Ready, set, wake up!
the influence of mindset on alarm clock user testing

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Ready, set, wake up!:

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Summary

Many people use an alarm clock in their bedroom on a daily basis. Before an alarm clock is introduced to the market it is developed and tested. During the test phase the test environment is often not similar to the natural use environment, in this case: the bedroom. The environment is of influence on the kinds of judgements and impressions that are formed (Wilson & Hodges, 1992). The research described in this thesis investigates the effect of the context in which user tests are preformed on the outcome of such a test.

This project was a collaboration between the TU/e and Philips Consumer Lifestyle. As Philips is currently developing the Philips Wake-up Light (WUL), this research is focusing on the bedroom environment and the needs people express related to a wake up appliance. The most common use environment of the WUL is the bedroom, but conducting tests in a personal bedroom brings along many issues. Different methodologies were used to simulate the environment and therefore activate concepts like the bedroom environment and the experience of waking up. This methodology is called priming and is used in many experiments to activate concepts (Bargh & Chartrand, 2000). Activation of concepts can alter people's behaviour, goals, and impressions.

It is understood from the literature that it is possible to activate concepts using priming techniques, thereby simulating the environmental effects of a bedroom. To study the difference in associative strength of several priming techniques, three techniques were compared: a cognitive technique in which people have to think of an environment, a pictorial technique in which people had to watch pictures of an environment and a physical technique in with people visit an environment. This experiment confirms that it is possible to activate an environment concept by using priming techniques. The difference between the techniques, in terms of response latencies which is a common used indicator to the degree of concept activation, is small. We therefore conclude that all three techniques can be used to activate environmental concepts. In a second experiment we studied the effect of concept priming on peoples expressions of needs related to a wake up appliance. In this experiment two priming methods were used: a priming method in which several priming techniques were combined to make the effect as strong as possible, and a physical method in which people had to enact their routine of waking up. They were compared against a control condition. Combining techniques did not result in the expected improvement of the effect, as its results have similarities with the control condition. However, the result suggests that using a physical priming method improves the potential to express needs related to wake up appliances.

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1. Introduction

An alarm clock is an important appliance in our daily life. People often use an alarm clock to wake up in the morning or to manage their daily agenda. Shops sell a large variety of alarm clocks, ranging from small appliances based on simple technology to very large appliances with many features that help consumers waking up (e.g., moving alarm clocks, alarm clocks that produce light, and puzzles that have to be solved before the alarm goes off). However, developing a successful alarm clock is nearly impossible without proper appliance testing. Most consumer appliances are thoroughly tested with many different methods. Ranging from a small end product tests to a full iterative testing procedure evaluating the product from first idea's to the final stages of a product before it is released into the market. Testing can take place in many different locations; at the consumer's home but also in situations like an office environment at the research facility. The location of the test is dependent on factors such as the consumer product, the kind of test, and the amount of available resources (e.g., time, money, and test engineers). The consumer product industry is often working with tight schedules and short consecutive deadlines they therefore work with methods that take little time. As a consequence, a discrepancy between the test environment and the context-of-use of the consumer product exists. For example, in the case of alarm clocks, these appliances are normally used in bedroom environments, but tests are conducted in an office environment. This thesis describes a research conducted in order to understand the effect of this discrepancy, and how to improve the efficiency of pre-launch testing of novel consumer goods.

The research described in this thesis was conducted as a collaboration between the TU/e and Philips Consumer Lifestyle. Philips Consumer Lifestyle is developing many kinds of consumer products. It exists of many departments that are all developing products in four value streams: Shaving, Grooming, Sleep, and Vitalight. Every value stream contains several products. The Application Research Centre department (ARC) is responsible for translating consumer needs[1] in all value streams to product requirements. Application experts from the ARC explore consumer wishes and test applications on usability and social acceptance. The results of these user-centred studies provide Philips with knowledge that contributes to the improvement of Philips products.

1.1. Research question

The use of many consumer products and related activities happen within a specific context (e.g., coffee machines are used in the kitchen, electric teeth brushes in the bathroom, and alarm clocks in the bedroom). Social psychology has since long acknowledged the effects of contextual effects on attitude formation and construction. Wilson and Hodges (1992, p.38) state

[1] According to the MacMillan English dictionary the definition of *need* is: "if you need something, you must have it because it is necessary" In most forms of communication this is a clear explanation that most people will understand. However, the definition of *necessary* is subjective, therefore *need* could range from fundamental physiological needs described by Maslow (1943) to a preference for something. In the context of this research the following definition of *need* is used: "something you have now or want in the future, because it improves your quality of life"

that: "It has become clear that many different kind of judgments and impressions are influenced by the context in which they are formed." In Human Computer Interaction (HCI) the role of context has also been gaining ground, for instance in the recent rise of the theories distributed cognition and situated action. However, the importance of context is not always apparent in user-centred research where sometimes the industry still chooses to study user-product interactions and evaluations in laboratories and meeting rooms. Only in later stages of product development do they ask users to evaluate those products in their actual context-of-use. In this stage, users, stimulated by their environment, can express themselves about a consumer product. Higgins (1996) states that: "Knowledge activation depends not only on the accessibility of the stored knowledge, but also on stimulus information and its relation to stored knowledge." An environmental stimulus activates stored knowledge depending on the strength of the relation between the stored knowledge and the environmental stimulus. The present study aims to answer whether contextualized user-centred research of consumer product development will deliver different results than user-centred research in which the actual use environment remains more implicit. The research question for this study is therefore:

> *To what extent is an environment of influence on a consumer's mindset during an appliance test?*

This question is very general, because there are many kinds of appliances and environments in which the tests can be performed. In this research we focus on the test and use environments of a specific alarm clock and the needs related to an alarm clock. An alarm clock that is under development at Philips Consumer Lifestyle is the Philips Wake-up Light (WUL). The validation process of the WUL user interface exists of several steps: e.g., validation with computer simulations, validation with actual prototypes, and final validation with home-use test. In this last phase the WUL is finally used in the bedroom environment, but in this step no major user interface changes can be made. The question is whether more could be learned during the first stages of product development, when the actual use environment was taken into account more explicitly. There are several reasons (e.g., resources, policy) why a test can not take place in the actual use environment, but we have reasons to believe that alternative methods exists to simulate an environment. Many studies suggest that it is possible to influence one's perception in a short amount of time by recent activation of mental accessibility of a concept, such as holiday, cleaning, and a bedroom (Chartrand & Bargh, 2002). Aarts & Dijksterhuis (2003) showed that exposure to environments, by means of pictures and visiting goals, automatically activates representations of behaviour and the behaviour itself that is associated with that environment. Previous research suggests that it is possible to imitate the influence of an environment by exposure to the environment without actually being in that environment. This can be used to study the waking up needs consumers express dependent of their environment. Knowing the needs of consumers related to waking up after a night of sleep is important in the user-centred development of the WUL. Consumers are often willing to share their needs, but the accessibility of their needs is dependent on their environment. It is therefore essential to understand the relation between the environment of the consumer and the ability to express their needs. Several methods exist to expose a consumer to enhance mental representations of a concept (Bargh & Chartrand, 2000), such as the concept of a bedroom and waking up which could improve the accuracy of consumers waking up need expression. However, it is not predefined which method has the most potential to activate a bedroom concept. It is therefore necessary to study the difference between methods that activate bedroom associations in order

to use the most appropriate methods for the elicitation of waking up needs. Therefore the main research question is divided into the following sub research questions:

1. *To what extent do methods that activate mental representations differ in the activation of mental bedroom association?*

2. *What is the effect of waking up associations on people's availability of needs related to a wake up appliance?*

To answer these questions, two experiments were conducted. In the first experiment, we compared the difference in associative strength between three methods that potentially activate mental bedroom associations. In the first method we let people explicitly think of a bedroom. In the second method we showed them pictures of a bedroom. We then compared those methods with the associative strength of a bedroom. The most potential methods are used in the second experiment. In the second experiment, we compared the associative strength of two methods that potentially active wake up associations with a control method to identify differences in availability of needs related to a wake up appliance. By answering these questions this study will provide better understanding of which circumstances are capable of activating mental representations of an environment and how this affects people in expressing their needs related to a wake up appliance.

1.2. Overview

In the following chapters the description of our research is given. Chapter two presents a literature review on the theories related to the present study, and it will introduce priming as an experimental methodology. In the third chapter the first experiment is explained, which is about the effect of environment priming. The fourth chapter explains the second experiment which is about the accessibility of consumer needs related to a wake up appliance. This thesis ends with chapter five in which the main results, conclusion, and recommendations are presented.

2. Literature review

In this chapter the theories and concepts that serve as the foundation for this research will be described. It will begin with a description about the influence of the environment, followed by an explanation of how knowledge can become activated and a description about priming as a methodology to make knowledge accessible.

2.1. Environmental influence

Electronic appliances have a variety of uses which are not always visible by looking at the object alone. Rather, the context often indicates what the proper use of the appliance is. For example, a large spacey looking machine with many handles and buttons standing behind the counter of a coffee corner. At first one may wonder what it is for, but because it stands in a context in which coffee is sold, one discovers that it is an espresso machine. Another example is the hard disk recorder, this often black and plane appliance gets it meaning because of its position on the television furniture, when it is placed in the kitchen people would have a harder time discovering what kind of appliance it is. Chamorro-Koc, Popovic and Emmision (2008) state that difficult user-product interactions can be explained by designs that are not supported by the user's experience and knowledge of the product's context-of-use. In their opinion, experience is the comprehension of life events that results from the interaction with products in their environment of use. Context-of-use refers to the relationship between use, activity, and situation during people's interaction with products. Product usability is the interaction between user and product that is affected by the user's experience and the use context of the product. Chamorro-Koc et al. (2008) suggest that different contexts-of-use influence different interactions, which results in different knowledge and understandings of a product's use. Their research shows that the knowledge of a product's context-of-use and the understanding of the products are related with each other. It is therefore likely that a test environment affects the assessment of a product.

The environment helps a person to understand what to do with an object. Not only the environment but also the object itself give use cues on how to interact with it, a term for this is affordance. Gibson (1986) defined affordances as all action possibilities latent in the environment, objectively measurable and independent of the individual's ability to recognize them, but always in relation to the actor and therefore dependent on their capabilities. Later, Norman (1988) narrowed the term affordance down in the context of human–machine interaction to refer to just those action possibilities that are readily perceivable by an actor. We understand our world in terms of use; to understand something is to know how to use it. And when we know how to use it we can tell if it fits our needs. Turner (2005) makes a binary classification of affordance into simple and complex. Simple affordance is the performance with an object based on Gibson's perception-action loop (e.g. the use of a hammer). Complex affordance is the performance in which familiarity and history are needed to perform the action (e.g. the use of a word processor on a computer). Turner (2005) implies that context and affordance are the same, because appliances get their meaning by there use (i.e. its affordance). This indicates that context and affordance are close related.

