were sitting on a comfortable chair or uncomfortable stool. They performed a stress test in these conditions. In the end, the same test was done by describing the suspect and measuring their stress levels.

The results show that the experiment has successfully created stress as participants from all experimental groups felt more stress at the end of the experiment in comparison to when they were in the neutral room. However, no links were found between wall colour and seating comfort, and the perceived levels of stress. Therefore, this study rejects H1 and H2.

According to literature, lower levels of stress lead to increased disclosure and higher accuracy in details. Similar to the stress levels, the results did not lead to evidence to support that wall colour and/ or seating comfort influence the disclosure of information (H3 and H4). Participants within all experimental groups used more words in their witness statements. However, there was only a link found between participants from the most comfortable setting and an increase in used time to describe the suspect. Concerning displaying details of the suspects and the experiment manipulation, no proof was found to accept hypothesis 5 or 6.

In conclusion, no factors could be identified which influence stress, self-disclosure and accuracy of information during police interrogations. On the other hand, the experimental design proved to be successful as stress was created in a brief period among participants. Also, small evidence in using more time by participants in the comfortable setting might suggest the experimental conditions did have a small effect. Therefore this study contributes to increasing the effectiveness of police interrogation in respect of the physical environment of the room.

8 Recommendations

The recommendations focus mainly on the police force as the experiment was performed within the police interrogation context and because the Dutch Police Academy forms the motivation for this study. Although in another context, the results of this study are also valuable for organisations within the facility and real estate sector. In the second part, recommendations are provided for future research. Side constraint to take into account while reading chapter 8.1 of the recommendations is that the results are based on the Dutch population. Especially regarding colour, this could differ for police stations or organisations in other cultures as colour perceptions can differ between cultures.

8.1 Recommendations for the field

Wall colour and seating comfort showed not to influence the process of a police interrogation. Participants within the experiment did not perceive higher levels of stress facing a red wall in comparison to those facing a blue wall. This is also applicable for seating comfort. Therefore, this paper does not recommend the police force in adjusting wall colour or seating comfort to increase the effectiveness of the interrogations.

On the other hand, adjusting wall colour can be favourable in creating a certain mood. RiosVelasco (2010) states that colour affects mood but not performance. Results from this thesis provide insights into the opinions of the general public regarding blue and red. This could be relevant for the police force to create a more calm and relaxed feeling. This could be in the interrogation rooms themselves, but also within the hallways or cells which influence the mood of suspects and witnesses before entering the interrogation room.

Attention rises regarding the choice of colours within organisations in the field of facility and real estate to influence performance. For instance, a blog of The Muse (Moon, n.d.), describes the influence of colour on mood and its impact on productivity. However, according to the study of RiosVelasco (2010) and the experiment in this thesis, these elements are not connected. Colour indeed might influence productivity but is not connected to mood. Therefore, facility and real estate professionals should be aware that these impacts might be smaller than expected. This is favourable for office designs that use colour to indicate functions. For instance, blue workstations that indicate concentration work and red colours that indicate collaboration. Knowing that these colours indicate the proposed functions and can influence the required mood, it is positive to know these colours do not affect the outcomes. Colour can set a certain mood in the organisation while not affecting the performance of people.

This paper recommends the procurement department of the police force to be aware that their selection process regarding seating does not have to be adjusted as seating comfort has no effect on the interrogation process. The experiment did not provide evidence that participants on the comfortable chair experienced less stress than those on the uncomfortable stool. However, it is recommended to use a chair with a backrest as Krahé et al. (2018) advocates that a forward position creates a feeling of frustration. The manipulation check of this study showed that people sitting on a chair without a backrest sit at an angle of fewer than 90 degrees, while participants who sat on a chair with a backrest sit at an angle of higher than 90 degrees. Therefore, the procurement departments of the police have more freedom knowing that these elements do not influence the process. This is also applicable for other organisations. Especially within offices, lots of attention is spent on changing workplaces. Collaboration spaces are created and sometimes the traditional office chair makes place for stools. Despite its advantages, organisations should be aware that sitting in a frontward position can create a frustrating feeling which might be obstructive during long-lasting discussions.

8.2 Future research

The experimental design worked well due to the high standardisation, especially while taking into account the low financial resources. Several recommendations for future research are provided by focussing on points of improvement of the experiment and new insights obtained by the researcher.

The manipulation check regarding colour showed to be very accurate and can function as fundamental for experiments that aim to study stress by influencing blue and red. This is highly applicable for the Dutch population as the results of the check are within the same vein as the results of the experiment. This is useful information as Adams and Osgood (1973) and Gao et al. (2007) state that there are differences between cultures regarding colour interpretations. If a comparable experiment will be conducted that uses these colours in another culture, it is recommended to conduct a manipulation check. It is also possible to perform this manipulation check with other colours as literature indicates that other than blue and red, green can also be seen as a calm colour and orange as intense.

Moreover, the manipulation check regarding seating is useful as the results from the check are comparable with the results from Pijls-Hoekstra et al. (2019). However, two recommendations advised. First, it is advised to use another chair as a comfortable chair as the chair was assessed moderately comfortable. A more comfortable chair might increase the chance of finding an effect. The uncomfortable stool suits the experiment well as it was assessed as very uncomfortable in the study of Pijls-Hoekstra et al. (2019) and by participants from the manipulation check and experiment of this study. Second, participants of the experiment experienced the comfortable chair much less comfortable as the manipulation check showed. For future research, it is suggested to focus on the seating in the neutral room and make sure that participants in the experimental room sit on a more comfortable chair than the one in the neutral room. Perhaps it would be convenient to use the comfortable chair of this experiment in the neutral room as it was assessed moderately comfortable. A manipulation check could assess a new seat to find a chair that is perceived as very comfortable.

Also, within the first two minutes of the stress test participants received pen and paper to make notes for their pitch. Although not measured, it is likely that it had an effect on the sitting position and stimulates participants on the seat with backrest to sit forward which has a negative influence in comparison to sitting backwards. It is recommended to remove the table and provide participants with a clipboard that can be used to make notes.

Moreover, it is recommended to perform a comparable experiment with a larger sample to increase the chance of finding an effect. Results from this experiment showed some differences between the experimental groups in the pre-test. The larger the sample size, the lower these differences are expected to be. The experimental design can also be adjusted by increasing stress to increase the chance of finding a relation between the independent and dependent variables. The time during the stress test could be increased and a video recorder can be added.

It is also recommended to experiment with other independent variables. Matching this experimental design it is recommended to focus on elements that reduce stress such as nature (Karlin & Zeiss, 2006) and light (Dijkstra et al., 2006). Also, additional elements of seating like armrests can be examined. For instance, Inbau et al. (2013) explain that dropping arms to the side leads to a less defensive position. On top of that, Veen, Hiemstra-van Mastrigt, Kamp and Vink (2014) examined comfort in cars by using armrests as a variable. Despite the difference in context, their findings are relevant as results showed a significant effect on comfort concerning the presence of armrests. Therefore it is recommended to examine different types of independent variables.

Not only other independent variables could be examined in future research, but also the dependent variables. The used colour combination of blue and red in this study can be used to examine other variables like concentration, learning and mood other than stress only.

References

Adams, F. M., & Osgood, C. E. (1973). A cross-cultural study of the affective meanings of color. *Journal of cross-cultural psychology*, *4*(2), 135-156. doi:10.1177/002202217300400201

Agoston, G. A. (2013). *Color theory and its application in art and design*. New York, United States: Springer.

AL-Ayash, A., Kane, R. T., Smith, D., & Green-Armytage, P. (2016). The influence of color on student emotion, heart rate, and performance in learning environments. *Color Research & Application*, *41*(2), 196-205. doi:10.1002/col.21949

Altman, I., & Taylor, D. A. (1973). *Social penetration: The development of interpersonal relationships*. Holt: Rinehart & Winston.

