Clean, Lean and Mean: A Fast Train is a Clean Train

The Effect of Music Tempo on the Travel Experience of NS Passengers in the Train under various Cleanliness Conditions

Floor Gostelie – March 2017

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Abstract

Objective: This research was carried out in order to identify the effect of music tempo on the travel experience of NS passengers (NS: Dutch Railways) in the train, under various conditions of cleanliness. Previous studies have shown that environmental stimuli such as music and layout positively affect the experience of the service environment (Bitner, 1992; Mehrabian & Russell, 1974). More importantly, congruence in terms of arousing qualities between those environmental stimuli is emphasized to enhance the experience of the service environment (Doucé, Janssens, Swinnen, and Cleempoel, 2014; Mattila & Wirtz, 2001). Hence, this study focused on the effect of congruence between music tempo and cleanliness in the train compartment on the travel experience of NS passengers which is distinguished in time experience and environmental experience.

Method: This study consisted of a 2(music tempo: slow tempo vs. fast tempo) x 2(cleanliness: unclean compartment vs. clean compartment) between-subjects experimental design that examined whether music tempo affects environmental experience and time experience, under various conditions of cleanliness. The experiment took place in a simulated train compartment in which fast or slow tempo music was played. After a simulated train journey, 123 subjects completed a survey on their time experience (subjective time and appraisal to time), and their environmental experience (pleasure, arousal, dominance, assessment of the journey, approach intentions).

Results: This study revealed that cleanliness is the key predictor of the travel experience. In a clean train, passengers estimate their travel time two minutes shorter, experience lower levels of (negative) arousal, and intend to revisit the train compared to an unclean train. Moreover, whereas congruence between music tempo and cleanliness enhances time experience in both unclean and clean conditions, coherent music tempo and cleanliness only enhances environmental experiences in the clean conditions.

Conclusion: Passengers estimate a shorter travel time in clean conditions compared to unclean conditions. In spite of uncleanliness, congruence between music tempo and cleanliness enhances appraisal of time. Nonetheless, congruence only enhances the environmental experience in clean conditions. Hence, cleanliness is a key predictor of the travel experience. These findings provide knowledge for science and NS to improve the experience of the service environment.

Keywords: Music tempo, cleanliness, congruence, time experience, environmental experience, travel experience

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Introduction

Service oriented organisations are becoming more aware of the importance of the experience of their customers (Richardson, 2010). Regarding the on-going evolution from the service economy to the experience economy (Pine & Gilmore, 1998) argue that instead of only offering products and service, businesses should offer memorable events to their customers. In fact, service experiences form the foundation for positive evaluations by customers. The current study is commissioned by the Dutch Railways organisation (NS: Dutch Railways): An organisation that delivers its service to more than one million people per day. One of NS' strategic goals is to enhance the in-train travel experience (NS, 2015). Hence, the aim of this study is to provide NS with additional knowledge in order to attain this goal.

Research on (customer) experiences has shown that customers form an impression of a service based on their interaction with the service environment (Bitner, 1992; Mehrabian & Russell, 1974). This interaction can be categorised into tangible and intangible dimensions (Mehrabian & Russell, 1974). Mehrabian and Russell (1974) illustrated with their Stimulus-Organism-Response (SOR) model that environmental stimuli affect an individual's emotions that in turn encourage either approach or avoidance behaviour towards the servicescape. Additionally, Bitner (1992) identified the service environment as the servicescape that consists of the combination of ambient, spatial, and signs, symbols and artefacts that influence people's responses and behaviours (Bitner, 1992).

The service environment comprises a wide range of different tangible and intangible elements (Kotler, 1973). Although these elements could be distinguished, they are highly interrelated and are believed to evoke synergistically affective responses (Babin, Chebat, & Michon, 2003; Mattila & Wirtz, 2001; Mehrabian & Russell, 1974). For NS, this implies that train passengers hear, see, feel, and smell different kinds of environmental stimuli that elicit affective responses. Applying pleasant stimuli to the servicescape of NS, such as music or pleasant scents (Mattila & Wirtz, 2001) may, thus, enhance passengers' experiences of their journey. As for the interaction between environmental stimuli, Mattila and Wirtz (2001) discovered that people experiences could be enhanced when stimuli in the servicescape are congruent. More precisely, people need to perceive the arousing qualities of music in the compartment (e.g. fast tempo music) to be coherent with those of the scent (e.g. stimulating scent) so as to enhance their experience and evaluations of the servicescape.

Similar to the study of Mattila and Wirtz (2001), this study focuses on the effect of music tempo. The service environment is, as indicated by Mattila and Wirtz (2001), and Bitner (1992), perceived holistically; implicating the effect of music should not be considered in isolation of other environmental stimuli. Interestingly, Mattila and Wirtz (2001) combined the effect of music tempo with scent and found that perceptions of the service environment were positively influenced when music tempo and scent were congruent in terms of arousing qualities (i.e. up-tempo music with intense scent). A similar design was used in the study of Van Hagen (2011) who identified the importance of congruent stimuli for the waiting experience at train stations, under various conditions of crowding. It appeared that atmospherics contribute to a pleasant customer (waiting) experience when environmental stimuli matched with passengers' goals, and the level of crowding. More specifically, incongruent environmental stimuli could over-stimulate passengers, which resulted in negative evaluations of the station environment and waiting experience. A similar approach is taken

in the current study in which the combined effect of environmental stimuli music and cleanliness is evaluated.

For this study, not scent, but cleanliness of the service environment is included. De Bruyn and De Vries (2009) identified cleanliness as an important element of the travel experience. Servicescape cleanliness was defined as a neat and tidy appearance of tangible elements in the service environment (Johnston, 1995). Additionally, cleanliness was found to be a key variable of physical surroundings (Barber, Goodman, & Goh, 2011) that appeared to affect positive customer emotions such as pleasure and satisfaction (Vilnay-Yavetz & Gilboa, 2010; Wakefield & Blodgett, 1996). In addition, filthy and dirty service environments are not welcoming and diminish the pleasure to stay in such an environment. In essence, in service environments, customers do not want to spend time in a dirty and messy environment. However, although cleanliness could enhance customer satisfaction and customers' behaviour towards a service environment, uncleanliness may lead to dissatisfaction and avoidance behaviour (Brown, 1991). With regard to cleanliness, NS aims to provide clean compartments to travel in for its passengers. Nonetheless, it is not always possible to maintain cleanliness of the train compartments on acceptable levels. A study on the effect of cleanliness on train passengers found that passengers, as well as staff, reported that unclean compartments are annoying and occur regularly (De Lange, Debets, Ruitenburg, & Holland, 2012). Therefore, NS intends to improve these evaluations and thereby enhance the travel experience (NS, 2015).

This study focuses on the effect of music tempo and cleanliness on the travel experience of NS passengers. The travel experience is divided into the time experience and the environmental experience. Many studies have been performed regarding the effect of atmosphere on time experience and environmental experience of consumers in the service environment (e.g. Bruner, 1990; Lucas, 2003; Smith & Curnow, 1966; Wakefield & Blodgett, 1996). Most studies focused on one atmospheric at the time. Hence, research on the effect of multiple stimuli is scarce. Moreover, many studies were performed regarding music tempo (e.g. Bruner, 1990; Gulas & Schewe, 1994; Milliman, 1982; 1986; North, Hargreaves, & McKendrick, 1999), whereas the role of cleanliness has received less attention (Vilnay-Yavetz & Gilboa, 2010). More specifically, no prior studies were performed on the relationship between music tempo and cleanliness in the service environment. Therefore, based on the study of Mattila and Wirtz (2001) regarding the congruence effect, for this study is assumed that time experience and environmental experience might be enhanced when environmental stimuli in the servicescape are congruent. Hence, this study examines whether congruence of stimuli in terms of arousing qualities enhances time experience and environmental experience of the servicescape.

This study is performed for the NS in order to determine effects of environmental stimuli on the travel experience of its passengers. The aim of this study is to evaluate the effect of music tempo on passengers' travel experience under different conditions of cleanliness. It is expected that a coherent combination of music tempo and cleanliness enhances passengers' time experience and environmental experience, which might improve passengers' travel experience. Hence, the general research question for this study is:

What is the influence of music (tempo) on the travel experience of NS passengers under various cleanliness conditions?

1.1 Prior NS research

Prior research has been carried out for NS in order to create a more valuable experience for its train passengers. However, most studies concentrated on passengers' experience in the station environment. At this point, the current study differs from those other studies for NS, since this research focused on the in-train experience of train passengers. Moreover, this study aimed to analyse the interaction effect between music and cleanliness. Since no prior studies for NS have taken this interaction into account, the current study provides novel knowledge for NS.

2. Literature review

This chapter is organised as follows. First, the dimensions of the servicescape are described. Second, the effect of music and cleanliness on environmental experience and time experience will be discussed in the light of the SOR model (Mehrabian & Russell, 1974), and servicescapes framework (Bitner, 1992). Third, the atmospheric music will be addressed and its influences on people's experiences and time perceptions, after which, the effect of cleanliness is discussed. Fourth, the effect of cleanliness will be discussed. Fifth, theories in the field of congruence will be discussed in paragraph 2.4. Finally, paragraph 2.5 elaborates on the effect of the interaction between music and cleanliness on time experiences.

2.1 Dimensions of the service environment

In the service environment customers filter experiences of environmental stimuli consciously and unconsciously and organise these "clues" into a range of impressions, some more rational, others more emotional (Berry, Wall, & Carbone, 2006). According to Berry et al (2006) a clue is "anything in the service experience the customer perceives by its presence or absence. If the customer can see, hear, taste, or smell it, it is a clue" (p.44). Haeckel, Carbone, and Berry (2003) distinguished clues into three main categories: Functional, mechanic, and human clues. Functional clues are defined by the technical quality of a service and refer to its reliability. The functional cues consist for instance of the cleanliness of the environment, which is determined by rubbish in a wastebasket or the amount of dust on a table. Mechanic clues are the sensory stimuli of the service environment. They refer to the sights, smells, sounds, textures, and tastes in the servicescape. Finally, human clues concern the appearance of staff and other customers, and the behaviour of service providers, such as being friendly, choice of words, and tone of voice towards the customers. Primarily mechanic clues influence customers' affective responses and form the first impression of customers towards the servicescape (Berry, et al., 2006).

2.2 The Service-Organism-Response model

As mentioned earlier, atmospherics influence people's experience of the environment, through affecting customers' emotions and their behaviour towards the environment (Kotler, 1973). Kotler (1973) defined the concept of environmental ambiance as "The conscious designing of space to create certain effects in buyers" (Kotler, 1973, p.50) Moreover, customers interact with atmospherics during all stages of their visit, and determine their impressions regarding the servicescape (Mazursky & Jacoby, 1986). In fact, atmospherics could influence customers' intentions to return, spread of positive word-of-mouth, and intention to evaluate the service(scape) positively (Mehrabian & Russell, 1974). The Stimulus – Organism – Response model (SOR-model) of Mehrabian and Russell (1974) illustrates the relationship between stimuli, organism, and response variables. More specifically, (environmental) stimuli (S) influence the internal responses (O) pleasure, arousal, and dominance. As Russell (1978) found, pleasure and arousal sufficiently predict affective- and behavioural responses. Then, response behaviour arises (R), such as approach behaviour or avoidance behaviour. Approach behaviour is characterised as the desire to explore the environment, lengthen one's stay, and to perform activities within this environment. Avoidance behaviour, on the

other hand, is defined as the opposite. Thus, positive or negative affective responses are able to influence people's response behaviour such as people's length of stay in the particular environment. Figure 1 represents the SOR-model (Mehrabian & Russell, 1974).

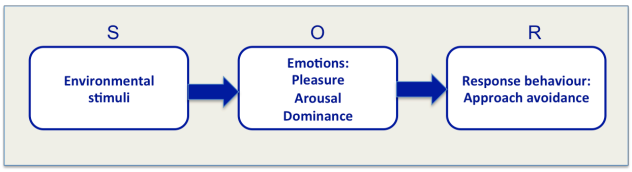


Figure 1. Stimulus Organism and Response model (Mehrabian & Russell, 1974)

Furthermore, Bitner (1992) defined the environment in which the service is delivered as the *servicescape*, in which environmental stimuli are perceived holistically. According to Bitner (1992), customers' service experience depends on the service processes, the environment, and the people present (similar to human clues from Berry et al (2006)). Emotions and perceptions evoked by surroundings of the servicescape operate as mediators in the relation between the service environment and customers' behaviours (Bitner, 1992). The surroundings in the servicescape could, then, lead to either approach or avoidance behaviour. Oakes (2000) extended Bitner's (1992) servicescape model, in which music was highlighted as one of the environmental stimuli, such as scent and air temperature that could influence customers' responses and behaviour. He proposed the 'musicscape': The extended framework concentrated on music in which the effects of music are visualised in the service environment. This framework not only demonstrates how music could be used to elicit desired cognitive and emotional responses from customers to ambient factors, but also is more concentrated on demographic factors to adjust the servicescape on its customers (Oakes, 2000). This study is based on the SOR-model (Mehrabian & Russell, 1974) and the servicescape model (Bitner, 1992) in which the influence of cleanliness (physical element) and music (ambient factor) on the travel experience and time perception is analysed.

2.3 Music

Music is a characteristic of the aural dimension of the servicescape (Kotler, 1973). In service environments, music is often implemented since music is relatively inexpensive to deploy into the servicescape, easy to control, and it enhances customers' experience. Music is one of the most studied environmental atmospherics in the servicescape (e.g. Bailey & Areni, 2006; Caldwell & Hibbert, 2002; Gulas & Schewe, 1994; Hui, Dubé, & Chebat, 1997; Lindstrom, 2005; Milliman, 1982; 1986; Smith & Curnow, 1966; Yalch & Spangenberg, 2000). The effect of music in the service environment will be discussed on the basis of the formulated hypotheses.

2.3.1 General effect of music

Music stimulates emotions directly, and enhances positive responses and experiences of people towards the servicescape (Hui, Dubé, & Chebat, 1997; Lindstrom, 2005). Several studies found music (especially background music) to be an effective ambient factor in servicescapes to influence customers' experiences and evaluations of the service environment (Bruner, 1990; Gulas & Schewe, 1994; Milliman, 1982; 1986; North, Hargreaves, & McKendrick, 1999). Music is capable of evoking emotional, cognitive and physiological reactions (Wirtz & Bateson, 1999). Moreover, music influences buying behaviour (Areni & Kim, 1993), time spent in a servicescape (Milliman, 1982; 1986)

and people's experience of time (Kellaris & Kent, 1992). Music is able to unconsciously influence behaviours (North, Hargreaves, & McKendrick, 1999), such as, purchasing speed (Smith & Curnow, 1966), and the amount of money spent (Milliman, 1982). Based on the findings in this paragraph music was identified as an environmental stimulus able to influence the experiences in the servicescape and people's time perceptions. Leading to the following hypothesis:

H1A: Passengers' environmental experience and time experience will be more positive when music (vs. no music) is played.

2.3.2 Music tempo and pleasure

To analyse the effect of music on experiences and time perceptions, music tempo can be distinguished. Music tempo is the speed in which music is played, defined by beats per minute (BPM) (Oakes & North, 2008). The effect of music is mediated by its tempo (Milliman, 1982; 1986), in which slow tempo music (<74 BPM) and fast tempo music (>92 BPM) could be distinguished. Additionally, Bruner (1990) argued that people's emotions could be well controlled by background music. Slow tempo music influences emotions positively and induces higher levels of satisfaction and relaxation, and pleasure than more up-tempo music (Oakes, 2003). Consequently, positively valued music evokes more positive emotional responses and more positive evaluations with the service (environment) (Hui, et al., 1997; Lindstrom, 2005; Sweeney & Wyber, 2002). In order to test whether or not slow tempo music might influence pleasure of NS-passengers in the present study, the following hypothesis was formulated:

H1B: Passengers will experience higher levels of pleasure when slow tempo music (vs. fast tempo music) is played.