In Human Computer Interaction (HCI) the importance of context has also been recognized, for instance in the recent rise of the theory of distributed cognition and situated action. From the perspective of distributed cognition, cognitive processes are not restricted to the personal mind, but they are distributed between the internal (the mind) and the external (artefacts) resources (Hollan, Hutchins & Kirsh, 2000). Mind and artefact combined can be understood as a unified cognitive system with a particular goal, for example, using a calculator to solve a problem or using an alarm clock to wake up pleasantly. In development of products, one must not only focus on the cognitive processes but on the interaction between the individual mind and external artefacts. However, context does not only intervene in direct interaction with objects, but also in attitude and perception of people towards objects. According to Nardi (1996), Lave (1988) stated in the theory of situated action that people's behaviour is contextualized; activity is a consequence of a situation. It is the relation between the individual and the environment that result in a specific behaviour. In their paper 'Attitudes as temporary constructions', Wilson and Hodges (1992) state that judgements and impressions that people have and get are influenced by the context in which these are formed. Environments are a rich display of information, people can form very accurate impressions based on the examination of context (Gosling, Ko, Mannarelli, & Morris, 2002). In the process of testing an appliance it is therefore likely that the environment plays a role in forming judgements and impressions.

In summary, the interaction with an appliance is situated in a specific environment. This environment provides clues as to the use of the appliance, and influences the thoughts, feelings and impressions a person has about the appliance. When the interaction with an appliance is not situated in the common use environment many clues are missing that lead to thoughts, feelings and impressions related to the interaction between the appliance and the common use environment. It is therefore important to use an environment that is similar to the common use environment during an appliance test. People can than form accurate thoughts, feelings and impressions about the appliance. When people interact with appliances they unconsciously access stored knowledge. The next paragraph will elaborate on this phenomenon.

2.2. Accessibility of stored knowledge

An enormous amount of knowledge is stored in the mind. In daily life, people access, use, change, and store that knowledge in all kinds of circumstances. To be able to process knowledge it has to be activated for use. This can happen by environmental stimuli that trigger that knowledge. Activation of knowledge is dependent on the availability and the accessibility of the knowledge and the fit of a stimulus. First of all, knowledge has to be present mentally otherwise it cannot be activated or brought to mind. This is referred to as 'availability'. Secondly, the accessibility of knowledge depends on the activation potential of that knowledge which is referred to as 'accessibility'. Thirdly, the strength of the accessibility depends heavily on the relation between the stimulus information and the stored knowledge (Higgins, 1996). This relation between the features of some stored knowledge and the attended features of a stimulus is referred to as 'fit' (Higgens & Chaires, 1980). The likelihood that some knowledge will be activated in the presence of some stimulus is greater when the overlap between the features of the stored knowledge and the attended features of the stimulus is larger (Higgins,

1989). Knowledge refers to any kind of knowledge such as, constructs[2], procedures, associations, and concepts[3]. Let's take 'bedroom' as an example of a concept. A person knows what a bedroom is, therefore this concept is available to that person. Encountering a house triggers the accessibility of 'bedroom' and possibly activates the concept by the encounter stimulus. When the house is similar to the persons own house the fit between the stimulus and the concept is greater so the strength of the accessibility is greater. Accessibility of knowledge can be enhanced using priming methods. The next paragraph describes the priming methodology, supported with several examples.

2.3. Priming

A proven method to activate knowledge is priming. The term priming refers to unobtrusive procedures that temporary stimulate and activate some stored knowledge (Higgins, 1996).

2.3.1. What is priming

Priming refers to an increased sensitivity to certain stimuli due to prior experience (Jacoby, 1983). Priming can result in an increased accessibility of knowledge. A stored knowledge unit is activated by a priming event, which temporarily increases the accessibility of that unit. The increased accessibility increases the likelihood that this knowledge unit will be activated by subsequent stimulus information (Higgins, 1996). Priming is based on the idea that concepts that have some relation to each other are connected in some mental network, so that if one concept is activated, then concepts related to it are also activated. Herr (1989) describes priming as a means of increasing the likelihood of use of any cognitive concept, be it a category, decision rule, or any stored information. The priming effect can be shown in the following example: The word 'bed' is presented to a participant. Presumably the participant will then think of other words related to the word 'bed'. If the participant is then presented with either the word 'sleep' or the word 'cake', the participant should be able to recognise the word 'sleep' more quickly than the word 'cake', because 'sleep' is related to 'bed' and therefore has been recently accessed, and for that reason more accessible to the participant. The word 'bed' then serves to prime the second word, 'sleep'. Basically, priming is readying information so that it can be used in a subsequent situation. But how does this differ from memory? It is believed that priming occurs outside of conscious awareness, it is different from memory that relies on the direct retrieval of information. Direct retrieval utilizes explicit memory, while priming relies on implicit memory (Jacoby, 1983).

Bargh & Chartrand (2000) describe several experimental methods that are used in priming research. Two common methods are: conceptual priming and mindset priming. In conceptual priming a stimulus activates existing knowledge in one context, so that it is more likely that this knowledge is used in a next unrelated context. Mindset priming has the participant actively engage in a pursued goal or mental process in one context, to show that this mindset (what

[2] Construct: Any psychological entitiy that does not exist in physical reality but is created by the mind. Types of constructs include willpower, intelligence, patriotism, attitude, and love (Corsini, 2002).
[3] Concept: The end product of conception, an idea that usually related various elements to one another in a unique manner. Type of concept includes diathesis-stress, just-world, the leaning tower of Pisa, and a car (Corsini, 2002).

goal to pursue in the situation) is more likely to operate later in an unrelated context. Thus, mindset priming carries over a procedure or purposive way of thinking about information into a new context. Primed participants must be unaware of the underlying structure, because participants could react (willingly or not) on the underlying structure. This could bias the results of the experiment; therefore it is necessary that priming is used without an intervening act of the participants will. However, the degree to which a participant is aware of the priming stimulus itself can differ. To distinguish between the levels of stimulus awareness two terms are used: supraliminal and subliminal priming. In supraliminal priming the participant is aware of the stimulus itself, but not aware of the underlying structure. In subliminal priming the participant is not aware of the priming stimulus. The stimulus is exposed very briefly, so that the participant is not able to consciously experience the stimulus. Using supraliminal or subliminal priming does not change the outcome of an experiment; with both methods knowledge is activated. The major difference between the two is that there is a larger chance of making the participant aware of the potential effect of the priming at supraliminal priming. It does not matter if the participant is consciously aware of the priming stimuli; but that he/she is not aware of the possible influence of those stimuli on subsequent experiences (Chartrand & Bargh, 1996). It is therefore important to be careful not to overdo the priming stimuli in our experiment.

Bargh (2006) briefly explains in one of his recent articles that, the idea of priming started with Hebb's (1949) work on internal mental representations. Priming was first noted by Lashley (1951), in his analysis of language comprehension. Lashley research pointed out that peoples have to hold some essential sentence information in order to understand the whole sentence. Later, Higgins showed that this principle also holds for the understanding of complex concepts. Now, the phenomenon of priming also holds for social behaviour and goal pursuit. More recent research (Gardner, Gabriel & Lee, 1999), demonstrates that priming has also a cultural implication. Over the years, more complex and sophisticated representations are used in priming research. But with this evolution the complexity of multiple effects from a single prime arises (i.e. a prime can have an effect on perception, motivation, behaviour and evaluation). Bargh (2006) states that: "we might not be priming single concepts, but rather conceptual structures, whether they are called metaphors, roles, perspectives or mindsets." Which aspect will be visible depends on the focus of the experimenter (Bargh, 2006).

2.3.2. Effect of priming

A large variation of priming experiments has been conducted over the years, in order to explore the possible effects of priming. These experiments showed that the effect of priming result in a change of a variety of reactions, such as impressions, evaluations, goals, needs or behaviours. Aarts and Dijksterhuis (2003) showed in one of their experiments that priming can result in a change of a participant's social behaviour. By showing pictures and telling participants that they would visit the library, they managed to activate the library concept, resulting in a behaviour response of the participant by talking more softly. Bargh, Chen, & Burrows, (1996) showed in a well known experiment that people take more time to walk to the elevator if they were primed with words related to elderly (e.g., bingo, gray, old). Effects of priming are also observable in social psychology. A clear example is the 'medical student syndrome': Many first year students of medical school tent to suspect that they have all kinds of serious illnesses instead of general illnesses. These students are exposed to many descriptions of diseases, resulting in imagining

much worse illnesses than they actually have. Another example of knowledge activation by priming is the experiment of Dijksterhuis and Knippenberg (1998) in which they primed stereotypes and traits to influence intellectual performance. Participants who thought for five minutes about professors and wrote it down where able to answer more general questions right, than participants of the control group. It also works the other way around, participant who where primed with secretaries, answered less questions right than the control group. Above examples are just a few of all the experiments performed in the field of priming, but already show impressive effects. The next paragraph will elaborate on the way priming is used, and deals with measuring of priming effects.

2.3.3. Priming technique

Knowledge activation by means of priming can be achieved in many ways. In most experiments priming is performed with words or in a visual manner. Examples are scrambled sentences that must be unscrambled and words to which a participant has to react. These sentences or lists of words contain words that are related to the target knowledge. In experiments with a visual priming technique, participants have to examine a small movie or photographs. Other less explored techniques are also possible to use, like scent for example. Holland, Hendrix & Aarts (2005) showed that the activation of the cleaning concept by exposure to citrus scent can guide a person's cleaning behaviour. Whatever the technique, it is important that concepts are activated and not one specific word or visual object, because this can result in an unintentional awareness of the target.

To test whether a concept has been activated, one could investigate for example behaviour or evaluations and compare this between a primed group and a control group. One could also compare response latencies of words related to the activated concept. Response latencies have been used successfully by Fazio (1990) in construct accessibility research in which response latencies were used as a retrieval speed indicator. The response latency is measured as the time interval between stimulus onset and the response of the individual. Already before Fazio, response latencies were used in Lexical Decisions Tasks (LDT; Meyer & Schvaneveldt, 1971). In the LDT used by Aarts, Dijksterhuis & Midden (1999), a participant has to indicate as accurate and as fast as possible whether a target word is a real word or a nonword. Several of the real words are related to the primed topic; latencies of correct responses to these words can be compared to those of correct responses to neutral words. Lower response latencies to topic related words indicate a priming effect.

After a priming experiment it is important to know whether participants were aware of the hypothesis. When participants are aware of the hypothesis they can, willingly or not, act on this. Therefore a priming experiment usually ends with a funnelled debriefing with questions such as: "What do you think this experiment was trying to study?" and "When you were completing the scrambled sentence test, did you notice anything unusual about the words?" By asking these questions, the experimenter gets insight into whether participants were aware of the hypothesis.