Arck, P., & Paus, R. (2006). From the brain-skin connection: the neuroendocrine-immune misalliance of stress and itch. *Neuroimmunomodulation*, *13*(5-6), 347-356. doi:10.1159/000104863

Blom, M., Oudhof, J., Bijl, R. V., & Bakker, B. F. M. (2005). *Verdacht van criminaliteit. Allochtonen en autochtonen nader bekeken.* The Hague, the Netherlands: WODC en CBS

Bovenkerk, F., & Fokkema, T. (2015). Criminaliteit onder Marokkaanse jongemannen in Nederland: speelt regionale herkomst een rol? *Tijdschrift voor Criminologie*, 57(1), 59–83. doi:10.5553/TvC/0165182X2015057001003

Campbell, D. T. (1957). Factors relevant to the validity of experiments in social settings. *Psychological Bulletin, 54*(4), 297–312. doi:10.1037/h0040950

Carroll, D., Smith, G. D., Shipley, M. J., Steptoe, A., Brunner, E. J., & Marmot, M. G. (2001). Blood pressure reactions to acute psychological stress and future blood pressure status: a 10-year follow-up of men in the Whitehall II study. *Psychosomatic medicine*, *63*(5), 737-743. doi:10.1097/00006842-200109000-00006

Cohen, S., Kessler, R. C., & Gordon, L. U. (1997). *Measuring stress: A guide for health and social scientists*. Oxford, United Kingdom: Oxford University Press.

Collins, N. L., & Miller, L. C. (1994). Self-disclosure and liking: a meta-analytic review. *Psychological bulletin*, *116*(3), 457. doi:10.1037/0033-2909.116.3.457

Danziger, S., Levav, J., & Avnaim-Pesso, L. (2011). Extraneous factors in judicial decisions. *Proceedings of the National Academy of Sciences*, *108*(17), 6889-6892. doi:10.1073/pnas.1018033108

Davis, D., Soref, A., Villalobos, J. G., & Mikulincer, M. (2016). Priming states of mind can affect disclosure of threatening self-information: Effects of self-affirmation, mortality salience, and attachment orientations. *Law and human behavior*, *40*(4), 351-361. doi:10.1037/lhb0000184

Dawson, E., Hartwig, M., & Brimbal, L. (2015). Interviewing to elicit information: Using priming to promote disclosure. *Law and human behavior*, *39*(5), 443-450. doi:10.1037/lhb0000136

Dawson, E., Hartwig, M., Brimbal, L., & Denisenkov, P. (2017). A room with a view: Setting influences information disclosure in investigative interviews. *Law and human behavior*, *41*(4), 333. doi:10.1037/lhb0000244

Dekker, M., & Feigenson, N. R. (2020). Visual Presentations in Dutch Police Interrogations: An Analysis and Lessons for the United States. *Arizona Journal of International & Comparative Law, 37*(2), 169-216. Retrieved from HeinOnline.

Delgado-Rodriguez, M., & Llorca, J. (2004). Bias. *Journal of Epidemiology & Community Health*, *58*(8), 635-641. doi:10.1136/jech.2003.008466

Dijkstra, K., Pieterse, M., & Pruyn, A. (2006). Physical environmental stimuli that turn healthcare facilities into healing environments through psychologically mediated effects: systematic review. *Journal of advanced nursing*, *56*(2), 166-181. doi:10.1111/j.1365-2648.2006.03990.x

Dijkstra, K., Pieterse, M. E., & Pruyn, A. T. H. (2008). Individual differences in reactions towards color in simulated healthcare environments: The role of stimulus screening ability. *Journal of environmental Psychology*, *28*(3), 268-277. doi:10.1016/j.jenvp.2008.02.007

Dohrenwend, B. S., Askenasy, A. R., Krasnoff, L., & Dohrenwend, B. P. (1978). Exemplification of a method for scaling life events: The PERI Life Events Scale. *Journal of health and social behavior*, *19*(2), 205-229.

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American journal of theoretical and applied statistics*, *5*(1), 1-4. doi:10.11648/j.ajtas.20160501.11
Flannelly, K. J., Flannelly, L. T., & Jankowski, K. R. (2018). Threats to the internal validity of experimental and quasi-experimental research in healthcare. *Journal of health care chaplaincy*, *24*(3), 107-130. doi:10.1080/08854726.2017.1421019
Folkman, S., Lazarus, R. S., Pimley, S., & Novacek, J. (1987). Age differences in stress and coping processes. *Psychology and aging*, *2*(2), 171-184. doi:10.1037/0882-7974.2.2.171
Forgas, J. P. (2011). Affective influences on self-disclosure: Mood effects on the intimacy and reciprocity of disclosing personal information. *Journal of personality and social psychology*, *100*(3), 449. doi:10.1037/a0021129
Gao, X. P., Xin, J. H., Sato, T., Hansuebsai, A., Scalzo, M., Kajiwara, K., ... & Billger, M. (2007). Analysis of cross-cultural color emotion. *Color Research & Application, 32*(3), 223-229. doi:10.1002/col.20321
Gazzaniga, M., Ivry, R. B., & Mangun, G. R. (2013). *Cognitive Neuroscience: The Biology of the Mind (Fourth Edition)*. New York, United States: W. W. Norton.
Gudjonsson, G. H. (2003). *The psychology of interrogations and confessions: A handbook*. Chichester, United Kingdom: John Wiley & Sons.
Hakim, C. (2000). *Research design: Successful designs for social and economic research*. London, United Kingdom: Taylor & Francis
Hanyu, K. (2000). Visual properties and affective appraisals in residential areas in daylight. *Journal of Environmental Psychology*, *20*(3), 273-284. doi:10.1006/jevp.1999.0163
Hirschi, T., & Laub, J.H. (2002). *The Craft of Criminology: selected papers*. Boca Raton, United States: Routledge. doi:10.4324/9781315131511
Hoewe, J. (2017). Manipulation check. In: J. Matthes, R. Potter & C. S. Davis (Eds). The international encyclopedia of communication research methods. Oxford: Wiley-Blackwell.
Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of psychosomatic research*, *11*(2), 213-218. doi:10.1016/0022-3999(67)90010-4
Hoogesteyn, K., Meijer, E., & Vrij, A. (2019). The influence of room spaciousness on investigative interviews. *Legal and Criminological Psychology*, *24*(2), 215-228. doi:10.1111/lcrp.12156
Hughes, B. M. (2005). Study, examinations, and stress: Blood pressure assessments in college students. *Educational Review*, *57*(1), 21-36. doi:10.1080/0013191042000274169
Inbau, F. E., Reid, J. E., Buckley, J. P., & Jayne, B. C. (2013). *Essentials of the Reid technique: Criminal interrogation and confessions*. Burlington, United States: Jones & Bartlett Publishers.
Jacobson, E. (1938). Progressive muscle relaxation. *Journal of Abnormal Psychology*, *75*(1), 18-19.
Joinson, A. N. (2001). Knowing me, knowing you: Reciprocal self-disclosure in Internet-based surveys. *CyberPsychology & Behavior*, *4*(5), 587-591. doi:10.1089/109493101753235179
Kassin, S. M., & Kiechel, K. L. (1996). The social psychology of false confessions: Compliance, internalization, and confabulation. *Psychological science*, *7*(3), 125-128. doi:10.1111/j.1467-9280.1996.tb00344.x
Karlin, B. E., & Zeiss, R. A. (2006). Best practices: environmental and therapeutic issues in psychiatric hospital design: toward best practices. *Psychiatric Services*, *57*(10), 1376-1378. doi:10.1176/ps.2006.57.10.1376
Kassin, S. M., & Fong, C. T. (1999). "I'm innocent!": Effects of training on judgments of truth and deception in the interrogation room. *Law and Human Behavior*, *23*(5), 499-516. doi:10.1023/A:1022330011811
Kelly, C. E., Dawson, E., & Hartwig, M. (2019). Context manipulation in police interviews: a field experiment. *Journal of Experimental Criminology*, 1-20. doi:10.1007/s11292-019-09389-8
Kirschbaum, C., Pirke, K. M., & Hellhammer, D. H. (1993). The 'Trier Social Stress Test'–a tool for investigating psychobiological stress responses in a laboratory setting. *Neuropsychobiology*, *28*(1-2), 76-81. doi:10.1159/000119004
Klare, B. F., Klum, S., Klontz, J. C., Taborsky, E., Akgul, T., & Jain, A. K. (2014). Suspect identification

based on descriptive facial attributes. *IEEE International Joint Conference on Biometrics,* 1-8. doi:10.1109/BTAS.2014.6996255

Klaver, J. R., Lee, Z., & Rose, V. G. (2008). Effects of personality, interrogation techniques and plausibility in an experimental false confession paradigm. *Legal and Criminological Psychology*, *13*(1), 71-88. doi:10.1348/135532507X193051

Knapp, M. L., Hall, J. A., & Horgan, T. G. (2013). *Nonverbal communication in human interaction*. Cengage Learning.