2.3.3 Music tempo and arousal

Moreover, previous research demonstrated that music is able to affect people's levels of arousal (Holbrook & Anand, 1990; Kent & Kellaris, 2001; Mehrabian & Russell, 1974; Milliman, 1986). Berlyne (1971) stated that highly arousing music is music with a quick tempo, while music with low arousing qualities is music with a slow tempo. According to Mehrabian and Russell (1974) fast tempo music increases the complexity of the environment, which in turn results in higher levels of arousal. Also as further evidence of arousal effects, Vanderark and Ely (1993) found that fast tempo music led to an increase in levels of arousal among consumers. Milliman (1986) found in a restaurant setting that customers spend less time at their tables when fast tempo music was played compared to slow tempo music or no music. Additionally McElrea and Standing (1992) revealed that playing fast tempo music in the restaurant caused customers to eat their dinner faster. These authors explain that due to the effect of fast tempo music customers perceived high levels of arousal, which speeded up their time spent on dining (McElrea & Standing, 1992). Conversely, playing slow tempo music in the restaurant decelerates customers to consume their drinks and increases time spent in the restaurant (McElrea & Standing, 1992). Hence, for this study is expected that fast tempo music increases arousal rather than slow tempo music. Leading to the following hypothesis:

H1C: Passengers will experience higher levels of arousal when fast tempo music (vs. slow tempo music) is played.

2.3.4 Music tempo and perceived control

Next to pleasure and arousal, Mehrabian and Russell (1974) assigned dominance as one of the internal responses of people in the service environment. Dominance is a feeling based on the extent to which people have control over their acts or not in a servicescape (Mehrabian and Russell, 1974). Since music does not have to be perceived consciously playing music influences people's emotions without them being aware (Milliman, 1982; North, Hargreaves, & McKendrick, 1999). However, dominance is often considered as being not of influence on people's internal responses (Donovan & Rossiter, 1982), whereas pleasure and arousal do influence people's emotions. Baker, Van der Voordt, Vink, and de Boon (2014) revised the model of Mehrabian and Russell (1974) and confirmed the original meanings still to be valid. Hence, dominance was taken into account for this study. Several authors identified that playing fast tempo music could over-stimulate people, which results in loss of self-control and mental overload (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Mattila & Wirtz, 2008). When the played music is perceived as too fast, people are not able to adapt to the tempo of music, resulting in distractions and feelings of being restless (Edworthy & Waring, 2006). As mentioned earlier, fast tempo music stimulates more powerfully than slow tempo music (Kellaris & Kent, 1992). Additionally, an experiment of Milliman (1986) demonstrated when hearing fast tempo music customers consumed their drinks faster, resulting in ordering more drinks. Conversely, when slow tempo music was played customers spent more time eating their dinner and stayed longer in the restaurant (Milliman, 1986). Thus, the tempo of music played in a service environment is expected to influence customers' sense of control. Hence, the following hypothesis is formulated:

H1D: Passengers will experience lower levels of control when fast tempo music (vs. slow tempo music) is played.

2.3.5 Music tempo and approach intentions

According to the SOR-model, cognitive and affective responses are influenced by environmental stimuli which in turn affect approach or avoidance behaviour (Mehrabian & Russell, 1974). As Mehrabian and Russell (1974) initiated, all the positive behaviour elicited by the service environment can be identified as approach behaviour. Responses towards the environment such as approach and avoidance imply positive or negative attitudes towards the service environment. Furthermore, Caldwell & Hibbert (2002) suggest that music elicits pleasure and arousal, which in turn influences intentions to return and intentions to recommend the particular environment. Thus, hearing background music influences people's responses and behaviours towards a particular environment (Caldwell & Hibbert, 2002). Several studies found that positively valued music elicits positive emotions and stronger approach behaviour towards the service environment (Hui et al., 1997; Lindstrom, 2005; Milliman, 1986;). Since slow tempo music induces higher levels of pleasure than fast tempo music (Oakes, 2003) for this study is expected that slow tempo music positively influences approach behaviour rather than fast tempo music. Based on this, the following hypothesis is formulated:

H1E: When slow tempo music (vs. fast tempo music) is played, passengers will be more willing to revisit (approach) the train.

2.4 Cleanliness

The importance of the effect of cleanliness on overall perception of the servicescape has been confirmed in several studies (e.g. Barber, Goodman, & Goh, 2011; Lucas, 2003; Vilnay-Yavetz & Gilboa, 2010; Wakefield & Blodgett, 1996). The effect of cleanliness in the service environment will be discussed on the basis of the formulated hypotheses.

2.4.1 Cleanliness and pleasure

Cleanliness is considered as an important dimension in the servicescape that is of influence on consumer's perceptions of service environments (Garry & Sansolo, 1993). People experience greater pleasure from servicescapes that are tidy and clean (Vilnay-Yavetz & Gilboa 2010). Cleanliness was also found to be a crucial element of pleasure (Lee & Kim, 2014) and a component for an ordered service environment, which induces customers' feelings of pleasantness (Gilboa & Rafaeli, 2003). Also De Bruyn and De Vries (2009) identified cleanliness as an important element of the travel experience. More specific, Vilnay-Yavetz and Gilboa (2010) found that a clean servicescape induces higher levels of pleasure than an unclean servicescape. To examine the effect of cleanliness on passengers' level of pleasure in the compartment, the following hypothesis is formulated:

H2A: Passengers will experience higher levels of pleasure under clean (vs. unclean) conditions.

2.4.2 Cleanliness and arousal

As Mehrabian and Russell (1974) demonstrated, environmental stimuli influence people's level of arousal (Mehrabian & Russell, 1974). However, prior studies do not provide any evidence for the effect of cleanliness on arousal. Therefore, based on comparable studies regarding the effect of environmental stimuli on arousal expectations for this study are formulated. According to the research from Mattila & Wirtz (2000) is expected that a highly stimulating environment induces higher levels of arousal and stress than environments with fewer stimuli. More specifically, Mattila and Wirtz (2000) emphasize the role of arousal in determining consumers' perceptions of the servicescape. High arousing servicescapes exceed people's preferred level of arousal, resulting in a desire to escape the servicescape (Mehrabian and Russell, 1974; North & Hargreaves, 2000). Similar to the effect of music tempo on people's level of arousal, cleanliness might affect arousal. More specifically, an unclean environment could be perceived as too arousing. Therefore, for this study is expected that an unclean environment might elicit higher levels of arousal than a clean environment. Leading to the following hypothesis:

H2B: Passengers will experience higher levels of arousal under unclean (vs. clean) conditions.

2.4.3 Cleanliness and dominance

Also for dominance no evidence was found in the current literature for the relation between dominance and cleanliness. However, disorder of the environment, such as dirt and garbage left in a particular service environment, triggers others to behave in a similar way unconsciously (Wilson & Kelling, 1982). Wilson and Kelling (1982) identified such behaviour in their broken window theory, in

which people act similarly as they experience in the environment. Additionally, based on prior studies regarding the effect of environmental stimuli on people's levels of control (Mehrabian & Russell, 1974) could be expected that the level of dominance is lower with a too stimulating, unclean environment. Mattila and Wirtz (2008) found that environments with highly arousing stimuli might result in experiences of lower levels of control. Since unclean environments include more stimuli and induces greater levels of arousal, for this study is expected that uncleanliness leads to less sense of control. Hence, the following hypothesis is formulated:

H2C: Passengers will experience lower levels of control under unclean (vs. clean) conditions.

2.4.4 Cleanliness and approach intentions

The effect of servicescape cleanliness on willingness to return to the servicescape was examined by Lucas (2003), and Wakefield and Blodgett (1996). Lucas' (2003) research regarding satisfaction of a casino revealed that cleanliness was related to several behaviours such as willingness to return and recommend the service. Also Wakefield and Blodgett (1996) identified cleanliness to be related to customer satisfaction and intentions to return. Lee and Kim (2014) found that a positive perception of cleanliness increases the intention to revisit that particular environment. Moreover, in store environments, cleanliness affects the effect of store atmospherics (Gajanayake, Gajanayake, & Surgani, 2011), and creates positive impressions among customers. Although cleanliness of the servicescape is able to increase customer' satisfaction with a service, uncleanliness is often referred to as a dissatisfier (Brown, 1991). Dissatisfiers refer to the elements that could negatively influence customer satisfaction and evaluation with the service when these elements are poor or missing (Herzberg, Mausner, & Snyderman, 1959). Cleanliness, thus, may cause dissatisfaction with a service when insufficient. The theory identified as the Expectation Disconfirmation Paradigm could be a possible explanation for this effect (Oliver, 1980). In fact, cleanliness could not only function as a hygiene factor, but, simultaneously, also as a motivator (Vilnai-Yavetz & Gilboa, 2010). When cleanliness of the environment is above people's level of expectations, the confirmation regarding cleanliness is met, therefore, influences satisfaction with a service positively. However, when cleanliness is as expected, neither positive nor negative responses are influenced. Particularly when cleanliness of the environment is not maintained, cleanliness as a hygiene factor is below expectations and causes dissatisfaction. Therefore, for this study it is expected that cleanliness influences approach intentions behaviour towards the compartment:

H2D: Passengers will be more willing to revisit the train under clean (vs. unclean) conditions.

2.5 Congruence

For this study it is presumed that music and cleanliness influence the travel experience and time perceptions simultaneously. In order to analyse this effect, a study from Mattila and Wirtz (2001) regarding congruence of environmental stimuli in arousing qualities is taken into account. In a service environment, people prefer a certain level of arousal (Berlyne, 1971). Research proved that small adaptions to the servicescape, such as playing background music or adding a low level of scents, enhance people's experience of that environment (Berlyne, 1971; Mattila & Wirtz, 2001). With regard to the dimension of arousal it was found that the experience of too much arousal, for instance from the incongruence between environmental stimuli, results in negative responses and over-

stimulation of people (Baker & Cameron, 1996) which in turn leads to avoidance behaviour from the servicescape (Donovan & Rossiter, 1982). In comparison, particularly congruence of stimuli elicits affective responses such as relaxation, pleasure, and satisfaction (Mattila & Wirtz, 2001). The impact of arousal on consumers' affective responses and experiences is identified with the optimal arousal theory (Berlyne, 1971; Mehrabian & Russell, 1974). People desire a certain level of arousal associated with the servicescape (Wirtz, Mattila, & Tan, 2000). The experience of too many, or incongruent surrounding stimuli might result in overstimulation, which eventually leads to low levels of satisfaction with the service (Wirtz, Mattila, & Tan, 2007). Doucé, et al (2014) confirmed the influence of matching environmental stimuli in their experiment in a store environment. These authors demonstrated that mismatching of scent (fresh, citrus scent) and store layout (messy environment) negatively influenced customers' assessment of the service. Conversely, when a similar pleasant scent was applied in a tidy and neat store layout, satisfaction levels and willingness to return were enhanced. Thus, when matching environmental elements in terms of arousing qualities (low arousing tidy store layout with a low arousing pleasant scent), customers' experiences and response behaviours towards the store were enhanced. Regarding the study from Mattila and Wirtz (2001) on congruence in terms of arousal, and Doucé et al (2014) to matching environmental stimuli, a similar effect is expected for the application of music and cleanliness in the compartment. More specifically, when low (high) arousing slow (fast) tempo music is applied in a low (high) arousing clean (unclean) compartment passengers' environmental experiences and time experiences might be enhanced. The following hypotheses are formulated in order to examine these effects for this study:

H3A: When slow tempo music (vs. fast tempo music) is played passengers will experience higher levels of pleasure under clean conditions; when slow tempo music (vs. fast tempo music) is played passengers will experience less pleasure under unclean conditions.

H3B: When fast tempo music (vs. slow tempo music) is played passengers will experience higher levels of arousal under clean conditions; when fast tempo music (vs. slow tempo music) is played passengers will experience less arousal under unclean conditions.

H3C: When fast tempo music (vs. slow tempo music) is played passengers will experience lower levels of control under clean conditions; when fast tempo music (vs. slow tempo music) is played passengers will experience higher levels of control under unclean conditions.

H3D: Passengers will be more willing to revisit the train (approach) when slow tempo music (vs. fast tempo music) is played under clean conditions; passengers will be less willing to revisit the train (avoidance) when slow tempo music (vs. fast tempo music) is played under unclean conditions.

2.6 Time experience

In 2011, Van Hagen identified the relation of congruent environmental stimuli and time perceptions. Van Hagen (2011) found the congruence of atmospherics, passengers' goals, and the level of crowding to enhance passengers' waiting time experience at the train station. In other words, when applying the right atmospherics at the right time, such as playing slow tempo music when passengers are in a hurry, in a low-density station environment, passengers experience a more pleasant wait and passengers estimate the time to be shorter (Baker & Cameron 1996; Hornik 1992; 1993). With regard

to Van Hagen's (2011) study and other prior researches to the effects of environmental stimuli on time perceptions, for this study similar effects are expected. People's responses to the servicescape (positive or negative affect) are related to subjective time (Hornik, 1992; 1993) and people's appreciation to the environment or the time spent there, based on the cognitive and affective component of appraisal (Pruyn & Smidts, 1998). Subjective time is defined by how people perceive and feel about the length of a specific time span (Baker & Cameron, 1996). The cognitive component- and the affective of appraisal of time are also influenced by such emotions. The cognitive component reflects on perception of a time frame using a long-short judgment, and the affective component is formed by the emotional responses to the time span such as irritation, boredom, and stress (Pruyn & Smidts, 1998). Thus, positive or negative affective responses to environmental stimuli influence people's time experience (Bruner, 1990; Kellaris & Kent, 1991). Milliman (1986) found playing music in the service environment is one of the environmental stimuli that influences time perceptions. More specifically, in this experiment in a restaurant Milliman (1986) demonstrated that playing fast tempo music resulted in customers to overestimate the time they spent there, while playing slow tempo music led to underestimate the time spent in the restaurant. Thus, time seems to be overestimated when too many stimuli are perceived in the servicescape as a result of too high levels of arousal.

Literature does not provide evidence regarding the relation between cleanliness and time experience. Therefore, similar to the study of Mattila and Wirtz (2001) and Wirtz, Mattila, and Tan (2007) the approach of congruent stimuli could be applied for the interaction between music and cleanliness on time experience in terms of arousing qualities. More specifically, people's positive or negative affective responses to environmental stimuli, resulting from the (in)congruence of music and cleanliness, influence their time experience (Caldwell & Hibbert, 2002; Oakes, 2003). This effect could also be explained using the optimal arousal theory (Berlyne, 1971), Figure 2.

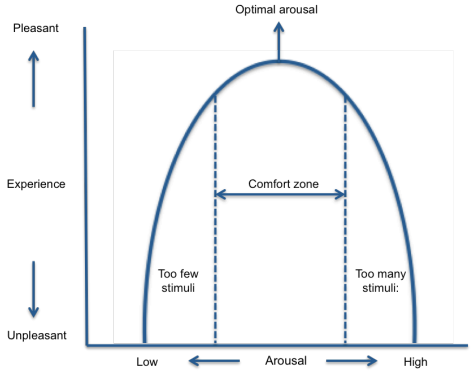


Figure 2. Optimal arousal theory (Berlyne, 1971)

This study focuses explicitly on the area in which too high levels of arousal are experienced. When environmental stimuli are coherent, people experience the optimal level of arousal which leads to higher levels of pleasantness (Berlyne, 1971) and which enhances people's experience with the service provider (Mattila & Wirtz, 2001). More precisely, when the optimal level of arousal is attained, people find themselves in the comfort zone (Berlyne, 1971). Then, people enjoy the situation and are distracted from the time, causing an underestimation of the time passed (Zakay & Block, 1997). However, when the comfort zone is exceeded, for instance when environmental stimuli are incongruent, people experience too high levels of arousal causing over-stimulation (Baker &

Cameron, 1996). Over-stimulation results in negative emotions and in people wanting to 'avoid' the servicescape (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). Similar to these findings, for this study is expected that congruence of environmental stimuli enhances people's affective responses to time and their time estimations. Hence, the following hypotheses are formulated:

H4A: Slow tempo music (vs. fast tempo music) will cause shorter judgments of time under clean conditions; slow tempo music (vs. fast tempo music) will cause longer judgments of time under unclean conditions.
H4B: Slow tempo music (vs. fast tempo music) will cause more positive affective responses to time under clean conditions; slow tempo music (vs. fast tempo music) will cause less positive affective responses to time under unclean conditions.
H4C: When slow tempo music (vs. fast tempo music) is played passengers' subjective travel time will be shorter under clean conditions; when slow tempo music (vs. fast tempo music) is played passengers' subjective time will be longer under unclean conditions.