In summary, the specific environment in which the interaction between an appliance and a person takes place provides clues about the use of the appliance, and also influences the thoughts, feelings and impressions a person has about the appliance. When the environment is

not the natural use environment of the appliance the clues may activate distracting information and associations to unrelated concepts. Priming is an unobtrusive procedure that temporary stimulates and activates mental information. By stimulating a certain environmental concept is it more likely that this concept is used in a secondary experience. This method can assist in the activation of the concepts related to the natural use environment to increase the likelihood that the thoughts, feelings and impressions related to that environment are activated.

2.4. Overview & setup experiments

During the development of the WUL it is important to understand the consumer needs regarding wake up appliances, therefore user-centred research is conducted. A large part of the consumer appliance interaction tests for the WUL are performed in environments that are not similar to the typical context-of-use. Consumer's understanding of a product is related to the product's context-of-use (Chamorro-Koc et al., 2008). For the WUL the end use environment is the bedroom. User tests that are performed in an environment unrelated to the bedroom could give an ambiguous result, because the result is realistic and it is therefore unnoticed that the result is not accurate. Thoughts, feelings and impressions of a consumer that arise during the interaction with a WUL in an environment unrelated to the bedroom may differ from the thoughts, feelings and impressions that a consumer would have in the bedroom environment. Performing WUL test in the consumer's bedroom could therefore improve the accuracy of the expressions of consumers needs related to waking up. Many resources are necessary to carry out user tests at consumer's personal bedroom. However, Aarts & Dijksterhuis (2003) indicated that by means of activating environmental concepts it is possible to generate the influence of an environment without actually being in that specific environment. We could therefore try to simulate the bedroom environment by stimulating the accessibility of concepts (Higgins, 1996) and explore the availability of wake up needs. Bargh & Chartrand (2000) indicate that priming can be used to enhance mental representations of a concept. We therefore use priming as a method to enhance the bedroom and waking up concept. To answer the main question we performed two experiments. In the following paragraph the hypothesis and setup of the two performed experiments are described.

2.4.1. Experiment 1: Comparing the effectiveness of types of priming

Before investigating the availability of waking up needs, we study to what extent techniques that can activate mental representations (i.e., priming) differ in the activation of mental environment associations. As an indication of the effect of the priming techniques, the response latencies of environmental concept related words are measured using a Lexical Decision Task. In addition to the bedroom environment, an office environment is used, because this environment is often used in WUL interaction tests. We expect that response latencies on bedroom and office related words are lower after exposure to the corresponding environments, because the corresponding environments enhance the salience of the concepts. These expectations are summarized in the following two hypotheses:

H1: Exposure to a bedroom environment enhances the accessibility of the bedroom concept automatically, so that such exposure would speed up participant's responses to bedroom related words in a lexical decision task.

H2: Exposure to an office environment enhances the accessibility of the office concept automatically, so that such exposure would speed up participant's responses to office related words in a lexical decision task.

Over the years many different kind of priming techniques have been used for al kinds of concept activation. In this experiment existing priming techniques were used. In the next experiment we want to use the most suitable priming techniques but for that we need to study the difference between the priming techniques. We expect that the strength of the used techniques is not similar we therefore hypothesize:

H3: The accessibility of the environmental concept is dependent on the priming technique.

To test our hypotheses three priming techniques were used to activate the bedroom and the office concept. a) A real bedroom was used, in which people could physically be in and experience the environment, this is called physical priming. b) Pictures of the real bedroom were used, which people could visually see, this is called pictorial priming (based on the experiment of Aarts & Dijksterhuis, 2003). c) People had to actively think about their own bedroom, this is called cognitive priming (based on the experiment of Dijksterhuis & Knippenberg, 1998). The pictorial and cognitive priming techniques were used, because they had been successfully used before. The psychical priming technique was used, because this is a close as a person can come to a bedroom without being in their own bedroom at home.

2.4.2. Experiment 2: Effect of priming on availability of waking up needs

On can assume that people's thoughts, feelings and impressions differ according to their experience with the environment, but do people also think of different aspects of wake up appliances when primed with the concept of waking up? We want to discover what the impact is of the activation of a waking up concept on the availability of wake up needs. As all kinds of concepts can be activated (Bargh & Chartrand, 2000), we suspect that participants that are primed with a waking up concept will have more concrete and detailed information related to waking up present in comparison with non-primed participants who will have more abstract and general beliefs present. This leads to the following hypothesis:

H1: Primed participants provide more wake up appliance descriptions that are related to waking up and the bedroom, in comparison with not primed participants.

H2: Primed participants provide more alarm clock descriptions that are related to waking up, in comparison with not primed participants.

H3: Primed participants will rate alarm clock properties related to waking up as more important, in comparison with not primed participants.

H4: Primed participants will rate needs related to waking up as more important, in comparison with not primed participants.

To test these hypotheses a second experiment was conducted to measure the availability of consumer waking up needs. This experiment existed of three conditions. In the first condition we combined cognitive priming with pictorial and goal priming (as is used by Aarts & Dijksterhuis, 2003). These techniques were combined to make the priming as strong as possible. Van den Hoogen (2007) indicated that combining pictorial priming and textual priming increased the strength of the priming effect. Combining priming techniques may increase the salience of contextual information and therefore influences the strength of the priming effect. In the second condition we used a real bedroom environment in which participants had to perform their waking up routine, by letting participants touch and feel the environment a more immersive and embodied experience was created. The third condition was a control conditions. The priming methods were used to activate the concept of waking up. We did not want to create a preference for or against the WUL, but we tried to create a larger representation of the concepts in the participants mind. The next chapters will describe in detail how these experiments are conducted and their outcomes.

3. Comparing the effectiveness of types of priming

3.1. Introduction

The Philips Wake-up Light (WUL) is mostly used in the bedroom environment. The best place to test the WUL would be at people's personal bedroom, but testing there is not simple, because it is a time consuming process (going from house to house) and it could violate someone's privacy. The research of Aarts & Dijksterhuis (2003) indicated that it is possible to activate mental environment associations without the presence of the real environment. As the WUL is used in the bedroom environment this study tries to activate bedroom associations. To achieve this we used three priming techniques: physical, pictorial, and cognitive priming. Besides using the bedroom environment we also used the office environment, because first WUL user test are performed in an office environment. By using both types of environments we can check whether they both have an effect. With this experiment we try to understand if it is possible to activate environment associations by use of priming techniques and to compare the efficacy of these three different priming techniques in influencing a person's mindset. The priming technique with the most potential for future research can then be used in the next experiment. The efficacy of the priming techniques were tested using a Lexical Decision Task, because this method is used in similar experiments (Aarts & Dijksterhuis, 2003; Holland, Hendriks & Aarts, 2005). By using a Lexical Decision Task, response latencies on environment related words can be compared within and between conditions. When the priming techniques are successful, response latencies of environment related words are lower (and therefore recognised faster) in comparison with other types of words within a participant's responses. In the following paragraphs, the experimental design, the participants, the procedure, the manipulation, and the measurement is explained. Subsequently the results are presented and discussed.

3.2. Design

The experimental design followed a 2 (type of room: bedroom vs. office) x 3 (type of prime: physical vs. pictorial vs. cognitive) x 2 (type of word: bedroom vs. office) mixed design (see Figure 1), with type of room and type of prime as between subject factor and type of word as within subjects factor. The dependent variable was composed of the response latencies on the office and the bedroom words task. These functioned as an indicator for the activation of relevant concepts, and as such of the success of the priming technique.

		Type of room	
		Bedroom	Office
Type of prime	Physical	A	B
	Pictorial	C	D
	Cognitive	E	F

Figure 1: six experimental conditions

3.3. Participants

121 participants were recruited using a participant database, posters, flyers and direct personal recruitment on campus. All participants could select a timeslot in a registration system which was online available to everyone who had the link and the password. As a reward for participating, each of them received a complimentary iris cheque of 10 euro. In order to prevent extreme reaction times in the Lexical Decision Task, participants were between 17 and 39 years old. The participants (48 females, 73 males) were on average 23 years old (SD = 3.74). Most of the participants (101 of the 121) were university students.

3.4. Procedure

The experiment was conducted at Eindhoven University of Technology. It consisted of one session of approximate 30 minutes. The experiment took place in two rooms. The instructor was waiting for the participant to arrive and guided the participant to the first room. In the first room the participant was asked to sit down and was primed with one of the two concepts, employing one of the three techniques. This took about four and a half minutes (Dijksterhuis & Knippenberg, 1998). In the second room participants performed a Lexical Decision Task and subsequently filled in a questionnaire in which they were asked to describe aspects of a new generation alarm clock and their thoughts and feelings during their stay in the first room. The questionnaire ended with a funnelled debriefing and several demographic questions. When the participant finished the last questions they came out of the room and received their payment.

3.5. Manipulation

Upon arrival, the participants were randomly assigned to one of six conditions (see Figure 2) (i.e. bedroom-physical, bedroom-pictorial, bedroom-cognitive, office-physical, office-pictorial, and office-cognitive).

		type of room	
		Bedroom	Office
type of prime	Physical	(A) Participant is sitting in an bedroom	(B) Participant is sitting in an office
	Pictorial	(C) Participant is sitting in a cubicle, looking at bedroom pictures	(D) Participant is sitting in a cubicle, looking at office pictures
	Cognitive	(E) Participant is sitting in a cubicle, describing a bedroom	(F) Participant is sitting in a cubicle, describing a office

Figure 2: experimental conditions

In all conditions the participants were given the impression that the research was consisting of three experiments of different researchers. For the reliability of the experiment it is important that the participants are not aware of the connection between the priming technique and the controlling method (Bargh & Chartrand, 2000). In the introduction of the experiment we therefore explicitly stated that the study was a collection of several separate studies conducted by three researchers from three different departments at three different Universities and that they were working together for the benefit of experiment. At the beginning of the experimental session participants were given instructions which stated that they had to perform several tasks (see Figure 3) and that these tasks were from different researchers. The participants were told that the first task was about receiving impressions of a room, the second task was a word task, the third task was a design task, and the fourth was a task about the impression they received at the first task (see Appendix A for questions). In reality this separation of tasks was a distraction to hide the connection between the first task which was the priming and the second word task which was the Lexical Decision Task.