Krahé, B., Lutz, J., & Sylla, I. (2018). Lean back and relax: Reclined seating position buffers the effect of frustration on anger and aggression. *European Journal of Social Psychology*, *48*(5), 718-723. doi:10.1002/ejsp.2363

Kwallek, N., Woodson, H., Lewis, C. M., & Sales, C. (1997). Impact of three interior color schemes on worker mood and performance relative to individual environmental sensitivity. *Color Research and Application, 22(*2), 121–132. doi:10.1002/(SICI)1520-6378(199704)22:2<121::AID-COL7>3.0.CO;2-V

Lam, L. W., Chan, K. W., Fong, D., & Lo, F. (2011). Does the look matter? The impact of casino servicescape on gaming customer satisfaction, intention to revisit, and desire to stay. *International Journal of Hospitality Management*, *30*(3), 558-567. doi:10.1016/j.ijhm.2010.10.003

Leo, R. A. (1996). Inside the interrogation room. *Journal of Criminal Law and Criminology*, *86*(2), 266-303. Retrieved from HeinOnline.

Leshem, S., & Trafford, V. (2007). Overlooking the conceptual framework. *Innovations in education and Teaching International*, *44*(1), 93-105. doi:10.1080/14703290601081407

Liu, W., Ji, J., Chen, H., & Ye, C. (2014). Optimal color design of psychological counseling room by design of experiments and response surface methodology. *PLoS ONE*, *9*(3). doi:10.1371/journal.pone.0090646

Lund, H. G., Reider, B. D., Whiting, A. B., & Prichard, J. R. (2010). Sleep patterns and predictors of disturbed sleep in a large population of college students. *Journal of adolescent health*, *46*(2), 124-132.

Mao, W., Chen, Y., Wu, B., Ge, S., Yang, W., Chi, I., & Dong, X. (2019). Perceived stress, social support, and dry mouth among US older Chinese adults. *Journal of the American Geriatrics Society*, *67*(3), 551-556. doi:10.1111/jgs.15890

May, L., Gewehr, E., Zimmermann, J., Raible, Y., & Volbert, R. (2021). How guilty and innocent suspects perceive the police and themselves: suspect interviews in Germany. *Legal and Criminological Psychology*, *26*(1), 42–61. doi:10.1111/lcrp.12184

Mendes, W. B., Gray, H., Mendoza-Denton, R., Major, B. & Epel, E. (2007). Why egalitarianism might be good for your health: Physiological thriving during stressful intergroup encounters. Psychological Science, 18, 991-998. doi:10.1111/j.1467-9280.2007.02014.x

Miles, M. B., & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. Los Angeles, United States: Sage Publications.

Miller, L. C., Berg, J. H., & Archer, R. L. (1983). Openers: Individuals who elicit intimate self-disclosure. *Journal of personality and social psychology*, *44*(6), 1234. doi:10.1037/0022-3514.44.6.1234

Moon, K. (n.d.). The color of your office affects your productivity even if you don't realize it. Retrieved from https://www.themuse.com/advice/the-color-of-your-office-affects-your-productivity-even-if-you-dont-realize-it

Moon, Y. (2000). Intimate exchanges: Using computers to elicit self-disclosure from consumers. *Journal of consumer research*, *26*(4), 323-339. doi:10.1086/209566

Morgan III, C. A., Hazlett, G., Doran, A., Garrett, S., Hoyt, G., Thomas, P., Baranoski, M., & Southwick, S. M. (2004). Accuracy of eyewitness memory for persons encountered during exposure to highly intense stress. *International journal of law and psychiatry*, *27*(3), 265-279. doi:10.1016/j.ijlp.2004.03.004

Myrtek, M., Weber, D., Brügner, G., & Müller, W. (1996). Occupational stress and strain of female students: results of physiological, behavioral, and psychological monitoring. *Biological*

psychology, *42*(3), 379-391. doi:10.1016/0301-0511(95)05168-6
Nevid, J. S., Rathus, S. A., & Green, B. (2016). *Psychiatrie in de verpleegkunde.* Pearson Benelux B.V.
Newport Academy. (2019). *Distress vs. Stress: What's the Difference?: Understanding Distress vs. Stress.* Retrieved from https://www.newportacademy.com/resources/mental-health/distress-vs-stress/
Nirider, L., Davis, D., & Leo, R. A. (2021). Interrogative Suggestibility. In: D. Lorandos (Ed.), *The Litigators Handbook of Forensic Medicine, Psychiatry and Psychology.* Thomson Reuters, 2021 Forthcoming).
Ofshe, R. J., & Leo, R. A. (1996). The decision to confess falsely: Rational choice and irrational action. *Denver University law review, 74*(4), 979-1122.
Okken, V., Van Rompay, T., & Pruyn, A. (2012). Room to move: On spatial constraints and self-disclosure during intimate conversations. *Environment and behavior*, *45*(6), 737-760. doi:10.1177/0013916512444780
Omarzu, J. (2000). A disclosure decision model: Determining how and when individuals will self-disclose. *Personality and Social Psychology Review*, *4*(2), 174-185. doi:10.1207/S15327957PSPR0402_05
Pavlov, P. I. (2010). Conditioned reflexes: an investigation of the physiological activity of the cerebral cortex. *Annals of neurosciences, 17*(3), 136. doi:10.5214/ans.0972-7531.1017309
Pedrotti, M., Mirzaei, M. A., Tedesco, A., Chardonnet, J. R., Mérienne, F., Benedetto, S., & Baccino, T. (2014). Automatic stress classification with pupil diameter analysis. *International Journal of Human-Computer Interaction*, *30*(3), 220-236. doi:10.1080/10447318.2013.848320
Perciavalle, V., Blandini, M., Fecarotta, P., Buscemi, A., Di Corrado, D., Bertolo, L., Fichera, F., & Coco, M. (2017). The role of deep breathing on stress. *Neurological Sciences*, *38*(3), 451-458. doi:10.1007/s10072-016-2790-8
Pijls-Hoekstra, R., Galetzka, M., Groen, B. H., & Pruyn, A. T. (2019). Comfortable seating: The influence of seating comfort and acoustic comfort on customers' experience of hospitality in a self-service restaurant. *Applied ergonomics*, *81*. doi:10.1016/j.apergo.2019.102902
Politie. (2021). *Aanhouding: Hoe lang mag de politie mij op het politiebureau houden?* Retrieved from https://www.politie.nl/themas/aanhouding.html#:~:text=De%20politie%20mag%20u%20maximaal,het%20achterhalen%20van%20uw%20identiteit.
RiosVelasco, C. (2010). *Color and Visual Comfort*. Austin, United States: The University of Texas at Austin.
Rispens, I., & van Amelsvoort, A. (2016). Het episodisch geheugen en getuigenverhoor: wat moeten politieverhoorders hiervan weten?. *Tijdschrift voor Criminologie*, *58*(3), 65. doi:10.5553/TvC/0165182X2016058003004
Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students*. Pearson education.
Saxion. (2020). *Jaarverslag 2019*. Retrieved from saxion.nl
Schlosser, A. E. (2020). Self-disclosure versus self-presentation on social media. *Current opinion in psychology*, *31*, 1-6. doi:10.1016/j.copsyc.2019.06.025
Schrantz, K. N., Nesmith, B. L., Limke-McLean, A., & Vanhoy, M. (2021). I'll Confess to Be Included: Social Exclusion Predicts Likelihood of False Confession. *Journal of Police and Criminal Psychology*, 1-6. doi:10.1007%2Fs11896-020-09414-x
Schubert, C., Lambertz, M., Nelesen, R. A., Bardwell, W., Choi, J. B., & Dimsdale, J. E. (2009). Effects of stress on heart rate complexity—a comparison between short-term and chronic stress. *Biological psychology*, *80*(3), 325-332. doi:10.1016/j.biopsycho.2008.11.005
Schug, J., Yuki, M., & Maddux, W. (2010). Relational mobility explains between-and within-culture differences in self-disclosure to close friends. *Psychological Science*, *21*(10), 1471-1478. doi:10.1177/0956797610382786
Shah, C., Trivedi, R. S., Diwan, J., Dixit, R., & Anand, A. K. (2009). Common stressors and coping of stress by medical students. *Journal of Clinical and Diagnostic Research*, *3*(4), 1621-1626. doi:10.1.1.625.6934