2.7 Theoretical model

With regard to the theoretical foundations it appears that a congruent servicescape is able to enhance people's environmental experience (Mattila & Wirtz, 2001). This effect, however, depends on the extent to which the arousing qualities of environmental stimuli are congruent (Mattila & Wirtz, 2001; Wirtz, et al., 2007) and are matching (Doucé, et al., 2014). The current study focuses on the interaction between music and cleanliness on passengers' environmental experience, and time experience. For this study the congruence of environmental stimuli is expected to enhance passengers' travel experience during their journey. This implies that playing low arousing slow tempo music in a low arousing clean compartment might enhance passengers' environmental experience and time experience. A similar congruence effect is expected for playing high arousing fast tempo music in a high arousing unclean compartment. Conversely, experiencing incongruent environmental stimuli is expected to affect passengers' environmental- and time experience negatively. Thus, based on the study from Mattila and Wirtz (2001) and Doucé et al (2014), coherent music tempo and cleanliness in the train compartment is proposed to enhance passengers' travel experience. Based on these foundations, the following research design is developed for the current study (Figure 3).

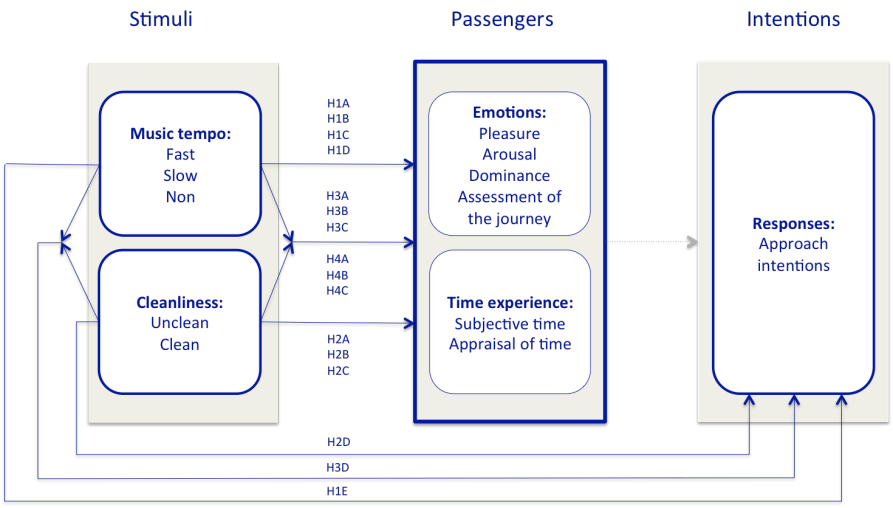


Figure 3 Theoretical model for the current study

The aim of this study is to evaluate the effect of music tempo under various conditions of cleanliness on people's travel experience. The optimal arousal theory states that people prefer an optimal level of stimulation (Berlyne, 1971). Wirtz et al. (2000) identified when people's expectations, needs, and desires correspond with their experiences in that particular environment higher levels of pleasure could be attained. Also, when stimuli in the servicescape are congruent in terms of arousal, experiences and evaluations regarding the service environment and time perceptions of people are enhanced (Mattila & Wirtz, 2001). Therefore, it is expected that a coherent combination of environmental stimuli (music tempo and cleanliness) will lead to better environmental experiences of the service environment and shorter time experiences. The following paragraph elaborates on the measurement method for this study (Chapter 3), followed by the results derived from the experiment (Chapter 4). Finally, the conclusions and discussion (Chapter 5) come back to the theoretical model in order to (dis)confirm the formulated hypotheses for this study.

3. Methodology

3.1 Research design

For the current study, a 3x2 between-subjects experimental design was used (Table 1) for the dependent variables regarding travel experience (Table 2). The six conditions of the research design consist of 3 (music tempo: fast tempo vs. slow tempo vs. no music) x 2 (cleanliness: unclean vs. clean compartment) conditions. The different conditions were presented in Table 1. Participants were randomly assigned into one of the six experimental conditions.

Table 1. Research design

	Unclean compartment	*Clean compartment*
Slow tempo music	Condition 1 N=22	Condition 5 N=21
Fast tempo music	Condition 3 N=19	Condition 2 N=20
No music	Condition 6 N=20	Condition 4 N=21

Row: Main effect music tempo

Column: Main effect cleanliness

Table 2. Travel experience dependent variables

Dependent variables:
Time experience
Subjective time Long/short judgment Affective component of appraisal of time
Environmental experience
Pleasure Arousal Dominance Assessment of the journey Approach intentions

Before the main study was operated, the stimuli for the main experiment were verified with 2 pre-tests: one for music tempo and one for cleanliness in the compartment. A short overview of the pre-tests will be discussed in the next paragraph.

3.2 Pre-tests

In total two pre-tests were conducted in order to determine which songs should be used as stimuli for the main study and another to select the right condition of cleanliness in the compartment for the main study.

The first pre-test concerned the selection of the songs based on attitude, tempo, and recognition. The aim for this pre-test was to affirm whether the songs that were chosen for the experiment were evaluated equally based on attitude, tempo, and were not recognised. A detailed description of the pre-test is included in Appendix I. NS passengers (N=20) listened to 16 music fragments of the songs (music list – Appendix I) in a random order, after which they evaluated the songs. Based on people's attitudes towards the songs, recognition and their perceived tempo, 8 songs were chosen as stimuli for the main experiment: 4 slow tempo songs (<74 BPM, mean of songs: 65 BPM) for the condition of

slow tempo music, and 4 fast tempo songs (>92 BPM, mean of songs: 126 BPM) for the condition consisting of fast tempo music (see Appendix I. Table A4).

The second pre-test is aimed to determine which conditions of cleanliness should be used for the compartments in the main experiment to be evaluated as a clean versus an unclean compartment. An overview of the description of the pre-test regarding cleanliness is included in Appendix II. In sum, participants (N=146) perceived the intense littered condition (condition 4) significantly messier compared to the clean condition (condition 1). For this reason, condition 1 (clean, tidy and neat) and 4 (intense littered, dirty) were used for the main experiment as being the unclean versus the clean compartment. Photos of the cleanliness conditions are included in Appendix II (Figure A1).

3.3 Main study

3.3.1 Procedure

The main experiment was performed in a mockup; a controlled laboratory environment used for experiments (Maldovan, Messner, & Faddoul, 2006). For this laboratory was chosen since a mockup is able to imitate elements of the servicescape, in which subjects realistically get the look and feel of the service environment (Miettinen, Rontti, Kuure, & Lindström, 2012). The mockup used for this experiment represented a compartment of sprinter train of NS (Figure 4 and 5).

After sampling an invitation was sent to the participants for the experiment in the mockup. When they enrolled for the experiment participants were randomly assigned to one of the six conditions in which the train compartment was clean or unclean, and in which fast, slow or no music was played. After participants were welcomed in the laboratory and the assignment (Appendix III) for the experiment was explained, they entered the train compartment and took a seat. Depending on the condition, music was already turned on when participants got into the compartment. Then, the journey started: the train (fictionally) departed from 'Stoevaart' and arrived in 'Beumen' twelve minutes later. Stoevaart and Beumen are fictional train stations in order to not manipulate time estimations. Travelling from familiar train stations might influence subjects' sense of time, since they might be familiar with the duration of the travel time between familiar train stations. During the journey, similar to a real train journey, background train noises were played in the compartment so as to create a situation as close to reality as possible. These noises had been recorded in a real sprinter train during an on-going journey for approximately twelve minutes. Since the train journey for the main experiment also consisted of twelve minutes, the noises were used in order to enhance realism for the experience in the mockup. When the participants arrived, they filled in the hard-copy questionnaire regarding the travel experience in the train, while they were still in the compartment. Furthermore, the songs that were played during the journey were repeated in the same order. Hence, subjects heard the same music while they filled in the survey as they heard during their journey. Constructs that were measured in the survey are described in paragraph 3.3.4. After participants completed the questionnaire, they left the compartment and handed in their surveys. Then, they were thanked for their participation in the experiment and exited the laboratory.

3.3.2 Stimulus materials

For the main experiment, regarding music two song lists were created, and regarding cleanliness two conditions of cleanliness in the compartment were selected. The research design (Table 1) represents how the conditions are divided for the main experiment.

Manipulation music

From the songs pre-test (Appendix I) two song lists were created for the conditions of the design consisting of 4 songs in the slow tempo category and 4 songs in the fast tempo category (Table A1). The songs were divided into two tempo categories based on beats per minute (BPM). According to the design, two conditions consisted of slow tempo songs (less than 72 BPM), two conditions consisted of fast tempo songs (more than 94 BPM), and in the remaining two conditions no music was played. The songs were played via Bluetooth speakers located through the compartment. The speakers played the songs on a moderate volume, taking the role as background music (Areni & Kim; 1993; Yalch & Spangenberg, 1990) in a random order.

Manipulation cleanliness

Furthermore, with regard to the research design, cleanliness was also manipulated. In three conditions participants travelled in the unclean compartment (Figure 4), and in the other three conditions participants travelled in the clean compartment (Figure 5). Based on the pre-test regarding cleanliness, the unclean compartment was manipulated through physical elements, such as napkins, coffee cups, prints of coffee circles on the tables, and remains of fruits. Figure 4 and 5 present photos of the unclean compartment versus the clean compartment as it was used for the main experiment.

Figure 4. Impression of condition 1, 3, 6 (unclean compartments) during the main experiment

Figure 5. Impression of condition 2, 4, and 5 (clean compartments) during the main experiment

3.3.4 Questionnaire design

The questionnaire consisted of several dependent variables that measured whether music (fast tempo versus slow tempo versus no music) influenced participants' time experience and environmental experience under various conditions of cleanliness. The questionnaire, with what these experiences were measured, is included in Appendix IV. The constructs of the questionnaire are discussed in this paragraph.

Time experience

First, time experience was measured using subjective time and the cognitive- and affective components of appraisal of time. The questionnaire commenced with these three time-constructs, since the experience was still fresh in participants' minds at that time.

Subjective time

Based on the perceived duration variables regarding customer's reactions to waiting (Pruyn & Smidts, 1998) subjective time of the journey was included in the survey. Participants were asked to estimate their travel time (in minutes) that passed from the moment they departed from station Stoevaart until arrival at station Beumen.

Appraisal of time

Next, the appraisal of time was evaluated, using the cognitive component of appraisal, which reflects the perception of the time period in terms of long or short; and the affective component of appraisal of time, which reflects participants' affective responses to time. These items are also based on constructs from Pruyn and Smidts (1998). The cognitive dimension of appraisal of time (long/short judgment) assessed whether participants experienced the duration of their journey as very long or very short using a long-short indicator. This item was measured on a seven-point scale ranging from 'very short' (1) to very long (7). Subsequently, the affective component of appraisal of time was assessed. Based on 5 statements participants indicated their affective responses towards the time, such as irritating, annoying, boring, and stressful on a 7-point Likert scale ranging from highly

disagree (1) to highly agree (7). Finally, a dichotomous question was included serving as a control question in order to affirm whether or not participants' checked the time during their journey.

Environmental experience

Next, the questionnaire (Appendix IV) consisted of constructs regarding the environmental experience. Subjects' environmental experience was measured using the PAD-emotions, assessment of the journey, and approach intentions. These constructs are explained in the following subparagraphs.

Emotions

The construct emotions was measured using the PAD-emotions (Mehrabian & Russell, 1974). The PAD-emotions consist of three dimensions, that is: pleasure, arousal and dominance. These constructs were measured with 6 items using a 7-point semantic differential scale of Mehrabian and Russell (1974). Items consisted of emotions such as: happy-unhappy (pleasure), sleepy-energized (arousal), and dominant-submissive (dominance).

Assessment of the journey

The construct *assessment of the journey* was measured using a 3 item, 7-point Likert scale. The construct was based on a prior study in the railway environment (Kramer, 2009). Items consisted of statements, such as: 'I felt stressed during my journey', and 'I felt hurried during my journey'.

Approach intentions

A 5 item, 7-point Likert approach avoidance scale (Mehrabian & Russell, 1974) was included to indicate participants' approach intentions. This construct was measured with several statements that indicated whether participants have intentions for approach behaviour, such as: 'I would return to this compartment', 'I would recommend travelling in this particular compartment to others', and 'I would travel in this compartment in the future'. The statements were evaluated on a 7-point Likert scale ranging from highly disagree (1 –avoidance behaviour is very likely) to highly agree (7 – approach behaviour is very likely).

Constructs for manipulation check

Besides time experience and travel experience, two manipulation checks were included in the survey: one for perception of cleanliness and one for perception of music tempo.

Cleanliness

The perception of cleanliness in the compartment was measured with a scale used in a prior study of Vos (2015), and the customer experience monitor of NS (2016). The construct in the questionnaire consisted of four statements, such as: 'I think the compartment is clean', and 'This compartment looks like it is being taken care of'. The statements were evaluated on a 7-point Likert scale ranging from highly disagree (1 – very unclean) to highly agree (7 – very clean).

Music tempo

To verify to which condition participants were assigned a control question was implemented in the questionnaire. This question was also added in the survey to conduct a manipulation check for music tempo. A dichotomous question indicated whether or not participants heard music. Next, a manipulation check was conducted regarding music tempo measured perceived tempo with a 7-point semantic scale, ranging from very slow (1) to very fast (7).

Attitude towards music (in the compartment)

Then, the attitude towards songs was assessed. This question was self-created, however, based on *the attitude towards music scale* (Edwards & Edwards, 1971), and a prior study in the railway environment regarding music (Sauren, 2010). The construct included six bipolar items measured on a 7-point semantic scale, such as: pleasant-unpleasant, calming-stressful, and energising-slow. Subsequently, a specific construct was included regarding participants' attitude towards music in the compartment during their journey. The question was added to verify if people who (highly) disliked the songs, also evaluated their travel experience differently from the other participants. They indicated their attitude with a 5 item, 7-point semantic scale. The construct consisted of similar items as were used for the measurement of attitudes towards the songs.

Demographic variables

Next, several general variables were included regarding participants' travel frequency, and travel purposes, in order to target the recommendations to NS on the right passenger group. Finally, a number of demographic variables were asked such as sex, age, education, in order to indicate the descriptive variables of the participants.

Moreover, the original scales were all set up in English. However, Dutch was the native tongue of the population in this experiment. Hence, the questionnaire was translated in Dutch. Then, the text was re-translated (from Dutch to English) to ensure the meaning of the original scale-items would be preserved as much as possible. The questionnaire is attached as Appendix IV. The questionnaire was distributed in hardcopy, since that was easier to fill in the questionnaire compared to digital methods.

3.4 Reliability analysis

The scale's internal consistency of the items within the construct is calculated with the Cronbach's alpha. Table 3 represents the overview of the Cronbach's alpha reliability analysis for the current study. The constructs consisted of: The affective component of appraisal, pleasure, arousal, dominance, assessment of the journey, approach intentions, perception of cleanliness, attitude towards the songs, and finally, attitude towards music in the train. Table 3 reveals that the Alpha of most constructs is sufficient. However, the internal validity of arousal could be enhanced by removing several items from the scale. Therefore, the scale for arousal was refined when reducing six items to three (.76).