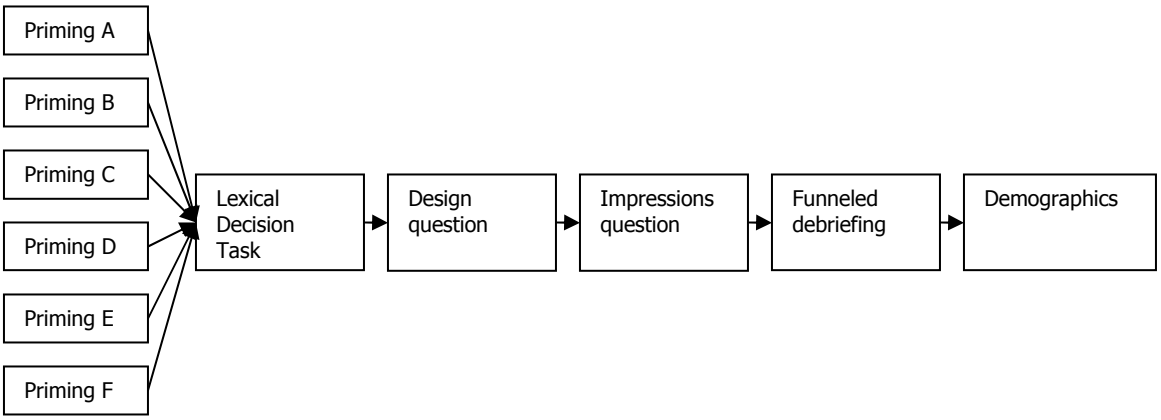

Figure 3: experimental procedure

The first part of all six conditions was slightly different due to their location and priming technique. The second part of all six conditions consisted of the same Lexical Decision Task and questionnaire. The procedures for all six conditions were kept as equal as possible. The following paragraphs will explain the difference between the six conditions (i.e. A-F).

3.5.1. Bedroom-Physical (A)

In the Bedroom-Physical condition the participant was placed in a bedroom. This room contained basic bedroom furniture, such as a bed, bedside table, simple alarm clock, 2 cupboards, a night lamp, and clothes. A curtain was hung from the ceiling to camouflage the absence of a window (see Figure 4). The Participant was explained that the research was held in two rooms. The experiment started with the participant standing and reading instructions for the experiment and introduction from a laptop screen. After reading the instructions the instructor made sure that the instructions were understood and told the participant to sit on a chair. This chair was placed in a corner of the room. Then the instructor left the room and closed the door. The participant stayed in the room for four and a half minutes. After this time period the instructor came back to accompany the participant to the next room where the second part of the experiment was conducted.

Figure 4: photographs of used bedroom environment

3.5.2. Office-Physical (B)

In the Office-Physical condition the participant was placed in an office. This room contained office related attributes, such as a monitor, scrapbook, articles, telephone, plant, cupboard, file cabinet, and paper waste (see Figure 5). The experiment started with the participant sitting behind the desk reading instructions for the experiment and introduction from a laptop screen. After reading the instructions the instructor made sure that the instructions were understood and left the room closing the door. The participant stayed in the room for four and a half minutes. After this time period the instructor came back to start the second part of the experiment.

Figure 5: photographs of used office environment

3.5.3. Bedroom-Pictorial (C)

In the Bedroom-Pictorial condition the participant was placed in a cubicle. This is a small white room with only a table, chair, and a computer. The participant was explained that the research was held in two cubicles; the first part would be in the starting cubicle and the second part would be in another cubicle. Then the instructor told the participant to start and left the cubicle closing the door. The experiment started with the participant sitting behind the computer reading instructions for the experiment and the introduction. Thereafter, the participant was presented thirteen pictures of a bedroom (for examples see Figure 4). These pictures were taken of the same room that is used in the bedroom-environment condition. Every picture was shown for twenty seconds. Watching the pictures took four minutes and twenty seconds (13 x 20 sec.). After this time period the participant came out of the cubicle and the instructor accompanied the participant to the next cubicle were the second part of the experiment was conducted.

3.5.4. Office-Pictorial (D)

The Office-Pictorial condition was equal to the bedroom-visual condition (C), except for the shown pictures. In this condition thirteen pictures of an office were used (for examples see Figure 5). These pictures were taken of the same room that is used in the office-environment condition.

3.5.5. Bedroom-Cognitive (E)

In the Bedroom-Cognitive condition the participant was placed in a cubicle. This was the same cubicle as used in the bedroom-visual condition. The participant was explained that the research was held in two cubicles; the first part would be in the starting cubicle and the second part would be in another cubicle. Then the instructor told the participant to start and left the cubicle closing the door. The experiment started with the participant sitting behind the computer reading instructions for the experiment and the introduction. Then the participant was asked to answer three questions about the atmosphere, their feelings, and the acts that are possible in their own bedroom. The questions were stated on the screen one after the other. When a question was displayed on the screen the participant had to type in the answers on the computer. These questions were: "Give an elaborate description of the atmosphere in your own bedroom.", "Give an elaborate description of the feelings you have when thinking of your own bedroom.", and "Give an elaborate description of the actions you can perform in your own bedroom." Asking the questions and letting the participants write the answers down, forces the participant to think deeply. When finished the participant came out of the cubicle and the instructor accompany the participant to the next cubicle were the second part of the experiment was conducted.

3.5.6. Office-Cognitive (F)

The Office-Cognitive condition was equal to the bedroom-cognitive condition (E), except for the asked questions. These questions were: "Give an elaborate description of the atmosphere in an office.", "Give an elaborate description of the feelings you have when thinking of an office.", "Give an elaborate description of the actions you can perform in an office."

The second part of the experiment was the same for all participants. In the other cubicle or room were a computer and a response box. The instructor explained the use of the response box and started the program which was used for the Lexical Decision Task. The name of the second experimenter was shown in the screen to give the impression that this task was of a different experimenter. The rest of the instructions were provided via the computer or laptop. When the participant was done they had to knock on the door to indicate that they finished the word task (i.e. the Lexical Decision Task). The instructor then entered the room for a brief moment to start the questionnaire. The questionnaire started with a loading screen, to indicate that a new task was started. The name of the third experimenter was visible in the lower part of the screen. In this task the participant was asked to name as many aspects for a new generation alarm clock. Participants could fill in aspects one by one. Thereafter, participants were asked to give the thoughts and feelings they had during the first tasks. This question was not really necessary for the real experiment, but was asked anyway to make the whole experiment believable for the participants. The funnelled debriefing was to check whether or not participants were aware of the connection between the first and the second task. This debriefing existed of two questions. The first one was about the connection between the different tasks and the second one was about the influence of one task on another task. In the demographical questions the participants were asked for age, sex, and education. The questionnaire was closed with a word of thanks and the participant was asked to not to talk with others about was happened during the experiment.

3.6. Measurement

Authorware and E-Prime 2.0 were used to provide the participants with instructions and record their answers.

3.6.1. Lexical Decision Task

For the Lexical Decision Task, E-prime 2.0 was used together with a Serial Response Box by Psychology Software Tools Inc. to register reaction times of the participants. Participants were confronted with a lexical decision task in which they had to respond to forty-eight words. Twenty four of the words were existing words and twenty four were fake words. For every word appearing on the screen, they were asked to decide as fast and as accurately as possible whether the word was a meaningful word or not. Participants pressed buttons on the response box marked green for yes and red for no. All words appeared at the same location on the screen, preceded by a fixation string, for 1500 milliseconds. Reaction times were measured in milliseconds from the onset of the words to the time participants pressed a button. The words were presented in random order, and were preceded by four practice trials (see Table 1a). Among the existing words, six target words represented the bedroom concept (see Table 1b) and six target words presented the office concept (see Table 1b). The words representing the

bedroom concept were taken from a small pilot in whom people must give a description of their waking up routine. From these descriptions bedroom related words were taken. The most frequent words were left out, because these words could be too directly related to the topic and therefore give away the reason of the experiment. The other twelve existing words were neither relevant for the concept of bedroom nor related to the concept of office (see Table 1c). The length of the words was controlled for. That is, the mean length of the bedroom, office and neutral words was equal (*M* = 7 letters). E-Prime 2.0 recorded the response latencies on the bedroom, office, neutral and fake words. The data was recorded in such a way that every response on a word was placed on a new row. This data had to be transposed in order to be able to use the data in SPSS. Wrong answers such as 'no' on a real word are indicated as a system missing value.

Table 1a: Trail Words

Trial Words		
Dutch	*English*	*Fake*
KAARTEN	MAPS	PSARMAK
APPEL	APPLE	BIMAL

Table 1b: Bedroom and Office Words

Bedroom Words		**Office Words**	
Dutch	*English*	*Dutch*	*English*
OPSTAAN	WAKE UP	POTLOOD	PENCIL
RUSTEN	REST	PAPIER	PAPER
OCHTEND	MORNING	AGENDA	AGENDA
OMKLEDEN	CHANGE	NOTITIE	NOTE
OPWARMEN	WARM	WERKDRUK	WORKLOAD
SLUIMER	SLUMBER	DISCUSSIE	DISCUSSION

Table 1c: Neutral and Fake Words

Neutral Words		**Fake Words**	
Dutch	*English*	*Fake*	
AANVULLING	SUPPLEMENT	MERFLEK	BREOFLIES
TROMMEL	DRUM	GADELERK	PLAAR
MELKKAN	MILK JUG	KROOR	DOLINN
KONING	KING	BEKELRE	KAKTERU
AUTOMAAT	MACHINE	BRODDEM	ZLEIMBT
STADION	STADIUM	RCKET	KLAUKB
BLOEMEN	FLOWERS	LEUVNES	LETREMEL
TENNISSEN	TENNIS	TREEPLEED	THREMIED
KAUWGUM	GUM	VERGLEK	ZLATYBYZ
HERFST	AUTUMN	DRUSMOOL	BREUD
FLES	BOTTLE	FOTLEOR	TGREUL
SLEUTEL	KEY	KWAFA	BLMOKOET

3.7. Results

The response latencies on the words are analysed using the two room and three priming techniques. In this analysis the following three hypotheses are tested:

> *H1: Exposure to a bedroom environment enhances the accessibility of the bedroom concept automatically, so that such exposure would speed up participant's responses to bedroom related words in a lexical decision task.*
>
> *H2: Exposure to an office environment enhances the accessibility of the office concept automatically, so that such exposure would speed up participant's responses to office related words in a lexical decision task.*
>
> *H3: The accessibility of the bedroom concept is dependent on the priming technique.*

3.7.1. Data preparation

All incorrect ("no") responses on real words were excluded from the analysis (4.75 %). Variables responses that were more than three standard deviations from the mean (1.96 %) were removed. The response time (in milliseconds) on the six bedroom words were averaged, as were those on the six office and twelve neutral words. Responses on fake words are not used in the analysis. To reduce the skewness of the response distribution, natural logarithmic transformations of averaged response latencies were conducted (Fazio, 1990). Levene's test was not significant, indicating that the variances of response latencies were not unequal across the conditions, therefore homogeneity of variance can be assumed.