Shepherd, E., & Griffiths, A. (2013). *Investigative Interviewing: The Conversation Management Approach*. Oxford, United Kingdom: Oxford University Press.

Strassberg, D., Roback, H., D'Antonio, M., & Gabel, H. (1977). Self-disclosure: A critical and selective review of the clinical literature. *Comprehensive Psychiatry*. doi: 10.1016/S0010-440X(77)80005-9

Thomas, M., & Tsai, C. I. (2012). Psychological distance and subjective experience: How distancing reduces the feeling of difficulty. *Journal of Consumer Research*, *39*(2), 324-340. doi:10.1086/663772

Valdez, P., & Mehrabian, A. (1994). Effects of color on emotions. *Journal of experimental psychology: General*, *123*(4), 394. doi:10.1037/0096-3445.123.4.394

Van den Berg, A. E., Wesselius, J. E., Maas, J., & Tanja-Dijkstra, K. (2017). Green walls for a restorative classroom environment: a controlled evaluation study. *Environment and Behavior*, *49*(7), 791-813. doi:10.1177/0013916516667976

Van Eck, M., Berkhof, H., Nicolson, N., & Sulon, J. (1996). The effects of perceived stress, traits, mood states, and stressful daily events on salivary cortisol. *Psychosomatic medicine*, *58*(5), 447-458. Retrieved from jounals.lww.com

Van Holland, B. J., Frings-Dresen, M. H., & Sluiter, J. K. (2012). Measuring short-term and long-term physiological stress effects by cortisol reactivity in saliva and hair. *International archives of occupational and environmental health*, *85*(8), 849-852. doi:10.1007/s00420-011-0727-3

Van Veen, S. A. T., Hiemstra-van Mastrigt, S., Kamp, I., & Vink, P. (2014). Improving car passengers' comfort and experience by supporting the use of handheld devices. *Work*, *49*(2), 215-223. doi:10.3233/WOR-131716

Verhoeven, N. (2014). *Wat is onderzoek?* The Hague, the Netherlands: Boom Lemma.

Verschuere, B., Crombez, G., De Clercq, A., & Koster, E. H. (2004). Autonomic and behavioral responding to concealed information: Differentiating orienting and defensive responses. *Psychophysiology*, *41*(3), 461-466. doi:10.1111/j.1469-8986.00167.x

Verschuren, P. J. M., & Doorewaard, H. (2007). *Het ontwerpen van een onderzoek*. Boom Lemma Uitgevers.

Vrij, A. (2008). Detection of lies and deceit: Pitfalls and Opportunities. In: P. J. van Koppen, H. Merckelbach, M. Jelicic & J. W. de Keijser (Eds.), *Reizen met mijn rechter* (p. 723-753). Deventer: Kluwer.

Wainer, H., & Braun, H. I. (2013). *Test validity*. New York, United States: Routledge.

Weller, L., & Livingston, R. (1988). *Effect of Color of Questionnaire on Emotional Responses. The Journal of General Psychology, 115(4), 433–440.* doi:10.1080/00221309.1988.9710580

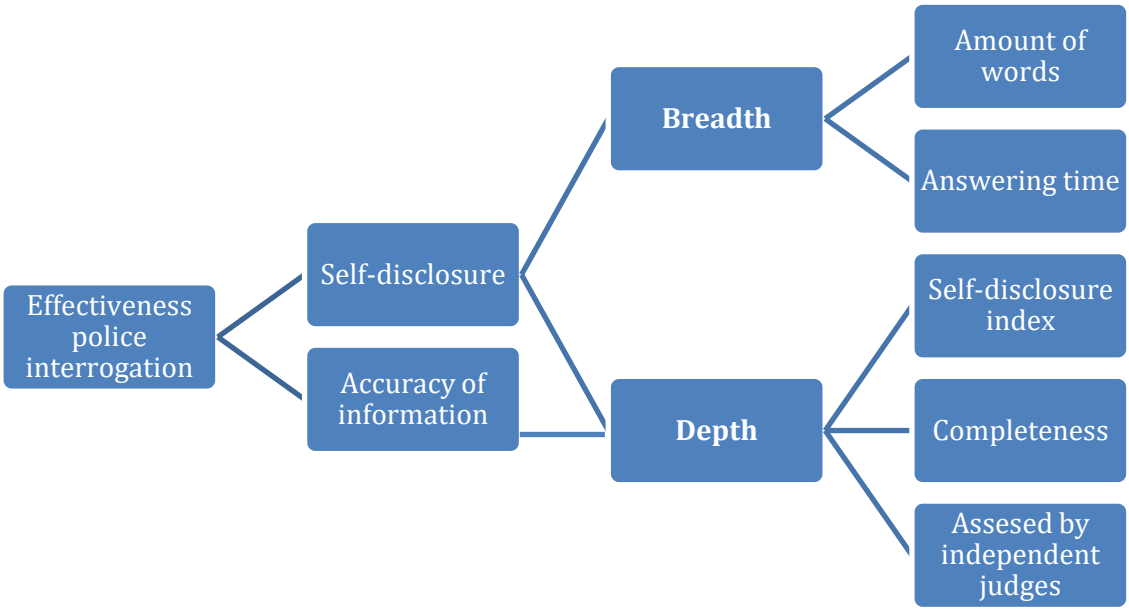
Wessel, I., & Wolters, G. (2010). Het geheugen van getuigen. In: P. J. van Koppen, H. Merckelbach, M. Jelicic & J. W. de Keijser (Eds.), *Reizen met mijn rechter* (p. 451-467). Deventer: Kluwer.