Table 3. Reliability analysis

Construct/item	# Items	α	α if item deleted	Remaining items	N
Affective component of appraisal	5	.70	.74	4	123
Pleasure	6	.80	.79	5	123
Arousal	6	.50	.76	3	123
Dominance	6	.74	.82	5	123
Assessment of the journey	3	.89	.85	2	123
Approach intentions	5	.91	.91	5	123
Cleanliness perception	4	.91	.97	3	123
Attitude towards songs	6	.85	.86	5	75
Attitude towards music in the train	5	.88	.92	4	75

3.5 Subjects

For the experiment in the mockup, NS-passengers were asked to participate using several resources such as online and offline methods. After dealing with no-show, the research sample consisted of 123 participants (N=123). The number of participants per condition is presented in the research design (Table 1). In total 41% men, and 59% women (Table 4) participated the experiment. There is not a major difference between the age groups except for the participants in the age group between 36-45 years old (5.7%). This group is unrepresented in the sample of the main experiment compared to other age groups.

To verify whether significant differences existed in conditions between age groups an ANOVA was used, which found a significant effect [$F(5,117)=2.491$, $p=.035$, $n^2_p=.096$]. The Tukey HSD post hoc indicated that the average age in the condition of the clean compartment with fast music (M=38 years old, SD=17) differed significantly from the condition of the unclean compartment without music [M=59 years old, SD=18), p=.029. Thus, the condition of fast tempo music in the clean compartment consisted of people in the age group of 36 years old to 45, whereas the condition of the unclean compartment without music consisted of people in the age group 56-65 years old. If remarkable results would be found for the dependent variables between these conditions, it might be due to the differences in age since older people have different music preferences compared to younger people.

Participants from the sample were recruited from several methods. First, participants were recruited from various public spaces at Utrecht Central Station, since most people were NS passengers in this

particular environment. Also, an online message was sent to several social media platforms for inhabitants of Utrecht who travel at least once per year by train. Via a sign-up sheet people could enlist for participation in the experiment in the mockup compartment. Finally, a research panel was used in order to sample participants for the experiment. The average age of the 123 participants was 47 years old (SD=19.28). Additionally, the average travel frequency of the participants was between 1-3 days per week and 1-3 days per month, whereby the average travel purpose of participants was to visit family and friends or to go shopping. An overview of the demographic characteristics is represented in Table 4.

Table 4. Sociodemographic characteristics participants

N=123	**Male**		**Female**		**Total**	
Gender:	50		73		123	
	41%		59%		100%	
Age:						
Up to 25	9		20		28	
	7.69%		16.24%		23.6%	
26-35	7		9		16	
	5.98%		6.84%		13.0%	
36-45	3		4		7	
	2.56%		2.56%		5.7%	
46-55	7		13		20	
	5.13%		11.11%		16.3%	
56-65	6		17		23	
	3.42%		14.53%		18.7%	
65+	18		10		28	
	15.38%		8.55%		22.8%	
Average age (years)	50 years		45 years		47 years	
SD	19.84		18.80		19.28	
	M	**SD**	**M**	**SD**	**M**	**SD**
Travel frequency	2.88	1.21	2.66	1.13	2.75	1.16
Travel purposes	4.70	2.43	4.66	2.50	4.67	2.46

*Note: a significant difference was found for age between condition 2 and 6 from the design (Table 1).

4. Results

In this section, the results of the main study are discussed. First, two manipulation checks are described: one for music tempo and one for the perception of cleanliness. Subsequently, the effect of music (regardless of tempos) and cleanliness is discussed, based on the research design (Table 1). Next, the analyses are described for the main effect of music tempos, cleanliness and the interaction effect of music tempo and cleanliness on the environmental experience- and time experience variables.

4.1 Manipulation checks

Perceived cleanliness

The first manipulation check that was conducted in the questionnaire for the main study was subjects' perception of cleanliness. In order to verify perceptions of cleanliness during the experiment a one-way ANOVA was used. The one-way ANOVA indicated a statistically significant effect between the cleanliness conditions [$F(1,121)=482.573$, $p<.001$, $n^2_p=.800$, with the unclean condition being perceived as significantly less clean ($M=2.39$, $SD=1.00$) than the clean condition ($M=5.99$, $SD=.81$) (Table 5).

Table 5. Number of respondents, mean score, and standard deviation per cleanliness condition

	Unclean			Clean		
	N	**M**	**SD**	**N**	**M**	**SD**
Perception of cleanliness	61	2.39	1.00	62	5.99	.81

Perceived music tempo

Furthermore, a manipulation check was performed for subjects' perceived tempo of the played songs. The one-way ANOVA indicated a statistically significant effect between the music tempos [$F(1,73)=45.811$, $p<.001$, $n^2_p=.386$], with the fast tempo music being perceived as significantly faster ($M=4.47$, $SD=.86$) compared to slow tempo music ($M=2.95$, $SD=1.05$) (Table 6).

Table 6. Number of respondents, mean score, and standard deviation per music tempo condition

	Slow	condition		Fast	condition	
	N	**M**	**SD**	**N**	**M**	**SD**
Perception of tempo	41	2.95	1.05	34	4.47	.86

4.2 Preliminary analyses

H1A: Passengers' environmental experience and time experience will be more positive when music (vs. no music) is played.

As the starting point of the analysis of this study two separate preliminary analyses are conducted in order to detect the effect on the dependent variables when fast tempo (N=39) or slow tempo (N=43) music was played compared to conditions without music (N=41). In other words, the one-way ANOVA verified which dependent variables were affected by conditions of slow tempo music

compared to no music, and which dependent variables were affected by conditions of fast tempo music compared to no music.

Firstly, an ANOVA (one-way) was performed regarding the effect of slow tempo music compared to no music on all dependent variables. For both time experience variables as for environmental experience variables no statistically significant effects were found between conditions with slow tempo music and without music.

Secondly, an ANOVA (one-way) was performed for the effect of fast tempo music compared to no music on all dependent variables. For time experience variables, no significant effects were found between conditions of fast tempo music and conditions without music. However, the one-way ANOVA indicated that for environmental experience variables playing fast tempo music negatively influences subject's assessment of the journey [$F(1,77)=4.264$, $p=.042$, $n^2_p=.052$). It appeared that assessment of the journey was higher in conditions without music ($M=6.15$, $SD=.99$) compared to conditions playing fast tempo music ($M=5.58$, $SD=1.46$). Hence, H1A could not be confirmed, since more positive assessments of the journey were found when no music was played compared to playing fast tempo music (Figure 6).

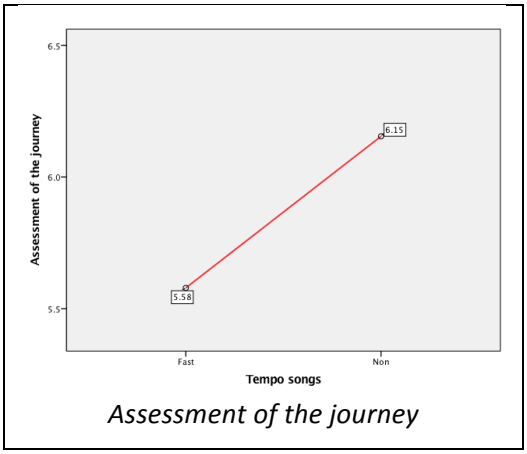


Figure 6. Preliminary analysis of the effect of fast tempo music compared to no music on assessment of the journey

To summarize, except for the construct assessment of the journey, no other time experience or environmental experience variables are affected between conditions with slow/fast tempo music compared to conditions without music. Thus, playing high arousing fast tempo music in the compartment affects passengers' assessment of their journey significantly compared to the low arousing condition without music in the compartment.

The formulated hypotheses for this study refer to expectations regarding the effect of music tempo on the travel experience, under various conditions of cleanliness. Hence, the question to answer is which dependent variables are significantly influenced by fast tempo music compared to slow tempo music, under various conditions of cleanliness. Now that analyses are performed to the effect of slow tempo music compared to no music, and fast tempo music compared to no music, on the travel experience variables, the effect of slow tempo music compared to fast tempo music is examined under various conditions of cleanliness. Several 2x2 ANOVA's are performed in order to detect possible main effects and interaction effects. The results are described in the next paragraph.

4.3 Manova

A 2(music tempo: fast tempo vs. slow tempo) x 2 (cleanliness: unclean vs. clean) multivariate analysis of variance (MANOVA; Pillai's Trace) was conducted for dependent variables referring to attitudes and experiences from the research design (Table 1): pleasure, arousal, dominance, assessment of the journey, and approach intentions (N=123). However, the design not only includes variables regarding environmental experiences, but also variables with regard to time experiences. Since environmental experiences are perceived differently than time experiences, another MANOVA was conducted also for the effect of music tempo, cleanliness, and the combination between music and cleanliness on the dependent variables for time experience: subjective time, long/short judgment, and affective component of appraisal of time.

For this study, two MANOVAs are performed: one for the effect of music tempo, cleanliness, and a two-way interaction between music tempo and cleanliness on all outcome time experience variables; and another for the environmental experience variables. Pillai's Trace was used since this statistic is considered as the most powerful and robust scale of the four statistics regarding the multivariate analysis of variances of small samples (Allen & Bennett, 2012). The findings of the MANOVA for the both time experience variables and environmental experience variables are represented in Table 7. Furthermore, Table 8 reflects on the scores for the univariate analysis of variance for the dependent variables – per music tempo condition, per cleanliness condition, and the combination of music tempo and cleanliness. Finally, the group means (and standard deviations) per dependent variable are shown in from Table 9 and Table 10.

Table 7. Multivariate analysis of variance (MANOVA) of main, and interaction effects on dependent variables regarding attitudes and experiences, and time experiences

Independent variable	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Time experience						
Music tempo	.05	1.36	3.00	78.00	.26	.03
Cleanliness	.04	1.45	3.00	119.00	.23	.04
Music tempo x Cleanliness	.19	6.02	3.00	76.00	.00	.13
Environmental experience						
Music tempo	.11	1.88	5.00	75.00	.11	.11
Cleanliness	.28	9.02	5.00	116.00	.00	.28
Music tempo x Cleanliness	.08	1.24	5.00	73.00	.30	.08

*Pillai's Trace multivariate test was used

According to Field (2013) a significance level of .10 is an acceptable alpha value to use when generating multivariate tests. Regarding time experiences, the MANOVA proved to be statistically non-significant for music tempo on dependent variables at this alpha level [F=(3,78)=1.358, p=.262, n^2_p=.031], indicating the absence of any meaningful music tempo differences on the dependent variables. Similarly, the main effect of cleanliness was found to be non-significant for the time-related dependent variables [F(3,119)=1.450, p=.231, n^2_p=.035] at the alpha level of α=.01. Nonetheless, the interaction effect between music tempo and cleanliness for the dependent variables proved to be significant [F(3,76)=6.021, p=.001, n^2_p=.131] at the alpha level of α=.05.

Furthermore, regarding dependent variables for environmental experiences the MANOVA retrieved from Table 7 proved that music tempo was statistically non-significant [F(5,75)=1.882, p=.107, n^2_p=.111]. Although Field (2013) proposed a significance level of .10 to be acceptable, the main effect

of cleanliness remained intact with the original, more strict alpha level of α=.05. The findings implied a significant main effect of cleanliness on the dependent variables [F(5,116)=9.024, p<.001, n^2_p=.280]. The interaction effect between music tempo and cleanliness, however, proved to be non-significant [F(5,73)=1.242, p=.289, n^2_p=.078].

In order to detect which dependent variables were influenced significantly from music tempo, cleanliness, or the combination of music tempo and cleanliness, several 2x2 factorial between groups analyses of variance (ANOVA) were conducted. The ANOVA for the main effect of music tempos, the main effect of cleanliness, and the interaction effect between music tempos and cleanliness generated an analysis for each dependent variable separately. Table 8 presents the results derived from the 2x2 ANOVAs, on the basis of the research design (Table 1) and the formulated hypotheses.

Table 8. Univariate 2x2 ANOVA main effects and interaction effects for all dependent variables

Independent variable	Dependent variable	Sum of squares	df	Mean square	F	Sig.	Partial Eta Squared
Time experience							
Music tempo	Subjective time	33.43	1,80	33.43	.89	.35	.01
	Long/short judgment	1.31	1,80	1.31	1.11	.30	.01
	Affective comp. of appraisal of time	.08	1,80	.08	.07	.80	.00
Cleanliness	Subjective time	120.30	1,121	120.31	4.33	.04	.04
	Long/short judgment	.17	1,121	.17	.11	.74	.00
	Affective comp. of appraisal	.040	1,121	1.14	.04	.85	.00
Music tempo x Cleanliness	Subjective time	28.90	1,78	28.90	.80	.37	.01
	Long/short judgment	4.46	1,78	4.46	3.86	.05	.05
	Affective comp. of appraisal	18.64	1,78	18.64	16.33	.00	.17
Environmental experience							
Music tempo	Pleasure	1.41	1,80	1.41	1.35	.25	.02
	Arousal	4.39	1,80	4.39	3.21	.08	.04
	Dominance	.01	1,80	.01	.02	.89	.00
	Assessment of journey	3.19	1,80	3.19	2.08	.15	.03
	Approach intentions	1.26	1,80	1.35	.94	.34	.01
Cleanliness	Pleasure	.09	1,121	.09	.09	.77	.00
	Arousal	13.35	1,121	13.35	9.79	.00	.08
	Dominance	.15	1,121	.74	.20	.65	.00
	Assessment of journey	.71	1,121	1.39	.51	.48	.00
	Approach intentions	22.78	1,121	22.78	15.91	.00	.12
Music tempo x Cleanliness	Pleasure	1.54	1,78	1.54	1.48	.23	.02
	Arousal	2.51	1,78	2.51	1.96	.17	.03
	Dominance	.19	1,78	.19	.27	.61	.00
	Assessment of journey	5.06	1,78	5.06	3.35	.07	.04
	Approach avoidance	7.61	1,78	7.61	4.87	.03	.06

Table 9. Mean scores, and standard deviations of dependent variables per music tempo condition

Dependent variable	M	SD	M	SD
	Slow tempo music N=43		Fast tempo music N=39	
Time experience				
Subjective time	14.53	7.81	13.26	3.37
Long/short judgment	3.53	1.14	3.28	1.03
Affective component of appraisal	5.48	.93	5.23	1.37
Environmental experience				
Pleasure	5.03	1.04	4.77	.99
Arousal	4.02	1.14	4.48	1.20
Dominance	4.08	.98	4.06	.66
Assessment of journey	5.98	1.01	5.58	1.46
Approach intentions	4.81	1.43	4.86	1.28

Table 10. Means and standard deviations of dependent variables per cleanliness condition

Dependent variable	M	SD	M	SD
	Unclean condition N=61		Clean condition N=62	
Time experience				
Subjective time	14.64	6.31	12.66	3.99
Long/short judgment	3.36	1.29	3.44	1.18
Affective component of appraisal	5.43	1.00	5.40	1.13
Environmental experience				
Pleasure	4.93	1.16	4.98	.84
Arousal	4.51	1.18	3.85	1.15
Dominance	4.15	.95	4.08	.76
Assessment of journey	5.84	1.24	5.99	1.13
Approach intentions	4.43	1.31	5.29	1.08

The results of the 2x2 ANOVAs are described on the basis the formulated hypotheses for the current study. The hypotheses, based on theoretical foundations, consist of expectations regarding the main effect of music tempo, cleanliness, and the combination between music tempo and cleanliness. However, as described, the MANOVA for the main effect of music tempo on dependent variables regarding environmental experiences indicated to be non-significant. Furthermore, although the main effect of cleanliness proved to be statistically significant, the interaction between music tempo and cleanliness on dependent variables was found to be non-significant.