3.7.2. Analysis

The transformed response latencies on bedroom and office words were subjected to a REMANOVA with type of room (bedroom vs. office) and type of prime (physical vs. pictorial vs. cognitive) as between subjects factors and type of word (bedroom vs. office) as the within subjects factor. This analysis showed a significant main effect of type of word, $F(1, 114) = 9.68$, $p = 0.002$. This indicates that overall participants responded faster to bedroom related words ($M = 645$) than to office related words ($M = 665$). No main effects between subjects were found on type of room, $F(1, 114) = 1.34$, p = n.s., and type of prime, $F(2, 114) = 0.16$, p = n.s. Also no significant interaction effect between subjects was found between type of room and type of prime, $F(2, 114) = 1.17$, p = n.s. There was a significant interaction effect between the type of word and the type of room, $F(1, 114) = 9.65$, $p = 0.002$. This indicates that the response latencies on bedroom and office related words differ between the types of room. To break down this interaction, two t-tests were performed. One with bedroom related words as the dependent variables and the type of room as the independent variables, and another one with office related words as the dependent variables and the type of room as the independent variables. Comparing bedroom related and office related words separately between the bedroom and office environments. On average, participants responded faster to bedroom

related words in the bedroom environment (M = 624, SE = 13.13) than in the office environment (M = 666, SE = 15.51), t (118) = -2.06, p = 0.042. No significant difference could be found in the response latencies on office related words between the bedroom environment (M = 665, SE = 14.55) and the office environment (M = 664, SE = 13.82), t (119) = -0.013, p = n.s. Average response latencies are presented in Figure 6.

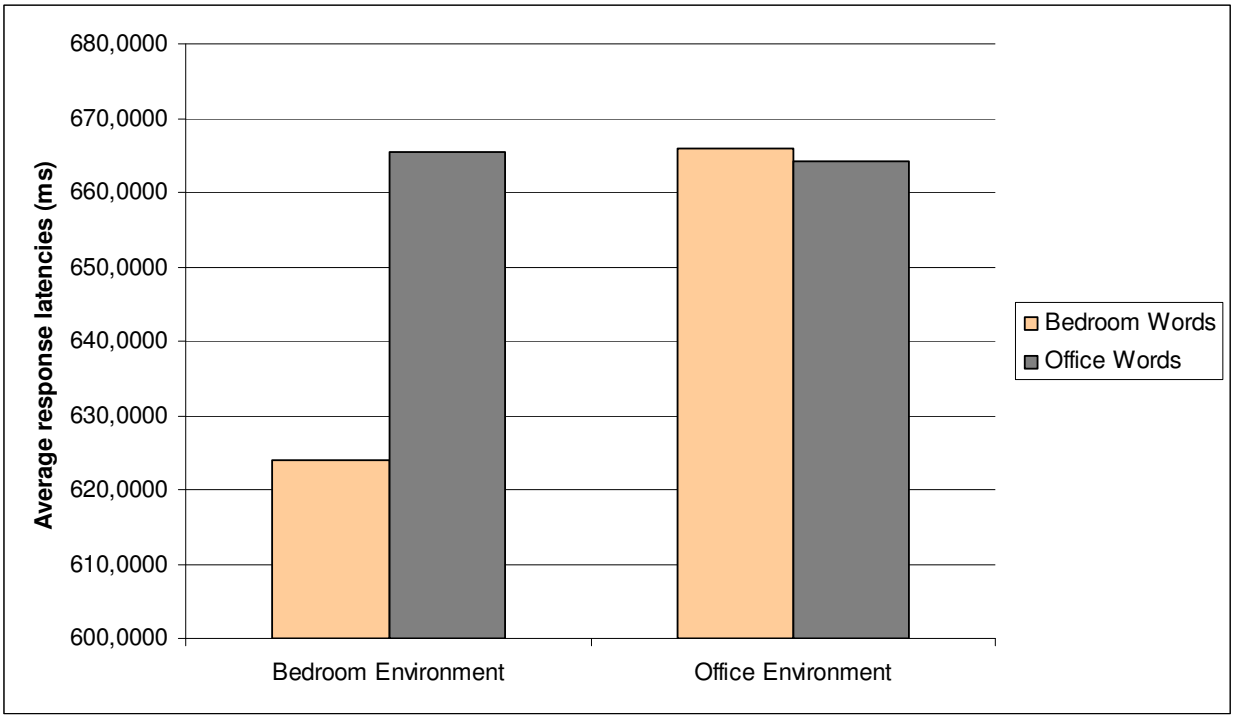

Figure 6: average response latencies and standard error for bedroom and office related words in the bedroom and office condition

There was a significant interaction effect between the type of word and the type of prime, F (2, 114) = 10.34, p < 0.001. This result has no further implications for our hypothesis.

Finally, the type of word x type of room x type of prime interaction was not significant F (2, 114) = 2.13, p = 0.124 (see Table 2 for means per condition). This indicates that the type of word x type of room interaction was not different between the three priming techniques.

Table 2: average response latencies in milliseconds (standard deviations are shown in parentheses) of bedroom and office words in the bedroom and office environments after use of physical, pictorial and cognitive priming

	Physical priming		Pictorial priming		Cognitive priming	
	Bedroom words	Office words	Bedroom words	Office words	Bedroom words	Office words
Bedroom environment	647 (117)	638 (112)	603 (84)	638 (84)	622 (103)	722 (117)
Office environment	695 (156)	664 (135)	663 (97)	677 (106)	640 (97)	651 (77)

3.8. Discussion

This experiment was performed to investigate the possibility of activating mental bedroom associations without the presence of someone's real bedroom environment. For this we hypothesized that exposure to a bedroom environment enhances the accessibility of the bedroom concept automatically, so that such exposure would speed up participants' responses to bedroom related words in a lexical decision task. The results of this experiment supported the prediction that the response latencies on bedroom related words would be faster if the participant was confronted with a bedroom environment than when the participant would be confronted with an office environment. This result is similar to the findings of Aarts & Dijksterhuis (2003) who showed that people reacted faster to words that represented the normative behaviour of being silent after being primed with the library environment, indicating that priming can activate an environmental concept. This result supports that mental bedroom associations can be activated without the presence of someone's own real bedroom environment.

We also hypothesized that exposure to an office environment enhances the accessibility of the office concept. However, no difference was found in the response latencies on the office words between the bedroom and office environment. A possible explanation could be that the used office words are not only office related, but also related to lecture halls and study activities (e.g., paper, workload, and discussion). Most of the participants were students who are mainly, during their day, in a study related environment. For students, these words are not particularly related to an office environment and can therefore not measure the effect of office concept activation. Another explanation could be that the study concept and the office concept have a large overlap, so the discrepancy between the two concepts is not large enough. If this is true than stimulating with an office environment will not result in activation of a measurable concept.

We exposed participants with the bedroom environment using three different techniques in order to find a technique that has the strongest activation effect of an environmental concept to study the availability of waking up needs. No significant difference between the three priming techniques was found. Basically, people either passively watched an environment (real or pictures) or thoroughly thought of an environment, but all techniques enhanced the accessibility of an environmental concept.

In summary, this experiment provides support for the idea that an environment can have an effect on knowledge accessibility. Mental bedroom associations can be activated without the presence of someone's own real bedroom environment. However, no single priming technique was outstanding the others. Nevertheless, we can use priming as a method to activate environmental concepts to study the availability of waking up needs. In the following experiment we study the availability of waking up needs by activation of the waking up concept using two kinds of priming techniques.

4. Effect of priming on the availability of waking up needs

4.1. Introduction

According to the experiment presented in the previous chapter, presenting a bedroom or letting people think of their own bedroom environment can enhance the accessibility of wake up associations. This chapter describes an experiment which was conducted to understand the relation between the environment of the consumer and the availability of needs related to waking up, by using priming to enhance the concept of waking up. In the user-centred development of the Wake-up Light, it is important to understand the consumer needs that are related to waking up after a night of sleep. Consumers are willing to share their needs, but it is likely that the availability of those needs depend on the environment of the consumer. In this experiment we study the effect of waking up associations on people's availability of needs related to a wake up appliance, using several priming techniques. We expect that participants primed with waking up will have an improved accessibility to the waking up concept. These participants will have therefore more concrete and detailed information related to waking up in comparison to non-primed participants who will have more abstract and general beliefs salient. In the following paragraphs, the experimental design, the participants, the procedure, the manipulation, and the measurement is explained. Subsequently the results are presented and discussed.

4.2. Design

A 3 (type of prime: control vs. cognitive vs. physical) between-groups design was used for this experiment (see Figure 7). In condition 'A', the control condition, no priming was employed. In condition 'B' the participant was cognitively primed. In condition 'C' the participant was primed by visiting a bedroom environment. The dependent variables are the ranking of needs, ranking of alarm clock properties, open answers on questions about a new wake up appliance and open-format Wake-up Light impressions.

Type of prime Condition		
Control A	Cognitive B	Physical C

Figure 7: the experimental design

4.3. Participants

58 participants were recruited using the participant database of Philips Drachten. All of them were native Dutch and living in or near Drachten. The average age of the participants was

43.41 year (*SD* = 7.81). 26 of the 58 (44.8%) were male. As a reward for participating, they received a gift certificate of 10 or 15 euro. This reward depended on the condition. In one of the three conditions the participants had to make an extra photograph and send this upfront, therefore receiving a higher reward. Additionally, travel expenses were reimbursed.

4.4. Procedure

The experiment was conducted at Philips Drachten Consumer Lifestyle. Participants were welcomed and guided to the room in which the experiment took place. They participated individually. For the experiment two rooms were used: a meeting room and a bedroom. Participants were randomly assigned to one of the three conditions. During the first part of the session, participants received a written description of the purpose of the experiment and basic instructions. In the two experimental conditions, participants then received their priming treatment. In the control condition the participant underwent no deliberate priming. During the second part of the session, participants filled out a printed questionnaire, which contained four questions. The questionnaire ended with several demographic items. When the participant finished they were thanked and received their payment. The session lasted approximately 25 minutes.

4.5. Manipulation

Three conditions are used in this experiment. Two conditions contained a priming treatment and one is the control condition: A) Control, B) Cognitive, and C) Physical.

4.5.1. Control (A)

In the control condition the participant underwent no deliberate priming but had to wait for a couple of minutes. This condition took place in a meeting room. After the participant had read the explanation of the research and the basic instruction from an instruction paper, the experimenter pretended that he had forgot something. He asked the participant if he could bring some drink for the participant and left the room. After a maximum of five minutes the experimenter came back with a drink and the questionnaire and the second part of the experiment started.

4.5.2. Cognitive (B)

The cognitive priming condition is similar to the cognitive condition in the first experiment. By asking several questions and letting the participants write the answers down, the participant is forced to think deeply about a specific situation. According to the results of the previous experiment no difference was found between the used priming techniques. In order to make one condition as strong as possible several techniques were combined (Van der Hoogen, 2007), next to priming the participant cognitively, they were also primed pictorial and with a goal (Aarts & Dijksterhuis, 2003). The cognitive priming condition exists of three techniques:

Firstly, the participants were asked to think thoroughly about their morning routine. Similar to the previous experiment, participants had to complete an assignment consisting of three questions. The questions covered the experience of waking up on a week day: 1) Describe the atmosphere in the morning in your own bedroom, 2) Describe the feelings you have at the moment of getting up, 3) Describe the actions you can perform just after waking up in your own bedroom. On the page with the questions was space to write down the answers. For writing down the answers the participants got five minutes, this was done to keep the time spend on the assignment evenly between the participants. The experimenter was not present in that time.