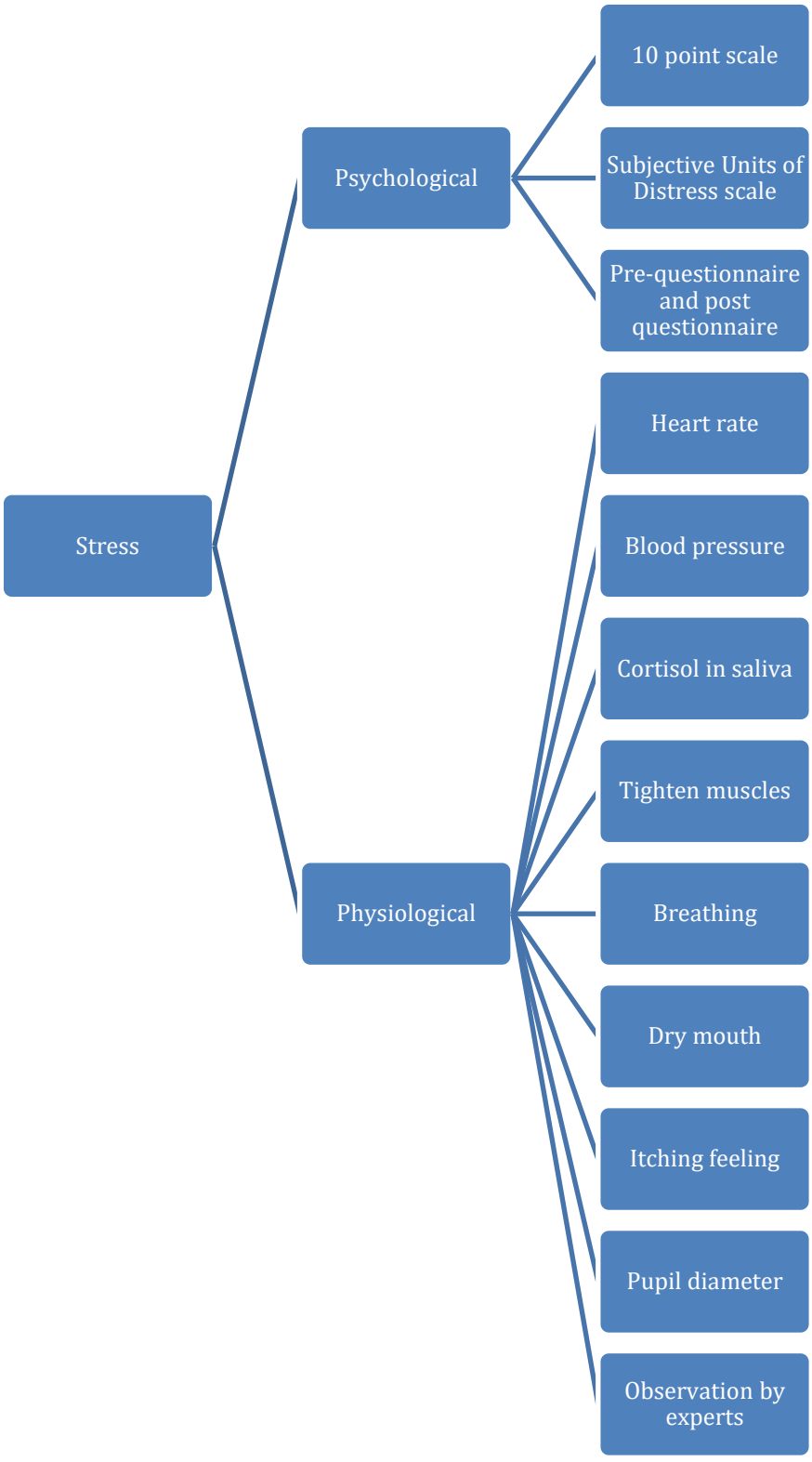
Wheaton, B., & Montazer, S. (2010). Stressors, stress, and distress. In A. V. Horwitz & T. L. Scheid (Eds.), A handbook for the study of mental health: Social contexts, theories, and systems (p. 171-199). Cambridge, United Kingdom: Cambridge University Press.

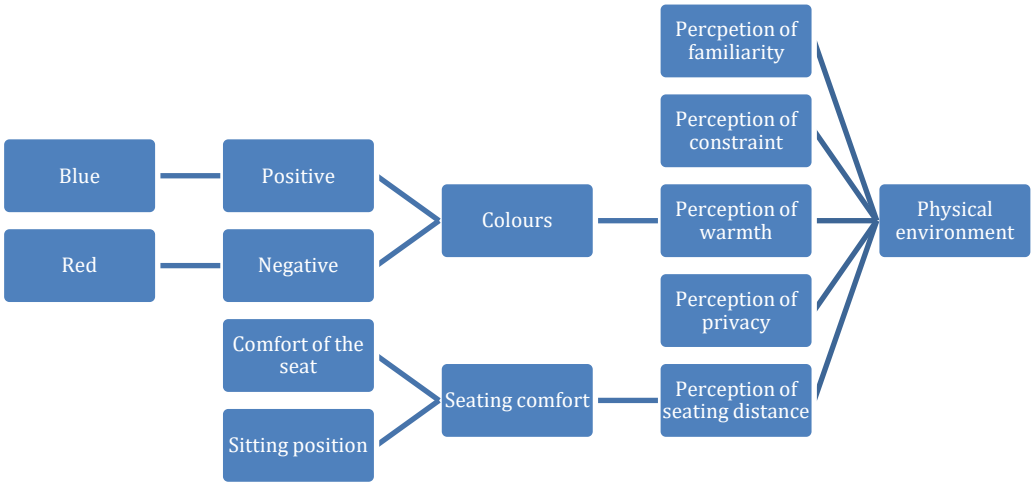
Wolpe, J. (1969). *The Practice of Behavior Therapy.* New York, United States: Pergamon Press.

Appendix I – Operationalisation

Operationalisation of the key words of the literature review




Stress
Psychological
10 point scale
Subjective Units of Distress scale
Pre-questionnaire and post questionnaire
Physiological
Heart rate
Blood pressure
Cortisol in saliva
Tighten muscles
Breathing
Dry mouth
Itching feeling
Pupil diameter
Observation by experts


Blue
Red
Positive
Negative
Colours
Comfort of the seat
Sitting position
Seating comfort
Percpetion of familiarity
Perception of constraint
Perception of warmth
Perception of privacy
Perception of seating distance
Physical environment

Appendix II – Questionnaires stress

	Strongly Disagree			Neutral			Strongly Agree
1. The upcoming task is very demanding.	1	2	3	4	5	6	7
2. I am very uncertain about how I will perform during the upcoming task.	1	2	3	4	5	6	7
3. The upcoming task will take a lot of effort to complete.	1	2	3	4	5	6	7
4. The upcoming task is very stressful.	1	2	3	4	5	6	7
5. I have the abilities to perform the upcoming task successfully.	1	2	3	4	5	6	7
6. It is very important to me that I perform well this task.	1	2	3	4	5	6	7
7. I'm the kind of person who does well in these types of situations.	1	2	3	4	5	6	7
8. A poor performance on this task would be very distressing for me.	1	2	3	4	5	6	7
9. I expect to perform well on this task.	1	2	3	4	5	6	7
10. I view the upcoming task as a positive challenge.	1	2	3	4	5	6	7
11. I think the upcoming task represents a threat to me.	1	2	3	4	5	6	7
12. I feel as if I am in complete control of my performance	1	2	3	4	5	6	7

	Strongly Disagree			Neutral			Strongly Agree
1. The task was very demanding.	1	2	3	4	5	6	7
2. I am uncertain about how I performed.	1	2	3	4	5	6	7
3. I exerted a lot of effort during the task.	1	2	3	4	5	6	7
4. The task was very stressful.	1	2	3	4	5	6	7
5. I felt that I had the abilities to perform well in the task.	1	2	3	4	5	6	7
6. It was very important to me that I performed well this task.	1	2	3	4	5	6	7
7. I believe I performed well on the task.	1	2	3	4	5	6	7
8. I felt that the task challenged me in a positive way.	1	2	3	4	5	6	7
9. I felt threatened by the task.	1	2	3	4	5	6	7
10. I felt in complete control during the task.	1	2	3	4	5	6	7

Appendix III – Questionnaires stress including theory

Red refers to stressors, green to coping

1. The upcoming task is very demanding.	1	2	3	4	5	6	7
2. I am very uncertain about how I will perform during the upcoming task.	1	2	3	4	5	6	7
3. The upcoming task will take a lot of effort to complete.	1	2	3	4	5	6	7
4. The upcoming task is very stressful.	1	2	3	4	5	6	7
5. I have the abilities to perform the upcoming task successfully.	1	2	3	4	5	6	7
6. It is very important to me that I perform well this task.	1	2	3	4	5	6	7
7. I'm the kind of person who does well in these types of situations.	1	2	3	4	5	6	7
8. A poor performance on this task would be very distressing for me.	1	2	3	4	5	6	7
9. I expect to perform well on this task.	1	2	3	4	5	6	7
10. I view the upcoming task as a positive challenge.	1	2	3	4	5	6	7
11. I think the upcoming task represents a threat to me.	1	2	3	4	5	6	7
12. I feel as if I am in complete control of my performance	1	2	3	4	5	6	7