Furthermore, with regard to the MANOVA for time experience, both the main effect of music tempo and the main effect of cleanliness proved to be non-significant either. However, the interaction effect between music tempo and cleanliness on the dependent variables was found to be significant. Findings from these analyses are presented in Table 8. Still, the main effects and interaction effect are discussed in this chapter. Since several hypotheses were formulated regarding these effects for environmental experiences and time experiences discussing the results will give fundaments to (dis)confirm expectations regarding the effects of music tempo, cleanliness, or the interaction between those individually.

In advance of processing the results of the univariate analysis of variance, the Bonferroni adjusted alpha level was calculated in order to prevent possible errors that occur from performing multiple tests on the same data. To do so, the significance of the univariate ANOVAs at a Bonferroni was measured. This was performed with dividing the alpha level α=.05 or α=.10 by the number of dependent variables from the MANOVA. Overall, for this current study eight dependent variables were used, which resulted in the adjusted alpha level of .006 - .013.

4.4 Environmental experience

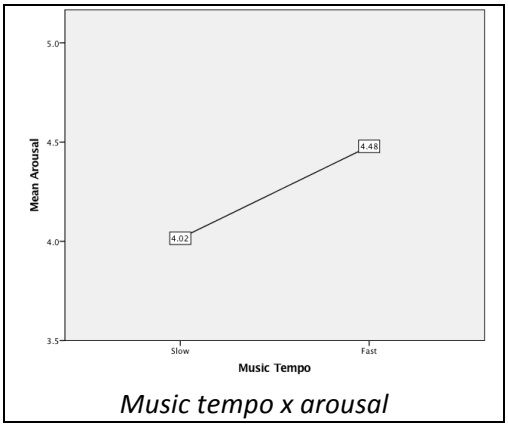
Main effect music tempo

H1B: Passengers will experience higher levels of pleasure when slow tempo music (vs. fast tempo music) is played.

Hypothesis 1B concerned the main effect of music tempo on pleasure. The findings from the 2x2 ANOVA proved non-significant effects of the main effect of music tempo on pleasure (p=.248). Hence, H1B is rejected.

H1C: Passengers will experience higher levels of arousal when fast tempo music (vs. slow tempo music) is played.

The 2x2 ANOVA revealed music tempo marginally significantly influenced arousal [F(1,80)=3.211, p=.077, n^2_p=.039], at the α=.10 level. Since music tempo was divided into two categories, a post hoc test could not be performed (Allen & Bennett, 2012). Thus, to indicate the significant distribution of music tempo on arousal, the descriptive statistics were taken into account. Accordingly, higher levels of arousal were reported in the conditions of fast tempo music (M=4.48, SD=1.20) compared to conditions of slow tempo music (M=4.02, SD=1.14). Hence, conditions of fast tempo music significantly elicited higher levels of arousal compared to slow tempo music conditions. Hence, H1C is confirmed (Figure 7).



Music tempo x arousal

Figure 7. Mean plot of arousal per music tempo condition (left: slow tempo, right: fast tempo)

H1D: Passengers will experience lower levels of control when fast tempo music (vs. slow tempo music) is played.

As for dominance, the 2x2 ANOVA showed non-significant effects of the main effect of music on dominance (p=.890) neither at the α=.05 level, nor at the α=.10 level. Thus, H1C is rejected.

H1E: When slow tempo music (vs. fast tempo music) is played, passengers will be more willing to revisit (approach) the train.

Regarding approach intentions in conditions of music tempo, the 2x2 ANOVA showed that the main effect of music tempo was statistically non-significant for approach intentions (p=.863). The high p-value of approach intentions in conditions of music tempo was non-significant at the .05 level nor at the .10 level. Therefore, hypothesis 1E is rejected.

Main effect cleanliness

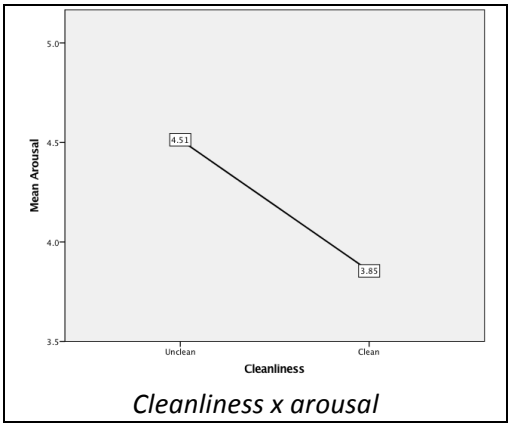
After the hypotheses regarding the main effect of music tempo were analysed, the hypotheses for the main effect of cleanliness on dependent variables are assessed. The formulated hypotheses concerned the influence of cleanliness on the PAD-emotions and approach avoidance behaviour.

H2A: Passengers will experience higher levels of pleasure under clean (vs. unclean) conditions.

The main effect of cleanliness on pleasure as hypothesised in H2A was analysed using the 2x2 ANOVA. However, the main effect of cleanliness proved to be non-significant for pleasure (p=.765). Consequently, H2A is rejected.

H2B: Passengers will experience higher levels of arousal under unclean (vs. clean) conditions.

The outcomes of the 2x2 ANOVA reached significance for the main effect of cleanliness on arousal [F(1,121)=9.791, p=.002, n^2_p=.075]. Since cleanliness consisted of only two conditions, a post hoc test could not be performed. Nonetheless, to detect the differences between the groups the descriptive statistics were used, which indicated that in unclean conditions higher levels of arousal were detected (M=4.51, SD=1.18), compared to clean conditions (M=3.85, SD=1.15). Consequently, H2B is confirmed based on the significant main effect of cleanliness on arousal. Figure 8 visually represents the distribution of cleanliness on arousal.



Cleanliness x arousal

Figure 8. Mean plot of arousal per cleanliness condition (left: unclean, right: clean)

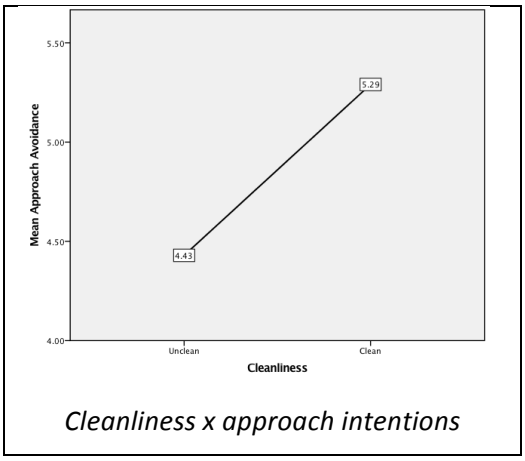
H2C: Passengers will experience lower levels of control under unclean (vs. clean) conditions.

Regarding H2C of the main effect of cleanliness on dominance, a 2x2 ANOVA showed non-significant effects for the main effect of cleanliness on dominance (p=.654). Hence, H2C is rejected.

H2D: Passengers will be more willing to revisit the train under clean (vs. unclean) conditions.

The main effect of cleanliness on approach avoidance behaviour was analysed using a 2x2 ANOVA. The outcomes of the analysis of variance indicated that the main effect of cleanliness on approach avoidance behaviour was statistically significant [F(1,121)=15.914, p<.001, n^2_p=.116]. The descriptive statistics indicated that approach behaviour was more likely in the clean conditions (M=5.29,

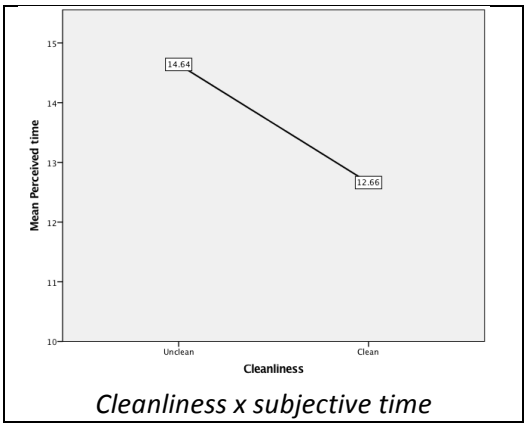
SD=1.08) compared to the unclean conditions (M=4.43, SD=1.30). Hence, H2D is confirmed (Figure 9).



Cleanliness x approach intentions

Figure 9. Main effect of cleanliness on approach intentions (left: unclean, right: clean)

Moreover, a main effect of cleanliness on subjective time was found. Although not formulated in the hypotheses, a 2x2 univariate analysis of variance was conducted, which revealed a significant main effect of cleanliness on subjective time [F(1,121)=4.330, p=.040, n^2_p=.035) at the .05 alpha level. The results indicated that estimations of the travel time were significantly lower in the clean conditions (M=12.66, SD=3.99) compared to the unclean conditions (M=14.64, SD=6.31) (Figure 10). More specifically, passengers estimated their travel time to be 2 minutes longer under unclean conditions versus clean conditions. This finding is something to reflect on in the discussion (chapter 5).



Cleanliness x subjective time

Figure 10. Mean plot main effect of cleanliness for subjective time (left: unclean, right: clean)

Interaction effect music tempo and cleanliness

Next, the interaction effect between music tempo and cleanliness for the environmental variables is described. Although the MANOVA of the interaction effect on the environmental experience variables was found to be non-significant, the analysis is still performed in order to (dis)confirm hypotheses regarding the interaction effect. Following the formulated hypotheses regarding the interactions, the results on the environmental variables are described.

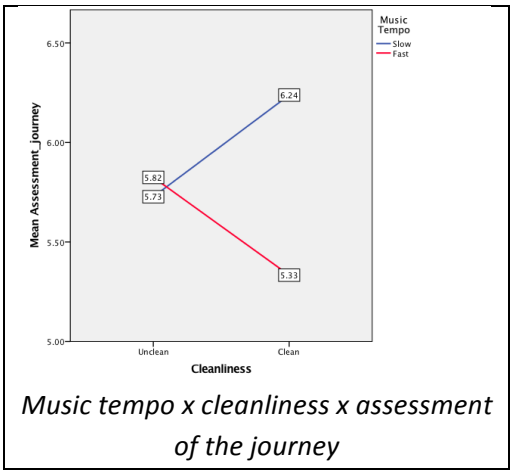
H3A: When slow tempo music (vs. fast tempo music) is played passengers will experience higher levels of pleasure under clean conditions; when slow tempo music (vs. fast tempo music) is played passengers

will experience less pleasure under unclean conditions.

H3B: When fast tempo music (vs. slow tempo music) is played passengers will experience higher levels of arousal under clean conditions; when fast tempo music (vs. slow tempo music) is played passengers will experience less arousal under unclean conditions.
H3C: When fast tempo music (vs. slow tempo music) is played passengers will experience lower levels of control under clean conditions; when fast tempo music (vs. slow tempo music) is played passengers will experience higher levels of control under unclean conditions.

Hypothesis 3A, 3B, and 3C refer to the interaction effect between music tempo and cleanliness for the PAD-emotions. The 2x2 ANOVAs proved the interaction effects to be statistically non-significant for pleasure (p=.228), arousal (p=.165), and dominance (p=.606). Hence, H3A, H3B, and H3C are rejected.

Moreover, although non-hypothesized, a 2x2 ANOVA found a marginally significant interaction effect between music tempo and cleanliness for assessment of the journey [F(1,78)=3.353, p=.071, n^2_p=.042]. The interaction shows that only under clean conditions slow tempo music evokes significantly more positive evaluations of the journey (M=6.24, SD=.73) compared to fast tempo music (M=5.33, SD=1.54), p=.026, (Figure 11). Hence, the difference between fast tempo music and slow tempo music under unclean conditions appears to be non-significant. Thus, only under clean conditions the interaction effect between music and cleanliness for the assessment of the journey is significant.



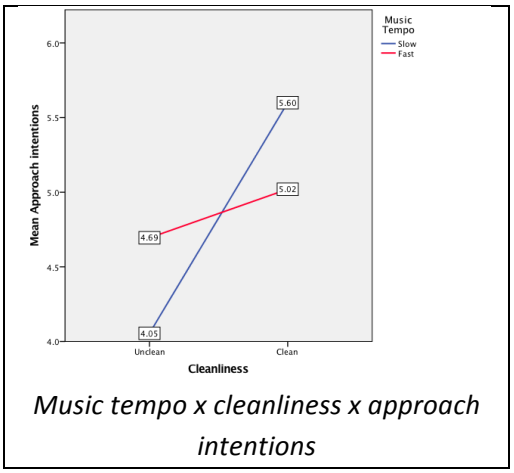
Music tempo x cleanliness x assessment of the journey

Figure 11. Interaction effect between music tempo and cleanliness on assessment of the journey (left: unclean, right: clean; red line: fast tempo music, blue line: slow tempo music)

H3D: Passengers will be more willing to revisit the train (approach) when slow tempo music (vs. fast tempo music) is played under clean conditions; passengers will be less willing to revisit the train (approach) when slow tempo music (vs. fast tempo music) is played under unclean conditions.

Next, the interaction effect between music tempo and cleanliness on approach intentions was assessed. A 2x2 ANOVA demonstrated that the interaction effect between music tempo and cleanliness affected approach intentions significantly [F(1,78)=11.437, p=.030, n^2_p=.059) at the α=.05 level. From the interaction appears that only under clean conditions slow tempo music marginally

significantly increases approach intentions (M=5.60, SD=.83) compared to fast tempo music (M=5.02, SD=1.10), p=.063 (Figure 12). Under unclean conditions the difference between slow tempo music and fast tempo music was found to be non-significant. Based on the significant difference between slow tempo music and fast tempo music under clean conditions for approach intentions, hypothesis 3D is partially confirmed (Figure 12).



Music tempo x cleanliness x approach intentions

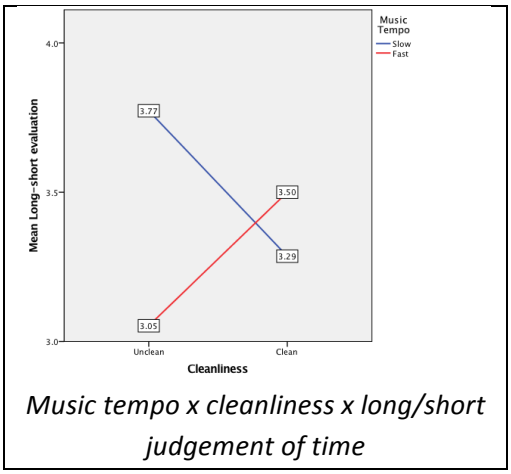
Figure 12. Interaction effect between music tempo and cleanliness on approach intentions (left: unclean, right: clean; red line: fast tempo music, blue line: slow tempo music)

4.5 Time experience

Subsequently, the interaction effect between music tempo and cleanliness on time experience was hypothesised. As described, a separate MANOVA was conducted in order to analyse the effects of music tempo, cleanliness, and the interaction between music tempo and cleanliness for time experience variables. The results indicated a significant main effect of cleanliness, and a significant interaction effect between music tempo and cleanliness for the dependent variables regarding time experience. In order to ascertain which variables regarding time experience were affected the following hypotheses were tested regarding the interaction effect between music tempo and cleanliness on time experiences.

H4A: Slow tempo music (vs. fast tempo music) will cause shorter judgments of time under clean conditions; slow tempo music (vs. fast tempo music) will cause longer judgments of time under unclean conditions.

A 2x2 ANOVA demonstrated the marginally significant interaction effect between music tempo and cleanliness for the long/short judgment of time [F(1,78)=3.862, p=.053, n^2_p=.047] at the .01 alpha level. From the interaction appears that only under unclean conditions fast tempo music causes significantly shorter time judgments (M=3.05, SD=.97) compared to slow tempo music that causes longer time judgments (M=3.77, SD=1.07), p=.030. Hence, under clean conditions, the difference between fast tempo music and slow tempo music was found to be non-significant (Figure, 13). Thus, hypothesis 4A is partially confirmed.