Secondly, participants viewed a picture of their own bedroom during the exercise. This picture was projected on the wall opposite to the participant. These pictures were taken by themselves, upon request of the experimenter. One week before their visit to the research facility the pictures were sent to the researcher. Instructions were given to the participants that this picture had to include as much as possible of the participant's bedroom. If multiple pictures were sent, then the pictures showing most of the bedroom including the bed was chosen.

Thirdly, they were told that they were to visit a bedroom after the experiment. Prior to the assignment the participant was told that after the experiment the participant would visit a similar room as the personal bedroom shown on the wall. This instruction was repeated in the printed assignment, to be sure that the participant did not miss the instruction. Using this goal-priming technique is based on the first experiment of Aarts & Dijksterhuis (2003). After finishing the assignment the second part of the experiment started.

4.5.3. Physical (C)

The physical condition took place in a specially furnished room at Philips to represent a real bedroom (see Figure 8). Participants were instructed to imitate their waking up routine. By imitating the waking up routine, participants do not only experience the room visually, but also physically by means of movement through the room, getting in and out of bed, and feeling the blankets and mattress. We expect that this enactment creates a more immersive experience that triggers the concept of waking up. Basically, the participant was asked to do the actions he/she would normally do when he/she get up. Instructions for performing these actions were put on a paper, so the participant could clearly read what was expected from them. They were asked to take off their shoes and take place in the bed on the side and in the position they were normally laying. After a couple of minutes, a small travelling alarm clock went off, and the participants performed the actions they normally did waking up in the morning. This took five minutes in total and the experimenter was not present in that time. After finishing the enactment the second part of the experiment started. When the whole experiment was finished, participants were asked whether they performed any actions during the absence of the experimenter. All participants claimed to have lain on the bed and to have performed some part of their morning routine such as: stretching and opening the curtains.

Figure 8: Philips bedroom

4.6. Measurements

The second part of the experiment, in which participants filled out a questionnaire, was the same for all participants. This part existed of four questions and several demographic items (see Appendix B for full questions).

In the first open question a small story was presented. This story stated: "Your old alarm clock broke down. While shopping, one of the shop-windows contains the state of the art alarm clock. What could this alarm clock mean to you?" The participants were given two minutes to write down their thoughts about what a new wake up appliance could mean to them. In this question participants can spontaneously express their needs by writing down what a new alarm clock could do for them. We can then analyse if the content is wake up related.

The second question was about properties of an alarm clock. In this closed question ten properties were presented in random order. Five properties that help waking up (wake up properties): *ability to snooze, sounds that gradually becoming louder, light to wake you up, motivating force to come out of bed,* and *natural wake-up sounds (e.g., farm sounds).* And five properties that are features of an alarm clock, but do not directly help waking up (not wake up related properties): *seven alarm times, automatic radiofrequency setting, self programmable wake-up sounds, automatic time setting,* and *ten preprogrammable radio channels*. Two sub questions were asked about these ten properties. In the first sub question the participants were asked to indicate the three most important properties. Indicating the most important property with a '1', the second most important property with a '2', and the third most important with a '3'. In the second sub question the participants were asked to indicate the three least important properties in the same manner as in the first sub question. So, a '1' for the least important property, a '2' for the second least important property, and a '3' for the third least important property. The ten alarm clock properties were presented in two tables (one for every sub question). In the second column of a table was space to indicate the property rating. With this question we expect to measure that primed participants will have a preference for alarm clock properties that help waking up and that they will least prefer alarm clock features.

Before the third question, the participants were asked to reveal an alarm clock. This was a Philips Wake-up Light (model number: HF3470). The third question stated: "Look at the alarm clock you have just revealed, write as much as possible of what you have to think of when looking at the alarm clock". Two minutes were given to the participants, in which they had to write down their thoughts by looking at the Philips Wake-up Light. With this question we expect to measure that primed participant provide descriptions which contain more wake up related arguments.

The fourth question was similar to the second questions, but instead of rating properties of an alarm clock participants had to rate needs. In this closed question ten needs were presented in random order. Five needs referring to waking up: *coming out of bed leisurely, waking up before the alarm goes, being able to drowse, being able to step out of bed immediately,* and *listen to the radio to wake up.* And five needs that refer to activities after one has come out of bed: *being able to stretch, having a nice shower, time enough for personal care, able to brush their teeth,* and *dress undisturbed.* Two sub questions were asked about these ten needs. In the first sub question the participants were asked to indicate the three most important needs (rating was done in the same manner as in the second question). In the second sub question they were asked to indicate the three least important needs. The ten needs were again presented in two tables. In the second column of a table was space to indicate the needs rating. With this question we expect to measure that primed participants will have a preference for needs that refer to waking up and that needs that refer to action after coming out of bed are least preferred.

In the demographic part, participants had to indicate if they had user experience with a Philips Wake-up Light, their age, and gender.

In order to use the retrieved data from the questionnaire the data is recoded and categorised. The answers of the open questions (one and three) are categorised. The answer are categorised in two groups. One group represents the answers that are related to waking up and the physical bedroom environment. The other group represents the rest of the answers, which covers design, size, display, and the like (see Table 3 for examples). The number of items in the categories are recorded and used in the analysis.

Table 3: examples within categories

Waking up / Bedroom	**Other answers**
"[…] hard to operate laying in my bed"	"easy to clean"
"It's the question if it [the alarm clock] fits on our shelf."	"I would choose a smaller version, one that e.g. is less high."
"Hard to read without glasses in the dark."	"a built-in antenna"
"A clear knob to snooze in the morning."	"What a huge appliance!"

The answers to the closed questions (two and four), where coded in a specific way. The items that were rated with a 1, 2 or 3 were coded into a 1 and the items that did not receive a rating were coded into a 0. Both the property items and the needs items exists of five wake up related items and five not wake up related items. Average is calculated for related items, creating eight variables: *most important wake up properties, least important wake up properties, most important not wake up related properties, least important not wake up related properties, most*

important wake up needs, least important wake up needs, most important out of bed needs, and *least important out of bed needs.*

4.7. Results

The responses on the four questions were analysed between the control, cognitive and physical condition. In this section we show the effect of the activation of a waking up concept on the availability of wake up needs. We suspect that with waking up primed participants will have more concrete and detailed information related to waking up present in comparison with non-primed participants who will have more abstract and general beliefs present. This is tested with the following hypotheses:

> *H1: Primed participants provide more wake up appliance descriptions that are related to waking up and the bedroom, in comparison with not primed participants.*
>
> *H2: Primed participants provide more alarm clock descriptions that are related to waking up, in comparison with not primed participants.*
>
> *H3: Primed participants will rate alarm clock properties related to waking up as more important, in comparison with not primed participants.*
>
> *H4: Primed participants will rate needs related to waking up as more important, in comparison with not primed participants.*

4.7.1. Analysis

The first analysis tested the hypothesis that primed participants, either with a cognitive or physical priming technique, have an improved accessibility of wake up needs. Participants will provide more waking up related arguments, when they express their needs in the answers on what a new alarm clock could mean to them. The number of participants that gave at least one argument that is related to waking up and the number of participants that gave no waking up related arguments were subjected to a chi-square test to compare the effect of the three conditions. This test indicated that there was a significant association between the type of prime and whether or not a participant had given an argument that is related to waking up, $\chi^2(2, N = 57) = 7.68$, $p = 0.022$. This seems to represent the fact that participants in the physical condition more frequently listed a wake up argument (89%) than participant in the cognitive (55%) and control condition (50%) (see Figure 9).

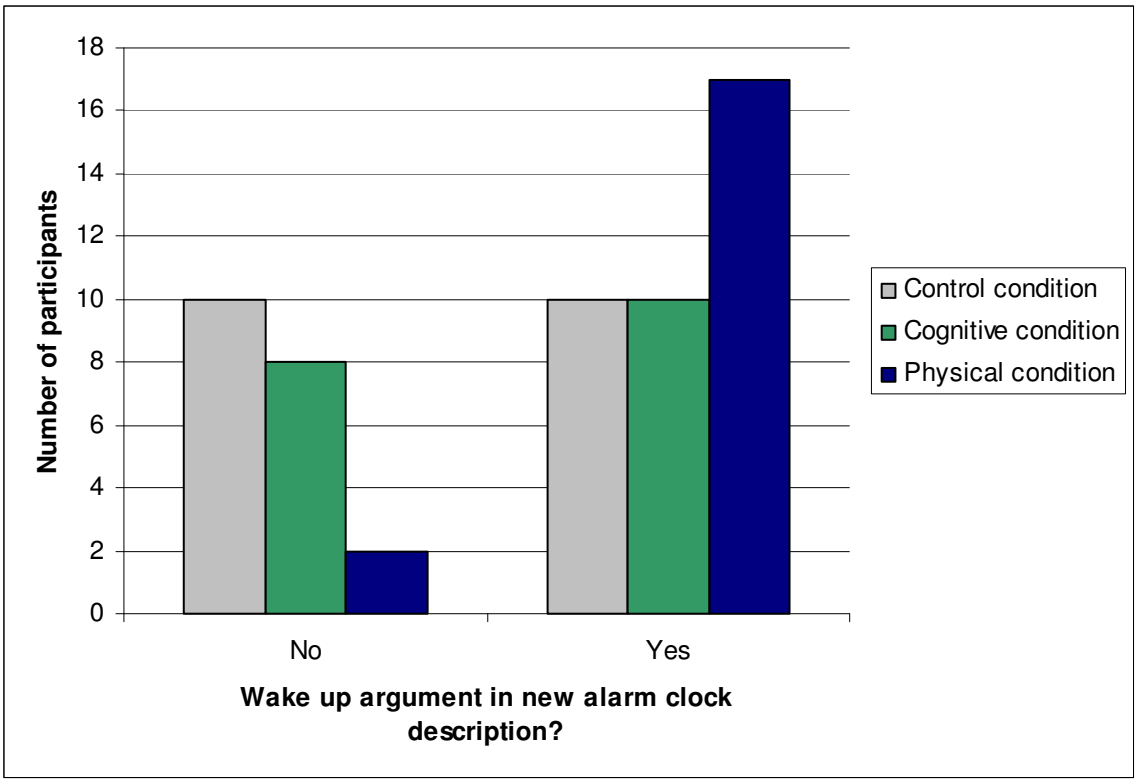

Figure 9: number of participants that described their needs related to a new wake up appliance with and without wake up arguments

To control for the effect that not only more participants in the physical condition gave wake up related arguments, but that they also gave more arguments per participant we performed a Kruskal-Wallis test to analyse the number of wake up or bedroom arguments given by participants between the three priming techniques. This test showed that the number of arguments given by participants was significantly affected by the priming technique ($H(2) = 9.96$, $p = 0.007$). Mann-Whitney tests were used to follow up this finding. A Bonferroni correction was applied and so all effects are reported at a 0.0167 level of significance. It

appeared that the number of arguments were no different after cognitive priming (U = 189, p = 0.976) in comparison with the effect of the control condition. However, participants from the psychical priming condition gave significant more wake up related arguments than participants from the control condition (U = 97, p = 0.007) and cognitive condition (U = 92, p = 0.007). So we can conclude that priming participants with a physical bedroom environment will significantly increase the number of wake up related arguments in their needs descriptions of a new alarm clock (see Figure 10).