1. The task was very demanding.	1	2	3	4	5	6	7
2. I am uncertain about how I performed.	1	2	3	4	5	6	7
3. I exerted a lot of effort during the task.	1	2	3	4	5	6	7
4. The task was very stressful.	1	2	3	4	5	6	7
5. I felt that I had the abilities to perform well in the task.	1	2	3	4	5	6	7
6. It was very important to me that I performed well this task.	1	2	3	4	5	6	7
7. I believe I performed well on the task.	1	2	3	4	5	6	7
8. I felt that the task challenged me in a positive way.	1	2	3	4	5	6	7
9. I felt threatened by the task.	1	2	3	4	5	6	7
10. I felt in complete control during the task.	1	2	3	4	5	6	7

Appendix IV – Questionnaire Manipulation check colour
Manipulatiecheck kleur 3

Onderzoek: Manipulatiecheck kleur
Bedankt dat je wil deelnemen aan dit vooronderzoek over de interpretatie van kleur. Dit onderzoek heeft het doel om te begrijpen hoe men kleuren interpreteert. Ik vraag je om te antwoorden op basis van je gevoel. Er zijn geen goede of foute antwoorden. Deelnemen duurt ongeveer 30 seconden. Antwoorden zijn anoniem. Voor meer informatie over het onderzoek kun je contact opnemen met Twan Bouwhuis:

- 421207@student.saxion.nl

Als je het onderstaande bolletje aanvinkt ga je akkoord met deelname aan het onderzoek. Als je alle voorwaarden wil lezen kun je dit aangeven bij Twan Bouwhuis.

Alvast bedankt voor je deelname!

Met vriendelijke groet,
Twan Bouwhuis, MSc student Facility and Real Estate Management

○ Ik ga akkoord met deelname aan het onderzoek

End of Block: Default Question Block

Start of Block: Block 1

Image of the blue or red colour

Intensiteit van de kleur

	zeer laag	laag	middelmatig	hoog	zeer hoog
Ik vind de intensiteit van deze kleur...	○	○	○	○	○

Wat vind je van de helderheid?

	Heel erg	Redelijk	Neutraal	Redelijk	Heel erg	
Helder	○	○	○	○	○	Grauw

Geslacht

- ○ Man
- ○ Vrouw

Leeftijd

_____

Appendix V – Questionnaire Manipulation check colour effects
Manipulatiecheck - Kleur

Onderzoek: Manipulatiecheck kleur
Bedankt dat je wil deelnemen aan dit vooronderzoek over de interpretatie van kleur. Dit onderzoek heeft het doel om te begrijpen hoe men de volgende twee kleuren interpreteert. Ik vraag je om te antwoorden op basis van je gevoel. Er zijn geen goede of foute antwoorden. Deelnemen duurt ongeveer **1 minuut**. Antwoorden zijn anoniem.

Voor meer informatie over het onderzoek kun je contact opnemen met Twan Bouwhuis:
- 421207@student.saxion.nl

Als je op de pijl klikt ga je akkoord met deelname aan het onderzoek. Alle voorwaarden staan weergegeven in deze link: Toestemmingsformulier manipulatiecheck kleur

Alvast bedankt voor je deelname!

Met vriendelijke groet,
Twan Bouwhuis, MSc student Facility and Real Estate Management

---

Geslacht

- ○ Man
- ○ Vrouw

Leeftijd

_____

Image of the blue or red colour

Vul de onderstaande stellingen in, gebaseerd op het gevoel dat jij krijgt van de bovenstaande kleur.

	Heel erg	Redelijk	Neutraal	Redelijk	Heel erg	
Aangenaam	○	○	○	○	○	Onaangenaam
Spannend	○	○	○	○	○	Saai
Ontspannen	○	○	○	○	○	Stressvol
Angstig	○	○	○	○	○	Veilig
Interessant	○	○	○	○	○	Niet interessant
Actief	○	○	○	○	○	Niet actief

Appendix VI – Questionnaire Manipulation check seating comfort

Manipulatiecheck - Zitcomfort en houding

Onderzoek: Manipulatiecheck zitcomfort en houding

Bedankt dat je wil deelnemen aan dit onderzoek over het testen van zitcomfort. Dit deel van het onderzoek heeft het doel om te weten hoe comfortabel de stoel zit en welk gevoel je hierbij krijgt. Ik vraag u om te antwoorden op basis van uw gevoel, er zijn geen goede of foute antwoorden. Deelnemen duurt ongeveer 2 minuten.

Je antwoorden zijn anoniem. Ik zal een foto maken van je zithouding waarbij je hoofd niet op de foto komt te staan. Niemand krijgt de foto te zien behalve ikzelf. Voor meer informatie over het onderzoek kun je contact opnemen met mij, Twan Bouwhuis:

- 421207@student.saxion.nl

Ga je akkoord met deelname aan het onderzoek? Indien je nog vragen hebt mag je ze nu stellen, ook mag je het toestemmingsformulier lezen als je dat wil.
Toestemmingsformulier manipulatiecheck zitcomfort en houding

End of Block: Block 3

Start of Block: Default Question Block

Geslacht

- ○ Man
- ○ Vrouw

Leeftijd

_____

Variabele

- ○ Comfortabele stoel
- ○ Niet comfortabele kruk

End of Block: Default Question Block

Start of Block: Block 1: Comfortabele stoel

In deze zithouding voel ik mij...

	1	2	3	4	5	6	7	8	9	10
op mijn gemak	○	○	○	○	○	○	○	○	○	○
ontspannen	○	○	○	○	○	○	○	○	○	○
stressvrij	○	○	○	○	○	○	○	○	○	○
zorgeloos	○	○	○	○	○	○	○	○	○	○
prettig	○	○	○	○	○	○	○	○	○	○
helder	○	○	○	○	○	○	○	○	○	○
vrolijk	○	○	○	○	○	○	○	○	○	○
blij	○	○	○	○	○	○	○	○	○	○
tevreden	○	○	○	○	○	○	○	○	○	○

Stellingen

	1	2	3	4	5	6	7	8	9	10
Deze stoel zit lekker	○	○	○	○	○	○	○	○	○	○
Deze stoel ondersteunt mijn lichaam goed	○	○	○	○	○	○	○	○	○	○
Deze stoel zit zacht	○	○	○	○	○	○	○	○	○	○
Ik kan nog uren lekker op deze stoel zitten	○	○	○	○	○	○	○	○	○	○

Foto zithouding gemaakt? Vul in: datum en tijd van de foto

_____

End of Block: Block 1: Comfortabele stoel

Start of Block: Block 2: Niet comfortabele kruk

Appendix VII – Questionnaire experiment pre-test

Experiment pre-test

Geslacht

- ○ Man
- ○ Vrouw
- ○ Anders
- ○ Zeg ik liever niet

Wat is je leeftijd?

_____

Wat is je functie binnen Saxion?

- ○ Student
- ○ Medewerker
- ○ Bezoeker
- ○ Anders

Display This Question:

If Wat is je functie binnen Saxion? = Student

Welke opleiding volg je?

_____

End of Block: Default Question Block

Start of Block: Block 2

Verdachte gezocht
Je krijgt zo een foto te zien van een persoon die verdacht wordt van een misdaad. De politie zoekt deze persoon en jij bent de enige getuige die deze persoon heeft gezien. Probeer de persoon die je zometeen te zien krijgt zo goed mogelijk te onthouden om vervolgens zoveel mogelijk details te kunnen vertellen over deze verdachte.