Music tempo x cleanliness x long/short judgement of time

Figure 13. Interaction effect between music tempo and cleanliness for long/short judgment (left: unclean, right: clean; red line: fast tempo music, blue line: slow tempo music)

Additionally, the results indicated a significant effect checking the time and the long/short judgment [F(1,121)=3.910, p=.050, n^2_p=.031]. More specifically, when the time was checked during the journey the travel time was evaluated to be longer (M=3.74, SD=1.29) versus when the time was not checked (M=3.26, SD=1.19), (Figure 14).

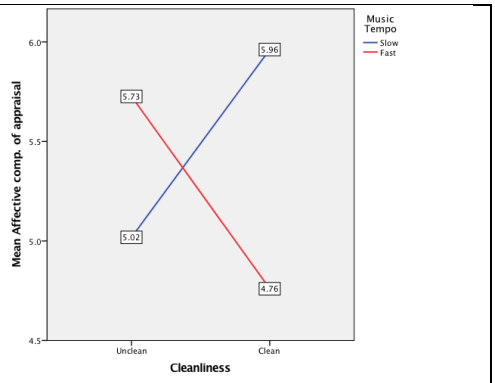
Check of time x long/short judgment

Figure 14. Distribution check of time and long/short judgment

H4B: Slow tempo music (vs. fast tempo music) will cause more positive affective responses to time under clean conditions; slow tempo music (vs. fast tempo music) will cause less positive affective responses to time under unclean conditions.

For the interaction effect between music tempo and cleanliness for the affective component of appraisal of time equal variances could not be assumed. Therefore, the Bonferroni adjusted alpha level was advised (.006 - .013) instead of the regular alpha level. Nonetheless, the results indicated that the interaction effect for the affective component of appraisal of time was statistically significant at the adjusted alpha level [F(1,78)=16.325, p<.001, n^2_p=.173). The interaction shows that under unclean conditions, fast tempo music causes significantly more positive affective responses to time (M=5.73, SD=1.00) compared to slow tempo music (M=5.02, SD=.85), p=.022. Moreover, a significant effect was also found under clean conditions, since slow tempo music causes significantly

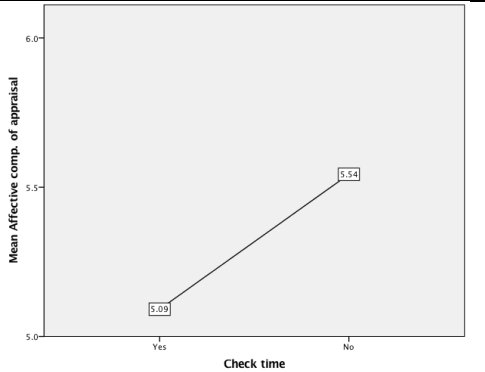
more positive affective responses to time (M=5.96, SD=.77) compared to playing fast tempo music (M=4.76, SD=1.49), p=.002 (Figure 15). Therefore, hypothesis 4B is confirmed.



Music tempo x cleanliness x affective component of appraisal of time

Figure 15. Interaction effect between music tempo and cleanliness on appraisal of time (left: unclean, right: clean; red line: fast tempo music, blue line: slow tempo music)

Furthermore, results indicated a relation between checking the time and affective responses. Passengers who did not check the time reported significantly more positive affective responses to the journey (M=5.54, SD=1.02) versus passengers who did check the time (M=5.09, SD=1.12) [F(1,121)=4.64, p=.033, n^2_p=.037] (Figure 16).



Check of time x affective component of appraisal by check of time

Figure 16. Mean of affective component of appraisal when time was (not) checked (left: did check time, right: did not check time)

H4C: When slow tempo music (vs. fast tempo music) is played passengers' subjective travel time will be shorter under clean conditions; when slow tempo music (vs. fast tempo music) is played passengers' subjective time will be longer under unclean conditions.

The final hypothesis referred to the interaction effect between music tempo and cleanliness on subjective time. A 2x2 ANOVA indicated statistically non-significant effects for this interaction on subjective time (p=.373). Therefore, hypothesis 4C was rejected.

Table 11 represents the overview of the (dis)confirmed hypotheses.

Table 11. Hypotheses of the study

Hypotheses	Confirmed
H1A:	-
H1B:	-
H1C:	+
H1D:	-
H1E:	-
H2A:	-
H2B:	+
H2C:	-
H2D:	+
H3A:	-
H3B:	-
H3C:	-
H3D:	+/-
H4A:	+
H4B:	+
H4C:	-

Differences between conditions

In order to verify possible significant differences between the conditions of the design for the dependent variables, a 2x2 ANOVA was performed. The results proved significant differences for the affective component of appraisal of time [F(5,117)=4.174, p=.002, n^2_p=.151]. The Tukey HSD post hoc analysis found that more positive affective responses appear in the clean condition with slow tempo music (M=5.96, SD=.77) versus the clean condition with fast tempo music (M=4.76, SD=1.49), p=.003. Moreover, affective responses are more positive in the unclean condition with fast tempo music (M=5.73, SD=1.05) compared to the clean condition with fast tempo music (M=4.76, SD=1.49), p=.037. Furthermore, a marginally significant difference was found between the unclean condition without music (M=5.61, SD=1.01) in which affective responses are higher than in the clean condition with fast tempo music (M=4.76, SD=1.49), p=.086. Finally, affective responses are significantly more positve in the clean condition with slow tempo music (M=5.96, SD=.77) compared to the unclean condition with slow tempo music (M=5.02, SD=.85), p=.030.

Furthermore, a significant difference was found between conditions of the design for arousal [F(5,117)=3.233, p=.009, n^2_p=.121]. A Tukey post hoc test indicated that in the unclean condition with fast tempo music arousal is higher (M=4.96, SD=1.05), compared to the clean condition without any music (M=3.67, SD=1.16), p=.007. Moreover, a significant difference was found between the unclean condition with fast tempo music (M=4.96, SD=1.05) compared to the clean condition with slow tempo music (M=3.89, SD=1.17), p=.045.

Finally, a significant difference was found between the conditions of the design for approach intentions [F(5,117)=4.440, p=.001, n^2_p=.159]. The Tukey HSD post hoc demonstrated significantly increased approach intentions in the clean condition with slow tempo music (M=5.60, SD=.83), compared to the unclean condition with slow tempo music (M=4.05, SD=1.49), p=.001. Also, the post hoc test indicated significantly increased approach intentions in the clean condition without music (M=5.24, SD=1.24), versus the unclean condition with slow tempo music (M=4.05, SD=1.49), p=.017.

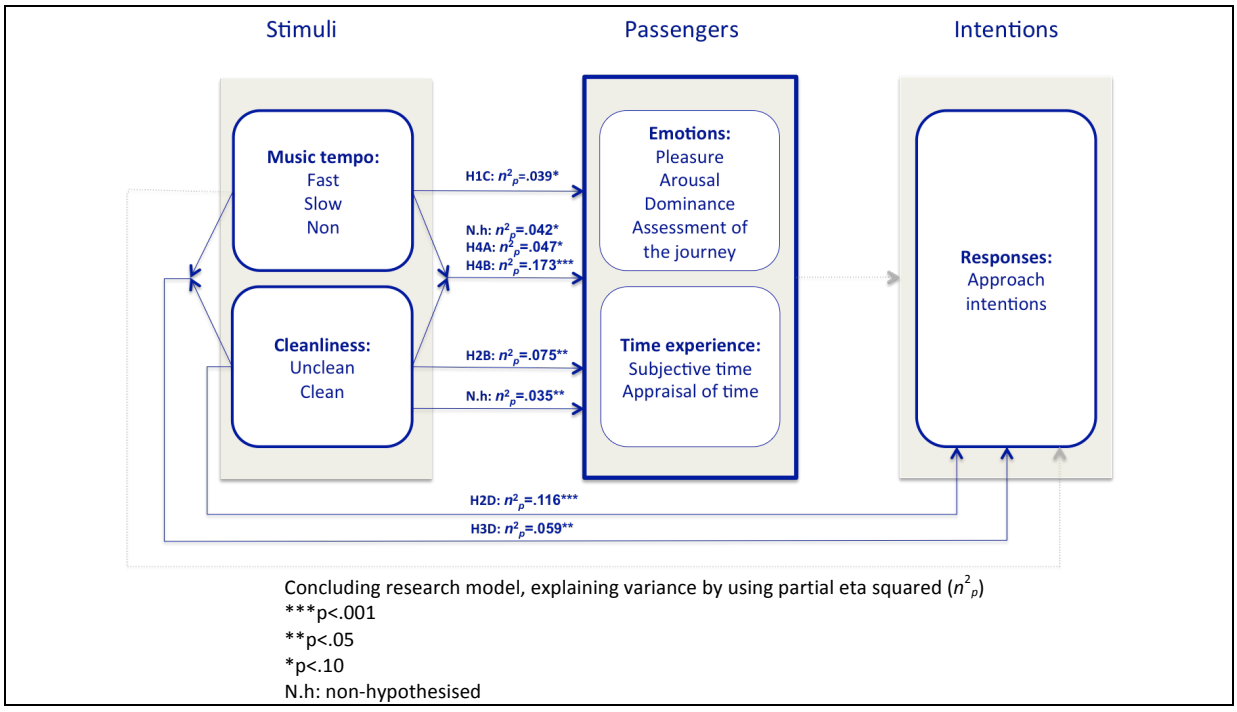
Effects of demographics

An ANOVA was used in order to find possible significant differences between age groups for the dependent variables of the design (Table 1). The univariate analysis of variance found a significant effect for pleasure [F(5,117)=2.729, p=.023, n^2_p=.104]. The Tukey HSD post hoc proved that participants between 56 and 65 years old experienced significantly higher levels of pleasure (M=5.37, SD=.91), compared to participants between 26-35 years old (M=4.34, SD=.93), p=.020. No other significant differences were found between the age groups of the subjects.

5. Discussion

This study focused on the effect of music on passengers' travel experience under various conditions of cleanliness, whereby travel experience was divided into the experience of surroundings (i.e. environmental experience), and the experience of time (i.e. time experience). Consistent with prior studies such as Mattila and Wirtz (2001) and Doucé et al (2014) this study considered environmental stimuli simultaneously, not in isolation. For this study, the functional (cleanliness) and mechanical (music) dimensions identified by Haeckel et al (2003) are the foundation for the combination of music and cleanliness in the servicescape. The objective of this study was to examine the effect of (in)congruence between music tempo and cleanliness on passengers' travel experience to (dis)confirm the formulated hypotheses regarding time experience and environmental experience (Figure 17).

Most importantly, this study provides evidence that the main effect of cleanliness, and congruence between music tempo and cleanliness affects time experience most powerfully. First, cleanliness influences subjective time. Second, congruence between cleanliness and music tempo enhances affective responses to time, and (under unclean conditions) cognitive appraisal of time. Furthermore, regarding environmental experience, cleanliness influences arousal as well as music tempo does. More importantly, cleanliness is a key driver for approach intentions. As a result, the (in)congruence between music tempo and cleanliness highly affects approach, which proofs the moderating effect of cleanliness on the relation between music tempo and approach intentions. This discussion sums up the results illustrated in Figure 17 according to the formulated hypotheses for this study (Table 11).



Concluding research model, explaining variance by using partial eta squared (n^2_p)
***p<.001
**p<.05
*p<.10
N.h: non-hypothesised

Figure 17. Research model

Main effect music tempo

Firstly, in line with prior research (Milliman, 1986; Holbrook & Anand, 1990; Kellaris & Kent, 1992) arousal levels are higher in conditions of fast tempo music compared to conditions of slow tempo music. Hence, this study shows that passengers experience more stimulation when fast tempo music is played compared to slow tempo music.

Main effect cleanliness

Secondly, remarkably in clean conditions time estimations appear to be two minutes shorter compared to time estimations in the unclean conditions based on the objective time of twelve minutes. Hence, this study provides evidence that cleanliness is a key driver for subjective time. Moreover, besides subjective time, cleanliness influences levels of arousal. To explain the effect of cleanliness on subjective time, arousal has shown to be a mediator. Several explanations might be applicable for this effect: First, passengers might have been specifically focused on the dirt in the environment. This might have caused extreme awareness on the garbage, rests of fruits, and coffee spots in the servicescape, and high levels of (negative) stimulation. Berlyne (1971) identified with the optimal arousal theory (Figure 2) that people find themselves in the comfort zone when they experience the optimal level of stimulation. When the comfort zone is exceeded as a result of a high arousing servicescape, too many stimuli are perceived. Consequently, and in line with Baker and Cameron (1996), perceiving too many stimuli results in over-stimulation, which affects time perceptions negatively. Furthermore, this effect could be explained by Hogan's (1978) U-curve of time perceptions on the basis of the principle of adaption level. Preferences of stimuli increase to a certain optimum, after which over-stimulation and aversion to the stimuli occur. People disengage themselves when too many stimuli are experienced. As a result, people pay more attention to the time. Hence time durations are estimated to be longer. Although various studies acknowledge the effect of arousal on time perceptions (Bruner, 1990; Hornik, 1992; Van Hagen, 2011), several researches disconfirmed the relation between affect (arousal) and time perception (Kellaris & Kent, 1992; Kellaris & Mantel, 1994). Kellaris and Kent (1992) however only measured selections of stimuli rather than examining the general affect of subjects. Additionally, the duration of experiments of Kellaris and Kent (1992) and Kellaris and Mantel (1994) was found to be shorter than for instance the study from Hornik (1992). Thus, similar to this study was found that environmental elements in the servicescape directly influence affect either positively or negatively (Mehrabian & Russell, 1974), that in turn affects perceptions of time (Baker & Cameron, 1996). Hence, the disconfirmation of the role of arousal on subjective time is something to consider for future research.

Moreover, this study revealed the powerful role of cleanliness on levels of arousal, in which uncleanliness evokes higher levels of arousal than cleanliness. According to the research from Mattila & Wirtz (2000) was expected that a highly stimulating environment induces higher levels of arousal and stress than environments with fewer stimuli. More specifically, Mattila and Wirtz (2000) emphasize the role of arousal in determining consumers' perceptions of the servicescape. High arousing servicescapes exceed people's preferred level of arousal, resulting in a desire to escape the servicescape (Mehrabian and Russell, 1974; North & Hargreaves, 2000). More importantly, since no evidence was found in prior studies for the effect of cleanliness on arousal, this study contributes new knowledge, in which cleanliness is a key driver for levels of arousal.

Additionally, and consistent with expectations based on a study from Vilnay-Yavetz and Gilboa (2010) and Wakefield and Blodgett (1996), this study shows that uncleanliness decreases intentions to revisit the service environment, whereas willingness to revisit is more likely under clean conditions. Prior research demonstrates that cleanliness enhances perceived quality and levels of satisfaction, while uncleanliness leads to dissatisfaction (Brown, 1991; Herzberg, Mausner, & Snyderman, 1959). Hence, cleanliness of the servicescape is a key driver for approach intentions, and this study confirms the determinant effect of cleanliness on approach intentions. Prior research demonstrated that cleanliness enhances perceived quality of the service provider (Lucas, 2003) and satisfaction with the service provider (Wakefield & Blodgett, 1996). Consistent to prior research (Lucas, 2003; Wakefield & Blodgett, 1996), passengers did not prefer to revisit a service environment with dirty furniture, or other unclean facets of the servicescape. Hence, this study proves that cleanliness of the servicescape is a powerful determinant for approach intentions.