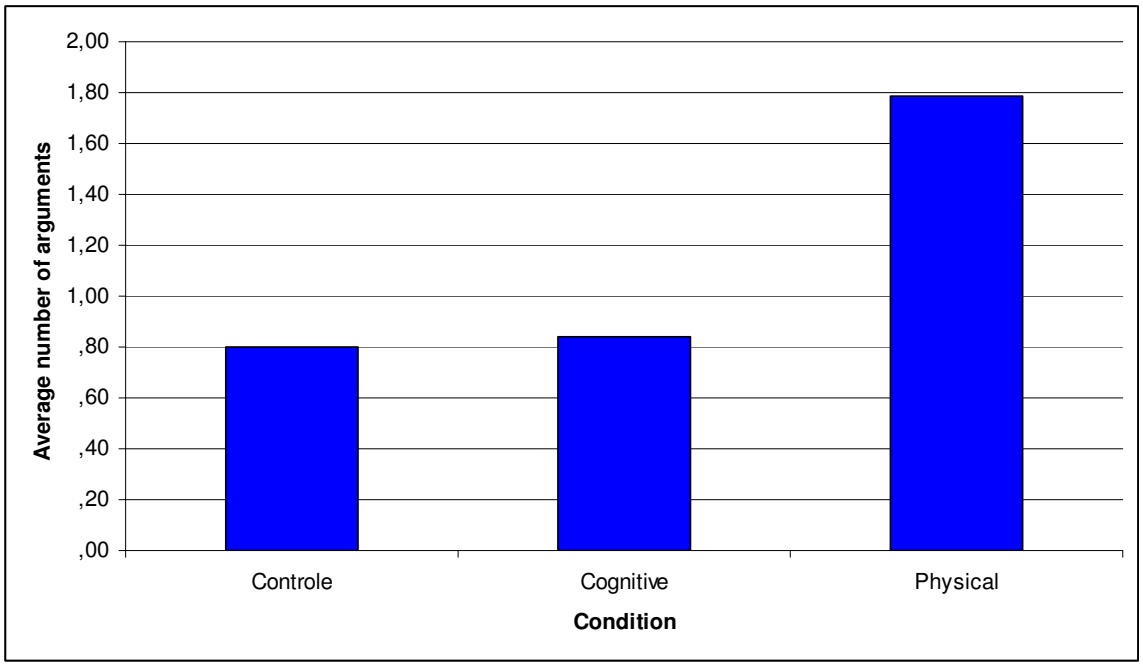

Figure 10: average number of wake up related arguments per participant between conditions

Participants were also asked to look at a Philips Wake-up Light and describe what they were thinking. We used a chi-square test to analyse the number of participants who gave at least one wake up related argument in their answer and the number of participants who gave no wake up related arguments between the three conditions. This test indicated that there was no significant association between the type of prime and whether or not a participant had given an argument that is related to waking up, $\chi^2(2, N = 57) = 5.54$, p = 0.063. Participants in the control condition did not significant more frequently listed a wake up or bedroom argument (30%) than participant in the cognitive (17%) or physical condition (47%) (see figure 11). Using a Kruskall-Wallis test to compare the average number of arguments per participant between the three conditions did not show a significant difference ($H(2) = 4.36$, p = 0.113).

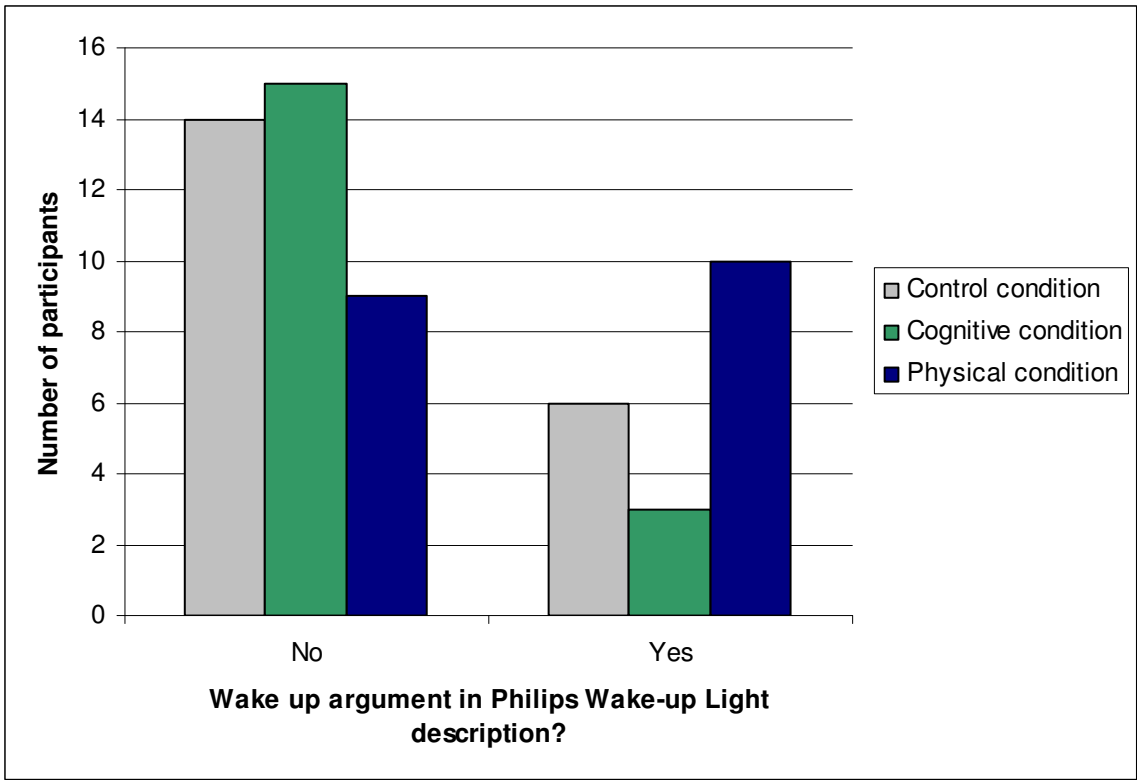

Figure 11: number of participants with and without wake up arguments in their Philips Wake-up Light descriptions

The third analysis tested the hypothesis that primed participants will rate alarm clock properties related to waking up as more important, in comparison with not primed participants. We expect that participants that are primed with waking up prefer alarm clock properties that help waking up over alarm clock properties that are not related to waking up. Five of the participants provided contradicting answers in their ranking, by indicating an item as most and as least important. The data of these participants was therefore excluded from this analysis. We used a Kruskal-Wallis test to analyse the number of times an alarm clock wake up property was chosen as most important in comparison with the number of times an not wake up related property was chosen as most important between the three conditions. This test indicated a significant difference between the three conditions ($H(2) = 6.02$, $p = 0.049$). Further analysis showed that the physical priming technique has in comparison the largest effect on the preference for alarm clock wake up properties over not wake up related properties (see Figure 12).

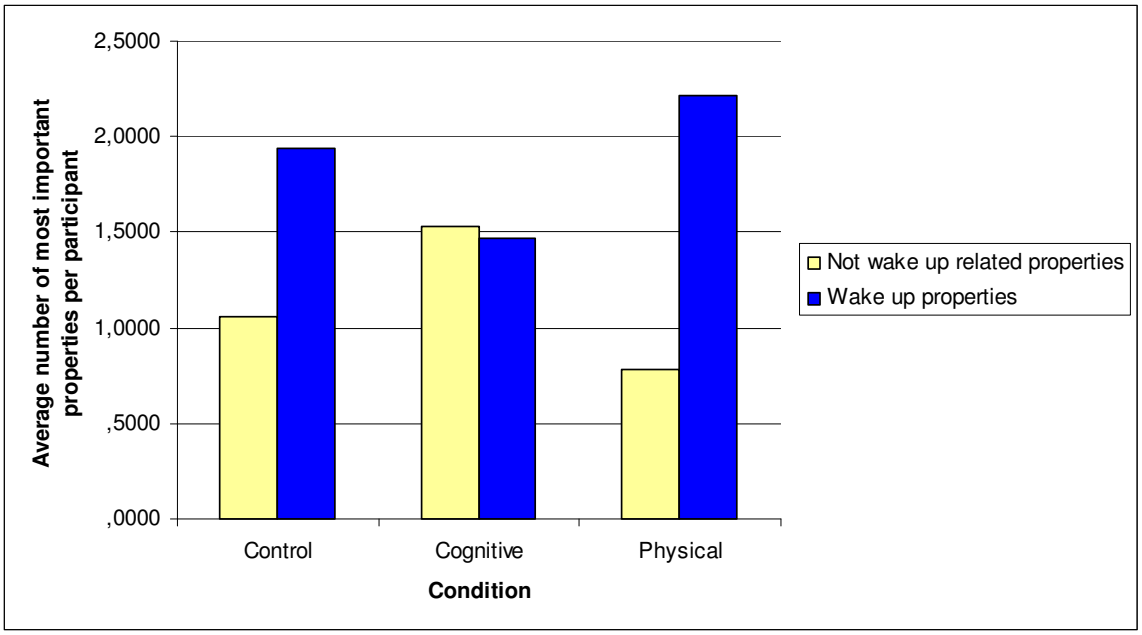

Figure 12: average number of most important properties per participant between conditions

We tested whether primed participants had the lowest preference for not wake up related properties. For this a Kruskal-Wallis test was used to analyse the number of times an alarm clock wake up property was chosen as least important in comparison with the number of times an not wake up related property was chosen as least important between the three conditions. This showed a non significant difference between the conditions ($H(2) = 3.24$, $p = 0.198$). A graph of this result indicated that participants rated more not wake up related properties as unimportant, than they rate alarm clock wake up properties as unimportant, the physical priming condition has the largest effect (see Figure 13 & Table 4).