10 seconde
De foto van de verdachte zal 10 seconde lang zichtbaar zijn. Na 10 seconde gaat de foto automatisch weg. Wanneer je op de groene pijl klikt krijg je de foto te zien en starten de 10 seconde gelijk.

Stellingen
Geef je mening over de volgende stellingen. De stellingen gaan over het uitvoeren van de drie opdrachten van ieder 2 minuten, terwijl je de verdachte dient te onthouden.

	Sterk mee oneens	Oneens	Niet mee eens, niet mee oneens	Eens	Sterk mee eens
De aanstaande opdrachten zijn erg veeleisend	○	○	○	○	○
Ik ben erg onzeker over hoe ik zal presteren tijdens de aankomende opdrachten	○	○	○	○	○
De aankomende opdrachten zullen veel moeite kosten om te voltooien	○	○	○	○	○
De aankomende opdrachten zijn erg stressvol	○	○	○	○	○
Ik heb het vermogen om de aankomende opdrachten met succes uit te voeren	○	○	○	○	○
Het is erg belangrijk dat ik goed presteer tijdens de opdrachten	○	○	○	○	○
Ik ben het soort persoon die het goed doet in dit soort situaties	○	○	○	○	○

Een slechte prestatie tijdens de opdrachten zou erg stressvol zijn voor mij	○	○	○	○	○
Ik verwacht goed te presteren tijdens de opdrachten	○	○	○	○	○
Ik zie de opkomende opdrachten als een positieve uitdaging	○	○	○	○	○
Ik denk dat de komende opdrachten een bedreiging voor mij vormen	○	○	○	○	○
Ik heb het gevoel dat ik in complete controle ben van mijn eigen presteren	○	○	○	○	○

End of Block: Block 3

Start of Block: Block 4

Einde
Geef aan bij de onderzoeker dat je de vragenlijst hebt afgerond.

End of Block: Block 4

Start of Block: Block 5

Verdachte gezocht
Je krijgt zo een foto te zien van een persoon die verdacht wordt van een misdaad. De politie zoekt deze persoon en jij bent de enige getuige die deze persoon heeft gezien. Probeer de persoon die je zometeen te zien krijgt zo goed mogelijk te onthouden om vervolgens zoveel mogelijk details te kunnen vertellen over deze verdachte.

10 seconde

De foto van de verdachte zal 10 seconde lang zichtbaar zijn. Na 10 seconde gaat de foto automatisch weg. Wanneer je op de groene pijl klikt krijg je de foto te zien en starten de 10 seconde gelijk.

Einde
Geef aan bij de onderzoeker dat je de vragenlijst hebt afgerond.

End of Block: Block 6

Start of Block: Block 1

Deelnemersnummer

_____

Experimentele groep

- ○ Groep 1 (blauw, stoel)
- ○ Groep 2 (blauw, kruk)
- ○ Groep 3 (rood, stoel)
- ○ Groep 4 (rood, kruk)

End of Block: Block 1

Appendix VIII – Questionnaire experiment pre-test
Experiment post-test

Start of Block: Block 1

Deelnemersnummer

_____

Experimentele groep

- ○ Groep 1 (blauw, stoel)
- ○ Groep 2 (blauw, kruk)
- ○ Groep 3 (rood, stoel)
- ○ Groep 4 (rood, kruk)

End of Block: Block 1

Start of Block: Default Question Block

Stellingen
Geef je mening over de volgende stellingen. De stellingen gaan over het uitvoeren van de drie opdrachten van ieder 2 minuten, terwijl je de verdachte dient te onthouden.

	Sterk mee oneens	Oneens	Niet mee eens, niet mee oneens	Eens	Sterk mee eens
De opdrachten waren erg veeleisend	○	○	○	○	○
Ik ben onzeker over hoe ik gepresteerd heb	○	○	○	○	○
Ik heb veel moeite gedaan tijdens de opdrachten	○	○	○	○	○
De opdrachten waren erg stressvol	○	○	○	○	○
Ik had het gevoel dat ik de capaciteiten had om goed te presteren tijdens de opdrachten	○	○	○	○	○
Het was belangrijk voor mij om goed te presteren tijdens de opdrachten	○	○	○	○	○
Ik denk dat ik goed gepresteerd heb tijdens de opdrachten	○	○	○	○	○
Ik heb het gevoel dat de opdrachten mij op een positieve manier hebben uitgedaagd	○	○	○	○	○

Ik voelde mij bedreigd door de opdrachten	○	○	○	○	○
Ik voelde complete controle tijdens de opdrachten	○	○	○	○	○

End of Block: Default Question Block

Start of Block: Block 2

Wat vind je van de kleur van de muur?

	Heel erg	Redelijk	Neutraal	Redelijk	Heel erg	
Aangenaam	○	○	○	○	○	Onaangenaam
Spannend	○	○	○	○	○	Saai
Ontspannen	○	○	○	○	○	Stressvol
Veilig	○	○	○	○	○	Angstig
Interessant	○	○	○	○	○	Niet interessant
Actief	○	○	○	○	○	Niet actief

Stellingen

	1	2	3	4	5	6	7	8	9	10
Deze stoel zit lekker	○	○	○	○	○	○	○	○	○	○
Deze stoel ondersteunt mijn lichaam goed	○	○	○	○	○	○	○	○	○	○
Deze stoel zit zacht	○	○	○	○	○	○	○	○	○	○
Ik kan nog uren lekker op deze stoel zitten	○	○	○	○	○	○	○	○	○	○

End of Block: Block 2

Appendix IX – Participations information letter

Experiment: politieverhoor
Saxion Deventer

Doel van het experiment
In dit experiment wordt jouw geheugen als getuige getest. Jij hebt namelijk een persoon gezien die betrokken is bij een misdaad. Jouw doel is om de politie zo goed mogelijk te helpen in het beschrijven van deze persoon.

Onthouden verdachte
Hier staat beschreven wat het experiment inhoudt, maar de onderzoeker zal tijdens het experiment per stap nogmaals vertellen wat je zal gaan doen. Voordat het experiment begint, zul je eerst een vragenlijst invullen en een foto van een misdader beschrijven om jou vaardigheden te meten. Vervolgens krijg je de foto te zien van de echte verdachte die de politie probeert op te sporen. Het is belangrijk dat je deze foto goed onthoudt aangezien je op het eind deze persoon zo goed mogelijk dient te beschrijven.

Opdrachten
Vervolgens betreed je de kamer waar zowel jij als ikzelf plaatsnemen. Je stem wordt met een audio recorder opgenomen. Ik zit buiten jou zicht maar help je door aanwijzingen te geven. Je voert drie korte maar uitdagende opdrachten uit van ieder precies 2 minuten. In opdracht 1 bereid je een pitch voor waar je pen en papier bij krijgt om voor te bereiden. In opdracht 2 voer je deze pitch uit zonder je aantekeningen en in opdracht 3 zal je een lastige rekensom uitvoeren. Het is van belang dat je de volle 2 minuten benut. Ik hou de tijd bij.

Getuigenis afleggen
Na de opdrachten, vraag ik jou als getuige om zoveel mogelijk te vertellen over de verdachte om zo de zaak op te lossen. Daarna vul je een vragenlijst in en is het experiment afgerond.

Rechten van de deelnemer
Zowel nu als na het experiment heb je de mogelijkheid om vragen te stellen. Je kan op ieder moment stoppen met het experiment door de ruimte te verlaten. Dit betekent het einde van het experiment en daarmee vrijwillige terugtrekking van het experiment.

Bedankt voor je deelname en veel plezier tijdens het experiment!

Met vriendelijke groet,
Twan Bouwhuis

Experiment: police interrogation
Saxion Deventer

Purpose of the experiment
In this experiment, your memory is tested as you take the role of a witness. You have seen a person who is involved in a crime. Your goal is to help the police in describing this person.