Interaction effect music tempo and cleanliness for time experience

As Figure 17 illustrates, this study proves that congruence between environmental stimuli most strongly enhances affective responses to time. More specifically, under clean conditions low arousing slow tempo music positively influences passengers' affective responses. Similarly, under unclean conditions high arousing fast tempo music influences internal responses positively as well. Thus, consistent with predictions based on a study from Mattila and Wirtz (2001) matching stimuli enhances the appraisal of time, whereas mismatching stimuli between cleanliness and music tempo elicits negative reactions such as irritation and stress. Furthermore, this study revealed that only under unclean conditions matching between stimuli shortens the evaluation of time (long/short judgment). Consistent with prior research regarding congruence (Mattila & Wirtz, 2001) when environmental stimuli are coherent, optimal level of arousal is attained (Berlyne, 1971). Hence, people enjoy the situation and are distracted from the time (Zakay & Block, 1997), regardless from uncleanliness. Thus, playing fast tempo music in a coherent high arousing unclean compartment distracts passengers during their journey in the compartment (Zakay, 1989), resulting in shorter judgments of time (Pruyn & Smidts, 1998).

Interaction effect music tempo and cleanliness for environmental experience

This study revealed that under low arousing clean conditions, slow tempo music influences assessment of the journey more positively than playing fast tempo music. Thus, cleanliness moderates the relationship between music tempo and assessment of the journey. This effect can be explained by using the optimal arousal theory (Berlyne, 1971) and congruence between stimuli (Mattila & Wirtz, 2001). People experience the optimal level of stimulation when environmental stimuli are coherent. Hence, the environment with few stimuli (slow tempo music in the clean compartment) is perceived as comfortable, thus, increases evaluations of the journey. Mismatching stimuli (Doucé, et al., 2014), on the other hand, might have increased levels of stress, which results in more negative evaluations of the journey.

In addition, under clean conditions congruent slow tempo music increases approach intentions. Hence cleanliness moderates the relation between music tempo and approach intentions. In line with the theories regarding congruence between stimuli and intention to revisit (Doucé et al., 2014; Mattila & Wirtz, 2001), congruence between stimuli leads to higher willingness to revisit the service

environment than mismatching, incongruent stimuli. However, no effect was found under unclean conditions and congruent high arousing fast tempo music. A possible explanation based on Wakefield and Blodgett (1996) might be that the service environment first must be clean before passengers want to return. More specifically, passengers might not want to spend time in an unclean, dirty train. Thus, only under clean conditions an effect is found for approach intentions, regardless from congruence for high arousing conditions.

Limitations and suggestions for future research

This study suggests the moderating effect of cleanliness on the relation between music tempo and passengers' environmental experience and time experience. For this study several shortcomings were addressed that challenge reliability of the results for other servicescape studies.

A first point to discuss is the motivation orientation of passengers. This study did not include passengers travel goals according to the must- and lust motivations from Apter (2007) as was taken into account in the study from Van Hagen (2011). In the railway environment, Van Hagen (2011) identified that must-passengers have different needs and preferences for their optimal level of stimulation during peak hours than lust-passengers during off peak hours. Future research should consider to include passengers' motivation orientations for the research design as was proposed for this study in order to create a well-fitted servicescape for the optimal level of stimulation of passengers.

Secondly, this study did not consider the effect of crowding in the compartment. Van Hagen (2011) demonstrated that in the railway environment, crowding is experienced as stimulating by which adding extra stimuli such as music could over-excite passengers. Hence, the influence of crowding in the compartment is recommended to include in the design for the current study in order to create a well-fitted servicescape for NS passengers to enhance their travel experience. Moreover, it would be interesting to find whether environmental stimuli such as music and cleanliness are perceived differently under various levels of density.

A third topic for further research concerns the inclusion of silence- and non-silence compartments in the train. For this study, the distinction between silence/non-silence zones was not considered, though this is worthwhile to take into account. Since the aim of such zones is to be to work quietly in a silent environment in designated compartments. However, as Van Hagen (2011) studied, applying calming and soft background music could enhance passengers' experience in the railway environment, it is recommended to investigate the effect of (calming) music.

Another limitation that could be addressed is the number of participants of this experiment. Although oversampling was initiated, it was very difficult to gain a high number of participants for this study. Since the mockup was located in the NS head office in Utrecht, participants had to come over to this location. This might had formed a barrier for many potential participants. Hence, for this study the total number of participants amounted to the minimum of 123 subjects. In order to obtain a more reliable research sample, future research should replicate this study with an increased number of subjects to gain more reliable results.

Furthermore, another point to discuss is the reliability of the mockup in which the experiment was performed. Although realistic, this laboratory is very specific, which might cause the external validity to be limited for other servicescapes. Compared to testing in real moving trains, the mockup might

have evoked different responses than when passengers would have travelled in a regular compartment. For instance, in real moving trains passengers might have looked out of the window to watch passing landscapes, which distracts them from their travel time. Nonetheless, a mockup is able to imitate elements of the servicescape, whereby a similar look and feel will be created of the service environment (Miettinen, Rontti, Kuure, & Lindström, 2012).

Finally, passengers' expectations regarding cleanliness were not assessed. As Oliver (1980) found when expectations (regarding cleanliness) were exceeded, this might influence passengers' satisfaction levels. However, this study did not consider expectations of passengers. Hence, future research should examine whether passengers' expectations will be exceeded when the cleanliness of the environment is maintained.

Conclusion

The aim of this study was to identify the effect of music tempo on NS passengers' travel experience under various conditions of cleanliness. This study revealed that cleanliness determines the travel experience. Travel experience is distinguished into the environmental experience and time experience during the journey in the train. Especially time estimations and intentions to revisit are strongly dependent by cleanliness. Evidently, under clean conditions passengers' subjective time is two minutes shorter than under unclean conditions. Additionally, cleanliness drives approach intentions. Furthermore, in spite of uncleanliness, as long as congruence between cleanliness and music tempo is maintained appraisal to time is enhanced. However, congruence between cleanliness and music tempo only enhances environmental experience when the compartment is clean.

Thus, except for the cognitive component of appraisal of time, as long as cleanliness of the compartment is maintained, applying slow tempo music in the compartment enhances the travel experience of NS passengers.

Suggestions for NS

This study was performed to undertake the first step into the direction of an enhanced travel experience of NS passengers by analysing the effect of music tempo and cleanliness in the train compartment. For this study, travel experience is distinguished in time experience and environmental experience. The recommendation to NS is based on these dimensions.

Cleanliness is a key driver of the travel experience. As described earlier, the journey in the simulated train consisted of twelve minutes. Remarkably, passengers estimate their travel time to be two minutes shorter in the clean compartment as opposed to passengers who travelled in the unclean compartment. Moreover, passengers would revisit the train when they travelled in a clean compartment compared to the unclean compartment. Thus, NS is highly recommended to keep on top of cleanliness in their trains to enhance the travel experience of its passengers.

Although cleanliness is the key driver of the travel experience, in spite of uncleanliness, when the tempo of music is matched to the cleanliness condition (such as fast tempo music in the unclean compartment) appraisal of time (affective responses to time and long/short judgment of time) are enhanced. One the one hand, especially passengers' affective responses to time could be improved with congruence between environmental stimuli, both in clean- and unclean conditions. On the other

hand, for passengers' long/short judgment of time, only under unclean conditions coherent stimuli influence judgments of time durations to be shorter. Hence, when the compartment is unclean, NS is recommended to play fast tempo music in the train when the compartment happens to be unclean that results in more positively appraisal of time. Uncleanliness creates higher levels of arousal than cleanliness, just as fast tempo music does compared to slow tempo music. Therefore, in unclean compartments, NS should implement fast tempo music in order to still positively affect passengers' appraisal of the time when cleanliness could not be maintained.

Furthermore, cleanliness determines NS passengers' environmental experience. Hence, congruence between environmental stimuli is only effective when the compartment is clean. Results of this study indicate that passengers would revisit clean trains rather than unclean trains. Additionally, passengers assess their journey more positively under clean conditions with coherent slow tempo music compared to unclean conditions.

Finally, NS is advised to perform some experimental additions as well. Firstly, NS should perform research on several other factors that may influence the effect of music tempo and cleanliness on the travel experience and time experience, such as must versus lust travel orientations, crowding, and silence versus non-silence zones. Secondly, since this study contains relatively few respondents per condition, future research is advised to sample more than 20 passengers per condition. Finally, besides a higher number of participants, future research is recommended to replicate this study in real trains. Passengers' travel experience would then be more realistic, which might deliver more reliable results. To summarize the recommendation of environmental experience, NS should maintain its cleanliness at all times to encourage passengers to view the train as an attractive means of transportation and worthwhile to revisit for travel purposes.

Summary of practical recommendations for NS:

- Prevent uncleanliness in trains. Maintain the compartment to be tidy, ordered and clean in order to enhance passengers' environmental experience and to shorten the time perception of their journey.
- When the train happens to be unclean, apply coherent fast tempo music as so to enhance passengers' appraisal of time.
- Avoid incongruence between these stimuli, since mismatching music tempo and cleanliness conditions negatively influence passengers' time experience of their journey.

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Appendix I. Pre-test songs

A pre-test was performed to categorise songs as stimuli for the main experiment into two categories, such as fast tempo and slow tempo songs. Also, songs were chosen based on participant's attitudes towards the songs.

Stimulus materials

For the pre-test, 16 songs were selected from music application 'Spotify' (2016) according to the criteria of Milliman (1982) regarding music tempos in beats per minute (BPM). BPM is the variable that is used to measure tempo of music (Milliman, 1982; Oakes & North, 2008). With regard to the studies of Milliman (1982; 1986) is determined that the category of slow tempo songs consisted of less than 72 BPM, whereas the category of fast tempo songs consisted of more than 94 BPM. Songs were retrieved from Spotify, since one of its tools is to filter songs based on BPM. Also, considering familiar music is able to influence people's time perception (Yalch & Spangenberg, 2000; Baker & Cameron, 1996) it was necessary to select songs that have not been in the Dutch national charts. Accordingly, with regard to the large database of Spotify, songs were selected that would not be familiar with Dutch people. As a result of these considerations, 8 songs with vocals were chosen for the slow tempo category (less than 72 BPM) in the pre-test, and 8 songs with vocals were selected for the fast tempo category (more than 94 BPM). During the experiment, 16 fragments of songs were played, with duration of 30 seconds per each song starting from the chorus. Based on these 30 seconds, participants evaluated the songs by answering the question regarding the song. Songs were played in a random order during the experiment. An overview of the songs that were selected from Spotify (2016) can be found in Table 1.

Table A1. Categorised song list for the pre-test

Slow tempo condition (less than 72 BPM)		
Song		**BPM**
S1	Honey - Trace	62 BPM
S2	Butterfly Culture – Benjamin Francis Leftwich	66 BPM
S3	Feeling Good – Ane Brun	72 BPM
S4	Is It Me – St. Paul & The Broken Bones	69 BPM
S5	Heal – Tom Odell	71 BPM
S6	Brandy Alexander – Feist	70 BPM
S7	It's a Wonderful Life – Sparklerhorse	66 BPM
S8	Superficial Love – Ruth B	44 BPM
Average BPM slow tempo condition		65 BPM
Fast condition (more than 94 BPM)		
Song		**BPM**
F1	Perfect Melody – Nano	118 BPM
F2	Paradise (Boehm remix) – Josef Salvat	120 BPM
F3	Brand New – Ben Rector	145 BPM
F4	Take Flight – Olympic Ayres	128 BPM
F5	Feel Good – Satin Jackets	114 BPM
F6	Feels Like Home (radio edit) – The Brahms	128 BPM
F7	Catch Me If You Can – Walking On Cars	129 BPM
F8	On the Blvd – Chris Ayer	128 BPM
Average BPM fast tempo condition		126 BPM

Questionnaire

The questionnaire of the pre-test consisted of 1 question per song including 4 items. After each song that was played, participants were asked to their perceived tempo of the song. The 7-point Likert scale used for this item was based on a long-short indicator regarding time perceptions (Pruyn & Smidts, 1998), ranging from very slow (1) to very fast (7). The second item referred to participants' attitude towards the song. This item was based on a scale from Cameron, Baker, Peterson, and Braunsberger (2003) regarding likeability, measured on a 7-point Likert scale. According to Hui, Dubé, and Chebat (1997) in service environments, customers experience more positive emotions when they think positively about the played music. Also, according to North and Hargreaves (1996) when music is disliked, people will be more likely to avoid the environment in the future. Hence, aiming for the selection of songs for the main experiment people's attitude towards the songs was measured in the pre-test. Participants' attitude was measured using a 7-point Likert scale based on the long-short indicator (Pruyn & Smidts, 1998), ranging from 1 (very pleasant) to 7 (very unpleasant). Songs were, then, selected based on participants' approximately equal attitudes towards the songs. Then, based on the findings of Yalch & Spangenberg (2000), familiar songs could influence people's time perceptions. Hence, by use of a dichotomous question (1=yes, 2=no) participants were asked whether or not they recognised the songs. At last, participants were asked to possible associations with the songs. In retail environments, associations with particular music pieces was found to influence purchase intentions and behaviour (North, Hargreaves, & McKendrik, 1999). Therefore, music that was recognised an with which people had (strong) associations supposed to be excluded in order not to influence people's behaviour on these dimensions in the main experiment.

Procedure

While travelling in the train, passengers (one-by-one) were approached and asked to be willing to participate in a small music experiment that took approximately 5 minutes. If one agreed to participate, the researcher handed over the headphones, and turned the music on. Then, the participant heard a fragment of a song, after which the participant filled in the question regarding that particular song. Subsequently, the next fragment was played, whereby another question was answered, etc. In total, the experiment took about 5 minutes. When all questions were finished, the researcher thanked the subject for participating, and left.

Subjects

NS passengers (N=20) were approached in the compartment of the train for participating in the experiment. The sample consisted of both male and female participants in different age groups. Each participant heard the fragments of all of the 16 songs.

Selection of stimuli for the main experiment

Participants' attitude towards the songs is taken into account (North & Hargreaves, 1996) in order to choose songs as stimuli for the main experiment. Also, there was verified if participants perceived the tempo of the songs as how they were categorised, based on the criteria of Milliman (1982).

Finally, participants' recognition of the song (Yalch & Spangenberg, 2000), and possible associations with the songs (North, et al., 1999) were used to exclude songs as stimuli for the main experiment.

The sets of songs were divided by music tempo. The results indicated that that on average the songs categorised as slow tempo were perceived significantly slower (M=2.57, SD=1.03) compared to songs categorised as fast tempo (M=4.96, SD=.96), t(1,319)=17.86, p<.01. Table A2 represents the evaluation of participants regarding music tempo.

Table A2. Mean scores on perceived tempo of the songs

Slow songs	**M**	**SD**	**Fast songs**	**M**	**SD**
S1	2.10	.72	*F1*	4.37	1.01
S2	2.50	.76	*F2*	4.40	.60
S3	2.50	.86	*F3*	5.78	.73
S4	2.32	.75	*F4*	4.72	.83
S5	2.89	.86	*F5*	4.35	.67
S6	2.89	.74	*F6*	4.95	.95
S7	1.95	1.70	*F7*	5.74	.81
S8	3.45	.69	*F8*	5.50	.96

The attitude of participants determined which songs should be included and which should not. From the results was found that the attitude of participants towards the songs that were selected as stimuli for the main experiment were evaluated approximately equal with each other. An overview of participants' attitude towards the songs is presented in Table A3.

Table A3. Mean scores on attitudes towards the songs

Slow songs	**M**	**SD**	**Fast songs**	**M**	**SD**
S1	3.85	1.39	*F1*	3.95	1.59
S2	3.80	1.77	*F2*	3.65	1.73
S3	3.83	1.79	*F3*	3.94	1.77
S4	3.79	1.62	*F4*	3.78	1.56
S5	3.74	1.56	*F5*	3.90	1.48
S6	3.37	1.34	*F6*	4.05	1.47
S7	5.15	1.69	*F7*	4.11	1.82
S8	3.65	1.39	*F8*	4.11	1.64

Moreover, the results indicated that participants associated S5 with feelings of 'sadness'. Hence, this song is excluded from the song list for the main experiment. Also, more than 20 percent of the participants recognised song S3 (M=1.74, SD=.44). For this reason, S 3 is also excluded from the song list as stimuli for the main experiment.