Remembering the suspect
This section describes the experiment entails, but during the experiment the researcher will repeat every step so you know what to do. Before the experiment begins, you will first complete a questionnaire and describe a picture of a criminal to measure your skills. Then you get to see the photo of the real suspect that the police are trying to track down. It is important that you remember this photo as you need to describe this person as well as possible at the end.

Exercises
Then you enter the room where both you and I take a seat. Your voice will be recorded with an audio recorder. I am out of your sight but help you by giving directions. You perform three short but challenging tasks of exactly 2 minutes each. In assignment 1 you prepare a pitch where you get pen and paper to prepare. In assignment 2 you will perform this pitch without your notes and in assignment 3 you will perform a difficult calculation. It is important that you use the full 2 minutes. I keep track of time.

Testify
After the assignments, I ask you as a witness to tell as much as possible about the suspect in order to solve the case. Then you fill in a questionnaire and the experiment is completed.

Participant's rights
You will have the opportunity to ask questions now and after the experiment. You can stop the experiment at any time by leaving the room. Leaving premature will be the end of the experiment and means a voluntary withdrawal from the experiment.

Thank you for participating and have fun during the experiment!

Yours sincerely,
Twan Bouwhuis

Appendix X –Participant consent form

Experiment: politieverhoor
Saxion Deventer

Ik vraag u hieronder aan te geven of u toestemming geeft voor deelname aan dit onderzoek. Leest u hiervoor onderstaande punten goed door:

Als deelnemer aan dit onderzoek:	Ja	Nee
Ben ik over aard, methode en doel van dit onderzoek op een voor mij duidelijke wijze geïnformeerd.	☐	☐
Heb ik genoeg tijd gekregen om over deelname te beslissen	☐	☐
Heb ik de gelegenheid gehad om vragen te stellen over dit onderzoek	☐	☐
Weet ik dat deelname vrijwillig is	☐	☐
Weet ik dat ik op elk gewenst moment kan stoppen met deelnemen aan het onderzoek. Daarvoor hoef ik geen reden te geven.	☐	☐
Geef ik toestemming voor het verzamelen, bewaren en gebruiken van mijn gegevens voor de beantwoording van de onderzoeksvraag in dit onderzoek.	☐	☐
Weet ik dat de uitkomsten van dit interview verwerkt kunnen worden in een verslag of (wetenschappelijke) publicatie	☐	☐
Geef ik toestemming voor hergebruik van mijn gegevens na dit onderzoek voor nu nog onbekend onderzoek dat binnen het vakgebied van dit onderzoek valt. Hierbij worden de erkende ethische normen voor deze vorm van onderzoek in acht genomen.	☐	☐
Weet ik dat alleen ter controle van de wetenschappelijk integriteit van het onderzoek sommige mensen toegang tot mijn verzamelde gegevens kunnen krijgen.	☐	☐
Begrijp ik dat alle informatie die ik met betrekking tot deze studie verstrek, anoniem zal worden verzameld en niet tot mij herleidbaar zal zijn.	☐	☐
Weet ik dat ik inzage kan krijgen in de wijze waarop de gegevens worden verwerkt en bewaard.	☐	☐
Weet ik dat als ik mij terugtrek, mijn gegevens tot dat moment gebruikt kunnen worden, tenzij ik ook vraag om de reeds verzamelde gegevens te wissen.	☐	☐
Geef ik toestemming tot het maken van audio-opnames. Deze zijn alleen te beluisteren door de onderzoeker(s) en ter controle van de wetenschappelijke integriteit	☐	☐

Naam:

Handtekening:

Datum:

Onderzoeker
Als onderzoeker verklaar ik dat ik mondeling toelichting heb gegeven over de aard, methode en het doel van het onderzoek. Ik verklaar mij bereid nog opkomende vragen over het onderzoek naar vermogen te beantwoorden.

Naam: Twan Bouwhuis

Handtekening:

Datum:

Email: 421207@student.saxion.nl

Experiment: police interrogation
Saxion Deventer

I ask you to indicate below whether you consent to participate in this research. Please read the following points carefully:

As a participant in this research:	yes	No
Have I been informed about the nature, method and purpose of this research in a way that is clear to me.		
Got enough time to decide on participation		
Have I had the opportunity to ask questions about this investigation		
Do I know that participation is voluntary		
I know I can stop participating at any time. I don't have to give a reason.		
I consent to the collection, retention and use of my data for the purpose of answering the research question in this study.		
Do I know that the results of this interview can be incorporated in a report or (scientific) publication?		
I consent to the re-use of my data after this research for as yet unknown research that falls within the scope of this research. In doing so, the recognised ethical standards for this form of research will be observed.		
I know that only for the purpose of verifying the scientific integrity of the research, some people can access my collected data.		
I understand that any information I provide in relation to this study will be collected anonymously and will not be traceable to me.		
Do I know that I can inspect the way in which the data is processed and stored.		
Do I know that if I withdraw, my data can be used until then, unless I also ask for the data already collected to be deleted.		
Permission to make audio recordings. These can only be listened to by the researcher(s) and to check the scientific integrity.		

Name:

Signature:

Date:

Researcher
As a researcher, I declare that I have given oral explanations about the nature, method and purpose of the investigation. I declare that I am willing to answer any questions that may arise regarding the research into ability.

Name: Twan Bouwhuis

Signature:

Date:

Email: 421207@student.saxion.nl

Appendix XI –Standardised sentences

During the experiment

Pre-test

Vragenlijst

- Je mag deze vragenlijst invullen op de tablet.

Foto

- Beschrijf de persoon die je zojuist hebt gezien zo uitgebreid mogelijk. Zeg ‘stop’ als je niets meer over de verdachte kunt vertellen. Als ik start zeg mag je beginnen.

Stress-test

- **Opdracht 1**. Bereid een pitch voor waarin je jouw competenties en kwaliteiten presenteert. Oftewel, waarom zouden bedrijven in jou werkveld met jou willen werken? Je mag gebruik maken van pen en papier om dingen op te schrijven maar tijdens de pitch mag je de aantekeningen niet gebruiken. Het is van belang dat je straks twee minuten lang jezelf kan pitchen. Je mag beginnen.
- **Opdracht 2**: verfrommel het papier en gooi het achter je neer. Pitch jezelf nu twee minuten lang, ik vertel je wanneer de tijd om is. Je mag beginnen.
- **Opdracht 3**: tel van 1,022 naar 0 in stappen van 13. Probeer om zo snel en ver mogelijk bij 0 te komen als je kan. Als je een fout maakt, vertel ik je opnieuw te beginnen. Ook vertel ik je wanneer de tijd om is. Je mag beginnen.

1022	879	736	593	450	307	164	21
1009	866	723	580	437	294	151	8
996	853	710	567	424	281	138	
983	840	697	554	411	268	125	
970	827	684	541	398	255	112	
957	814	671	528	385	242	99	
944	801	658	515	372	229	86	
931	788	645	502	359	216	73	
918	775	632	489	346	203	60	
905	762	619	476	333	190	47	
892	749	606	463	320	177	34	

Aanvullende zinnen bij twijfel deelnemer:

1. Ga asjeblieft verder
2. Voor het experiment is het van belang dat je verder gaat met de opdracht
3. Het is echt belangrijk dat je verder gaat
4. Je moet verdergaan met de opdracht (*note: probeer deze niet te gebruiken gezien deelnemers vrijwilligers deelnemen*).

Eindmeting
Je hebt de opdrachten voltooid. We gaan nu weer focussen op de persoon die jij hebt gezien.

Fictie foto
Laatst heeft een persoon een misdaad gepleegd maar elk spoor ontbreekt. Jij hebt je gemeld als getuige. Vertel alsjeblieft zoveel mogelijk over de verdachte als jij je herinnert. Zeg ‘stop’ als je niets meer over de verdachte kunt vertellen. Als ik start zeg mag je beginnen.

Enquête
Ik vraag je nu om deze vragenlijst in te vullen. Daarna is het experiment afgelopen.

Post-experiment
- Benadruk om niet te delen met andere studenten
- Bedanken