In total, based on participants' equal attitude, people's recognition, and possible associations, the following songs were selected as stimuli for the main experiment (Table A4). As discussed, the attitude towards songs selected for the main experiment was approximately equal, and, additionally, the songs differed significantly in terms of music tempo. Also, songs that were chosen were not recognised (M=1.93, SD=.26) and there were not any negative associations with the selected songs.

Table A4. Mean attitude selected set of songs as stimuli for main experiment

Slow songs	**Song**	**M**	**SD**	**Fast songs**	**Song**	**M**	**SD**
S2	Butterfly Culture	3.80	1.77	*F1*	Perfect Melody	3.95	1.59
S4	Is It Me	3.79	1.62	*F2*	Paradise	3.65	1.73
S6	Brandy Alexander	3.37	1.34	*F4*	Take Flight	3.78	1.56
S8	Superficial Love	3.65	1.39	*F5*	Feel Good	3.90	1.48

Appendix II. Pre-test cleanliness

A pre-test was conducted in order to select stimuli for the main experiment regarding cleanliness in the compartment. During this pre-test is decided what stimuli should be used in order to perceive the compartment to be more unclean compared to the clean compartment. The pre-test for cleanliness is applied by use of a small online survey in which respondents were randomly assigned into one of the five conditions (between subjects).

Stimulus materials

The compartment was littered in 5 conditions based on the Cleanliness Scorecard (U.S. Conference of Mayors, 2000) of 7 cleanliness conditions on streets in New York. Since the differences between the 7 conditions of littering (as was conducted on streets in New York) were difficult to apply in the mockup compartment, there was chosen to only implement 5 conditions of cleanliness in this pre-test (Figure A1). Respondents were shown the conditions with the use of photos. The psychological effects of photos can be assumed to be similar to effects in real-settings (Bateson & Hui, 1992; Nasar & Hong, 1999). Using photos for the pre-test, therefore, allowed for complete and accurate control of the servicescape cleanliness, while still maintaining experimental accuracy.

As shown on the pictures, the first condition (clean) consisted of a clean compartment. In the second condition (rarely littered), a few napkins were spread in the compartment. For the third condition (quite littered), a coffee cup and a moist coffee circle were added into the compartment. Next, in the fourth condition (intensively littered) remains of fruits were applied on the jar and the seats, along with more napkins on the ground and spilled coffee on the table. Finally, the fifth and least clean condition (most concentrated littered) consisted of several newspapers that were spread through the compartment, more coffee cups, a cola can, spilled cola and coffee, and more napkins on the ground. The photos of the conditions were separately shown to respondents. Each respondent evaluated only 1 photo of a cleanliness condition.

Figure A1. Cleanliness conditions for the online pre-test

Questionnaire

The questionnaire for the cleanliness pre-test consisted of one construct including five items (α=.94). Items were based on a prior study of Vos (2015) to the experience of cleanliness at train stations, and on the NS train experience monitor (2016) in which several items measure cleanliness of the trains. The items consisted of a 5-point Likert scale ranging from 1 (highly disagree) to 5 (highly agree). Statements of the constructs consisted of: “In my opinion, the compartment is attractive”, “In my opinion, the compartment is nice and neat”, “In my opinion, the compartment is clean”, “In my opinion, the compartment is well-maintained”, and “I feel welcome in this compartment”. The items were translated in Dutch for the experiment. In addition to the statements, respondents were given the possibility to add any remarks regarding cleanliness in the compartment to find what is experienced most uncomfortable or least pleasant in the compartment on the photo.

Procedure

Respondents were approached via the NS customer panel. Via e-mail an invitation was sent to participate in the online experiment including the link to the online experiment. After respondents pressed on the link, they were shown a photo of one of the cleanliness conditions (1-5). Each respondent evaluated only one photo. After respondents had seen the photo, they went to the next screen on which the survey started. As soon as the statements of the questionnaire were completed, the respondents were thanked for participation, and the survey had finished.

Subjects

Respondents were retrieved from the NS customer panel (N=146). The sample consisted of 146 respondents, 54.1 percent men and 45.9 percent women, approximately 47 years old (SD=18 years).

Results

After a Cronbach's alpha analysis, one item was excluded from the construct (α=.92), since it measured cleanliness less than the other constructs. Overall, respondents' perceived the cleanliness of the compartment, based on the photos, significantly different F(4,141)=25.45, p<.01. An overview of the scores of the conditions can be found in Table A5. As expected, the 3 conditions in which the dirt was present, concentrated and highly concentrated (condition 3, 4, and 5), were evaluated significantly less clean (p<.01) than the clean- and nearly clean compartment (condition 1 and 2).

Table A5. Mean scores and standard deviations cleanliness conditions

Statement/Condition	**1**	**2**	**3**	**4**	**5**
N	N=27	N=22	N=35	N=35	N=27
This compartment looks attractive	M=4.07 SD=1.71	M=4.73 SD=1.52	M=4.03 SD=1.67	M=2.40 SD=1.50	M=2.48 SD=1.95
This compartment looks tidy	M=5.22 SD=1.25	M=4.32 SD=1.70	M=3.69 SD=1.75	M=1.97 SD=1.58	M=1.56 SD=1.37
This compartment looks clean	M=5.33 SD=1.27	M=4.00 SD=1.83	M=3.49 SD=1.65	M=1.91 SD=1.42	M=1.30 SD=.82
This compartment looks like there has been taken care of	M= 5.07 SD=1.36	M=4.86 SD=1.49	M=4.11 SD=1.71	M=3.11 SD=1.64	M=2.59 SD=2.01
Total cleanliness perception	M=4.93 SD=1.21	M=4.48 SD=1.49	M=3.83 SD=1.49	M=2.35 SD=1.30	M=1.98 SD=1.27

Note: the statements were given in Dutch

Selection of the conditions

The aim of this pre-study was to determine to what extent the compartment should be littered, in order to be perceived as an unclean compartment. With regard to Figure A2, the argumentation for the fourth condition will be discussed. As presented, the graph shows a descending line from the first condition (clean) to the fifth condition (concentrated littered). However, the decrease of the line is marginal between the fourth and the fifth condition (.37) compared to the differences between the other conditions, such as the third and the fourth condition (1.48). In addition to this, a post hoc analysis showed that respondents did not perceive the fourth condition significantly more unclean (M=2.35, SD=1.30) compared to the fifth condition (M=1.98, SD=1.27) p>.05. Accordingly, from the results can be derived that the fourth condition is the saturation point of people's perception of cleanliness. Hence, the difference in respondents' perception of cleanliness between the fourth and fifth condition is marginal. There can be stated that unclean=unclean.

Figure A2. Mean score experience of cleanliness of the pre-test

Appendix III. Assignment main experiment in the train compartment

The following assignment was given to the participants during the main experiment. With regard to the Dutch nationality of subjects participating in the experiment the questionnaire was translated in Dutch as well.

Goedenavond,

Bedankt dat u wilt deelnemen aan het onderzoek naar uw reisbeleving van NS.

U gaat straks een fictieve reis maken met een Sprinter van Station Stoevaart richting Station Beumen. U komt net aanlopen op het station en u weet richting welk perron u moet lopen.

Opdracht:

Neem de eerstvolgende trein richting Beumen. U heeft al ingecheckt bij de OV-incheckpunten en u kunt direct de Sprinter instappen. Voer uw reis uit hoe u dit doorgaans ook zou doen. U mag praten tijdens uw reis in de Sprinter, maar hou rekening met andere reizigers en doe dit dus op een (zeer) laag volume. Prettige reis gewenst!

Appendix IV. Questionnaire main experiment

Zojuist bent u in de coupé waarin u nu zit van Station Stoevaart naar Station Beumen gereisd. Naar aanleiding van uw reis in de coupé, vragen wij u om deze vragenlijst in te vullen. Alle vragen in de vragenlijst hebben betrekking op uw reis in deze coupé. Kies bij iedere vraag of stelling één antwoord. Uw antwoorden worden vertrouwelijk behandeld.

Succes en bij voorbaat dank!

---

1. Als u afgaat op uw gevoel, hoe lang heeft uw reis van Stoevaart naar Beumen dan geduurd? (in minuten)

____ minuten

2. Hoe heeft u de tijd ervaren die u tijdens uw treinreis doorbracht?

Erg lang	O	O	O	O	O	O	O	Erg kort

<u>Nu wordt u een aantal vragen gesteld over uw beleving van uw reis.</u>

3. Geef bij de stellingen aan hoe u zich voelde tijdens uw treinreis:

Ik vond mijn reis plezierig						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik ergerde me tijdens mijn treinreis						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik verveelde me tijdens mijn treinreis						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik vond het gezellig tijdens mijn treinreis						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik vond mijn treinreis stressvol						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

4. Geef aan welk gevoel bij u meer van toepassing is:

Tijdens mijn treinreis voel ik me…

Ongelukkig	O	O	O	O	O	O	O	Gelukkig
Tevreden	O	O	O	O	O	O	O	Ontevreden
Voldaan	O	O	O	O	O	O	O	Niet voldaan
Gespannen	O	O	O	O	O	O	O	Ontspannen
Hoopvol	O	O	O	O	O	O	O	Wanhopig
Verveeld	O	O	O	O	O	O	O	Vermaakt

Tijdens mijn treinreis voel ik me…

Geïrriteerd	O	O	O	O	O	O	O	Comfortabel
Opgewonden	O	O	O	O	O	O	O	Kalm
Opgefokt	O	O	O	O	O	O	O	Lusteloos
Gestimuleerd	O	O	O	O	O	O	O	Verveeld
Slaperig	O	O	O	O	O	O	O	Energiek
Alert	O	O	O	O	O	O	O	Sloom

Tijdens mijn treinreis voel ik me…

Begeleid	O	O	O	O	O	O	O	Zelfstandig
Invloedrijk	O	O	O	O	O	O	O	Beïnvloedbaar
Leidend	O	O	O	O	O	O	O	Volgzaam
Sturend	O	O	O	O	O	O	O	Volgend
Gewichtig	O	O	O	O	O	O	O	Onbelangrijk
Dominant	O	O	O	O	O	O	O	Onderdanig

5. Geef aan bij onderstaande stellingen in hoeverre u het ermee eens bent:

Tijdens mijn reis voelde ik me ontspannen <u>in de coupé</u>

Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

Tijdens mijn reis voelde ik me gestrest <u>in de coupé</u>

Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

Tijdens mijn reis voelde ik me gejaagd <u>in de coupé</u>

Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

6. Geef bij onderstaande stellingen aan in hoeverre u het ermee eens bent:

Ik zou anderen reizen in deze coupé aanraden						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik zou met vrienden in deze coupé willen reizen						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik vind het prettig om in deze omgeving te reizen						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik heb genoten van mijn treinreis in deze coupé						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik zou graag nog eens reizen in deze coupé						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

7. Geef bij de volgende stellingen aan in hoeverre u het ermee eens bent:

Ik vind deze coupé netjes						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Ik vind deze coupé schoon						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Het meubilair in deze coupé (bank/tafeltjes/vuilnisbakken) voldoet aan mijn wensen						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O
Deze coupé maakt op mij een verzorgde indruk						
Helemaal oneens						Helemaal eens
O	O	O	O	O	O	O

8. Heeft u tijdens uw reis in deze coupé gekeken naar de tijd?

- o Ja
- o Nee

9. Hoorde u muziek in de coupé tijdens uw reis?

- o Ja
- o Nee **(ga naar vraag <u>13</u>)**

Deze vragen dient u alleen te beantwoorden indien u muziek heeft gehoord in de coupé.

Nu wordt u een aantal vragen gesteld over muziek in de coupé:

10. Wat vindt u van het tempo van de muziek die u hoorde?

Zeer langzaam						Zeer snel
O	O	O	O	O	O	O

11. De afgespeelde muzieknummers vind ik …

Onplezierig	O	O	O	O	O	O	O	Plezierig
Storend	O	O	O	O	O	O	O	Niet storend
Sfeervol	O	O	O	O	O	O	O	Sfeerloos
Rustgevend	O	O	O	O	O	O	O	Stress verhogend
Stimulerend	O	O	O	O	O	O	O	Slaapverwekkend
Energiek	O	O	O	O	O	O	O	Sloom

12. Hoe vindt u het om tijdens uw reis muziek te horen in de trein?

Onplezierig	O	O	O	O	O	O	O	Plezierig
Storend	O	O	O	O	O	O	O	Niet storend
Sfeervol	O	O	O	O	O	O	O	Sfeerloos
Rustgevend	O	O	O	O	O	O	O	Stress verhogend
Stimulerend	O	O	O	O	O	O	O	Slaapverwekkend

13. Hoe vaak reist u met de trein? (kies één antwoord)

- o 4 dagen per week of vaker
- o 1-3 dagen per week
- o 1-3 dagen per maand
- o 6-11 dagen per jaar
- o 1-5 dagen per jaar

14. Om welke reden reist u doorgaans met de trein? (kies één antwoord)

- o Van- en naar mijn werk
- o Zaken- of dienstreis, bezoek congres
- o Van- en naar school, studie, opleiding, stage
- o Bezoek aan familie, vrienden, kennissen
- o Winkelen
- o Vakantie of uitstapje
- o Sport of hobby
- o Zeer wisselend
- o Anders, namelijk_____

15. Wat is uw geslacht ?

- o Man
- o Vrouw

16. Wat is uw leeftijd?

_____ jaar

17. Wat is uw hoogst genoten opleiding? (kies één antwoord)

- o Lagere school, basisschool
- o Vmbo
- o Mbo
- o Havo
- o Vwo
- o Hbo
- o Universiteit
- o Ander beroepsonderwijs, namelijk: _____

18. Wat is de kleur van de stoel waar u op zat?

- o Blauw
- o Rood

19. Heeft u nog opmerkingen over dit onderzoek?

Dit is het einde van de vragenlijst. Hartelijk bedankt voor uw medewerking en de moeite die u heeft genomen om naar dit onderzoek te komen! Prettige reis naar huis gewenst.

Appendix V. Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Subjective time	1													
2	Cognitive comp. of appraisal	.02	1												
3	Affective comp. of appraisal	.03	.36**	1											
3	Pleasure	.17	.28**	.46**	1										
4	Arousal	.19*	.50**	.34**	.37**	1									
5	Dominance	.08	.25**	-.07	.00	.21	1								
6	Assessment of the journey	-.01	-.19*	-.59**	-.45**	-.09	.01	1							
7	Approach intentions	.11	.31**	.44**	.43**	.27**	-.07	-.43**	1						
8	Cleanliness perception	-.09	-.01	.11	.07	-.24**	-.10	-.15	.45**	1					
9	Check time	-.05	.18	.19*	.05	.22*	.14	-.08	.07	.03	1				
10	Tempo songs	-.21	.04	-.18	-.22	-.07	.05	.18	-.15	.15	.05	1			
11	Attitude towards songs	.04	.23	.36**	.10	.14	-.00	-.26*	.39**	.16	.14	.02	1		
12	Attitude towards music in the train	-.01	.19	.38**	.17	.19	-.15	-.23*	.38**	.04	.03	-.07	.79**	1	
13	Travel frequency	.01	.14	.16	.08	.11	-.01	-.13	.13	-.00	.07	.07	.04	.08	1
14	Travel motivation	-.14	.03	.08	-.04	-.03	-.03	-.05	.04	.15	.12	.20	-.00	-.07	.28**

N=123

*Correlation significant at the .05 level (2-tailed)

**Correlation significant at the .01 level (2-tailed)