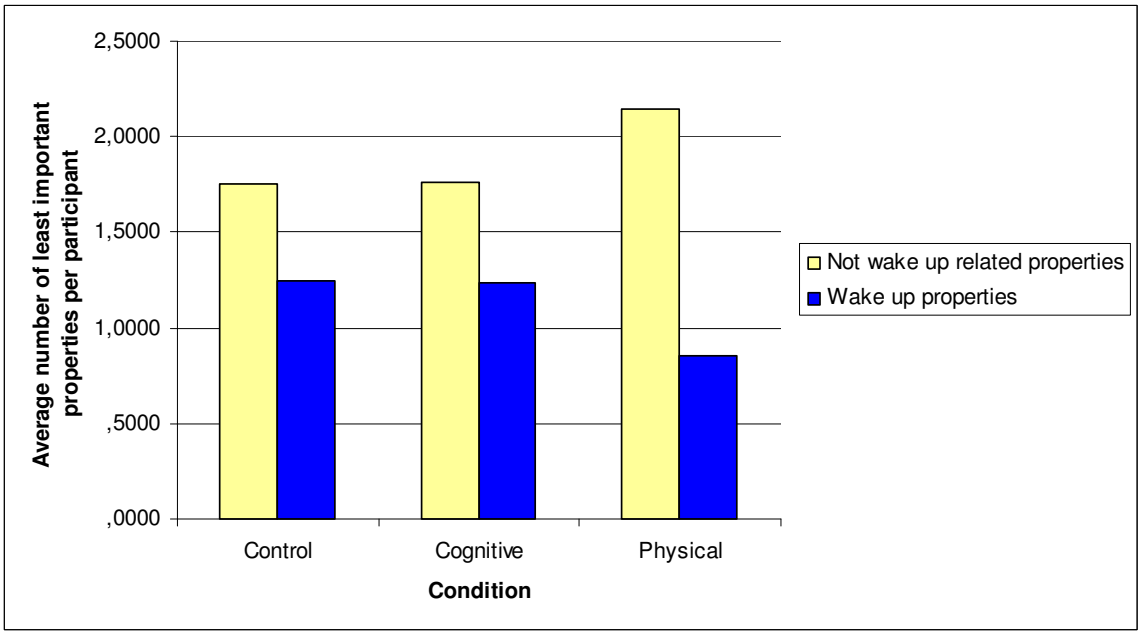

Figure 13: average number of least important properties per participant between conditions

Table 4: number of times a property received a ranking score

	Top ranking		Bottom ranking	
Condition	Not wake up related property	Wake up property	Not wake up related property	Wake up property
Control	17	31	28	20
Cognitive	26	25	30	21
Physical	11	31	30	12

The fourth analysis tested the expectancy that primed participants will rate needs that are closer to the moment of waking up as most important and needs that are related to activities after coming out of bed as least important, in comparison with not primed participants. The items that were rated as most important were divided in two groups: wake up needs and out of bed needs. These two groups were tested between priming condition using a Kruskal-Wallis test. This analysis showed that there was non significant difference between the three conditions ($H(2) = 3.05$, $p = 0.217$). This indicates that primed participants do not have a preference for wake up needs in comparison with not primed participants (see Figure 14).

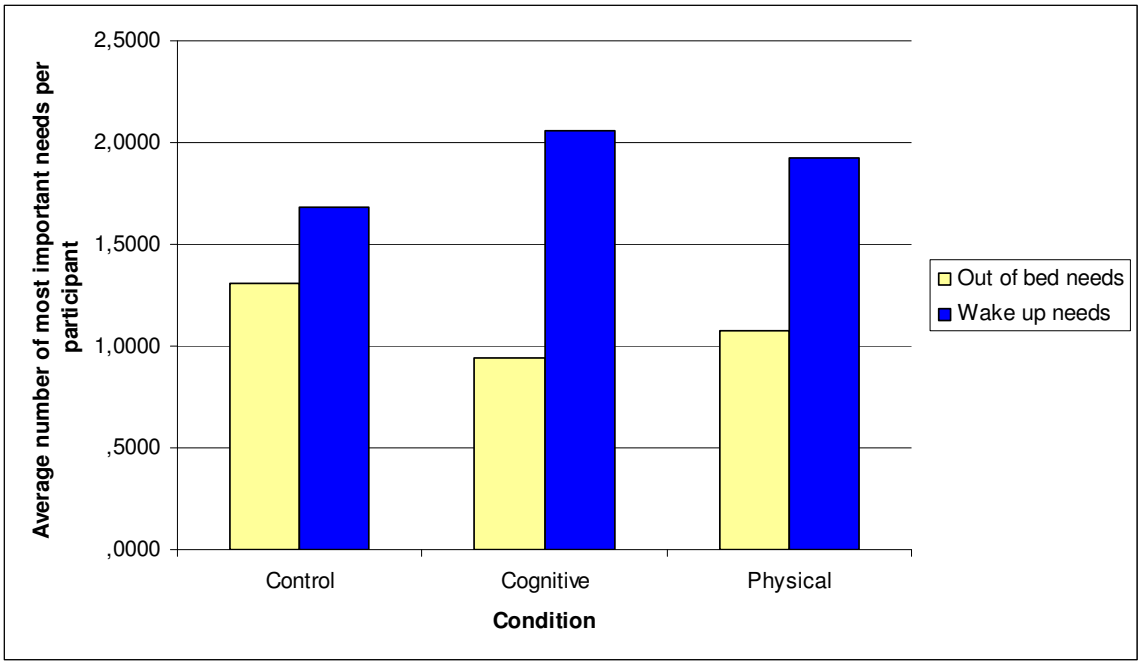

Figure 14: Average number most important needs per participant between conditions

The items that were rated as least important were divided into the same two groups. These two groups were compared between priming conditions using a Kruskal-Wallis test. This showed a non significant difference between the three conditions ($H(2) = 0.94$, $p = 0.624$). Indicating, that primed participants do not prefer out of bed needs less than not primed participants (see Figure 15 and Table 5).

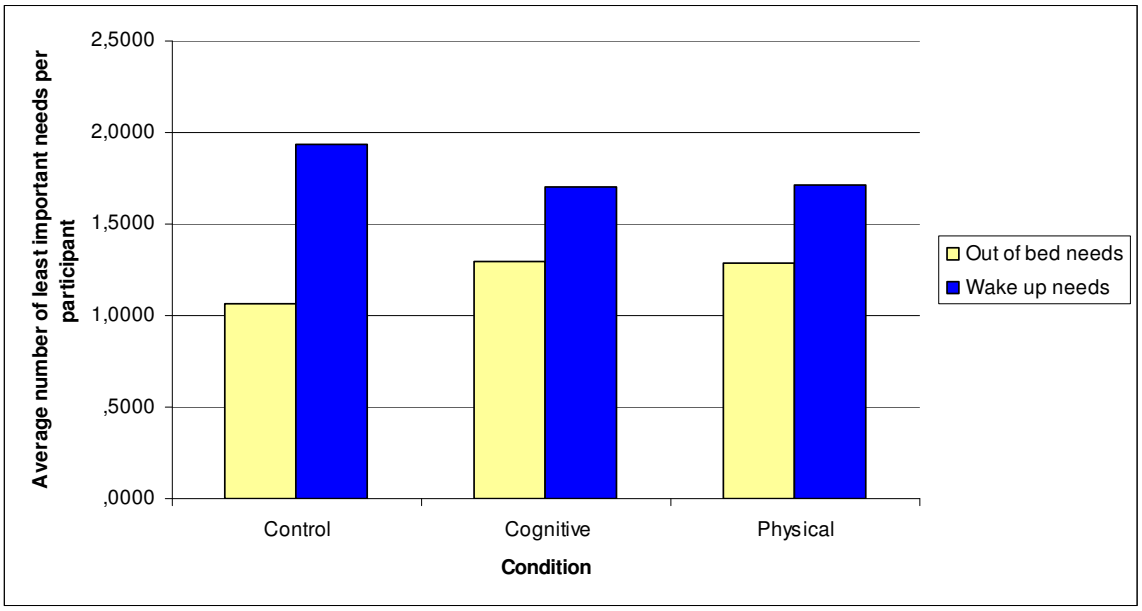

Figure 15: average number of least important needs per participant between conditions

Table 5: number of times a need received a ranking score

	Top ranking		Bottom ranking	
Condition	Out of bed need	Wake up need	Out of bed need	Wake up need
Control	21	27	17	31
Cognitive	16	35	22	29
Physical	15	27	18	24

4.8. Discussion

This experiment was performed to investigate the effect of wake up associations on people's availability of needs related to a wake up appliance using two priming methods. In the first condition three priming techniques were combined: cognitive, pictorial and goal priming. Participants had to think thoroughly of their morning routine and watched a picture of their own bedroom and they were led to believe to visit a real bedroom. In the second condition physical priming techniques were used in which the participant visited a real bedroom and performed some of their morning wake up routine. These two priming methods were compared against a control condition in which the participants were seated in a standard office environment and did not undergo any deliberate priming.

We assumed that priming people with waking up would enhance their wake up associations. We first tested the hypothesis that primed participants provide more alarm clock descriptions that are related to waking up in comparison with not primed participants. We did this by analysing the descriptions that participants provided of what a new alarm clock could mean to them and in their descriptions of their thoughts about the Philips Wake-up Light. We compared the arguments related to waking up with the arguments that were not related with waking up in the new alarm clock descriptions between the three conditions. We discovered that there was a significant association between the type of prime and the number of arguments that are related to waking. The primed conditions contain more participants that gave wake up related argument than participants that did not give a wake up related argument in comparison with the control condition. And participants of the prime conditions provided more wake up related arguments than participants from the control condition. However, the difference between the control condition and the cognitive condition was relatively small in comparison with the physical condition. In the physical condition more participants provided more wake up related arguments than participants of the other two conditions. The difference between the physical and control condition is as expected, but based on the result of the previous conducted experiment we expected that the cognitive condition would have a similar result as the physical condition. The discrepancy between the cognitive condition and the physical condition could result from the way the cognitive condition was setup. We wanted the cognitive condition to be as strong as possible therefore combining three techniques. One of the three techniques was the cognitive priming techniques in which people had to write down their experience of waking up in the morning. People maybe expressed less of their needs in later questions, because they already expressed some of their needs in the answers of the cognitive priming tasks, but further research has to be conducted to study this.

Secondly, we compared the arguments related to waking up with the arguments that were not related with waking up in the Philips Wake-up Light descriptions between the three conditions. There was no significant difference between the conditions. In this experiment we attempted to activate the waking up concept. In addition to basic cognitive priming we showed participants a picture of their own bedroom and we led them believe that they would visit another bedroom. This was done to make it easier for the participant to recall their bedroom environment and therefore more likely to think of their wake up routine. The possibility exist that the unexpected happened and that next to the waking up concept another concept is activated. Whereas the cognitive priming technique activates the wake up concept, the pictorial and goal techniques

were designed to help that process, but it maybe worked as a distraction. For example, people could get uncomfortable by the picture of their own bedroom or have to think about changing things in their own bedroom or they think of the Philips building and the way to the bedroom. This would result in the activations of multiple concepts, therefore losing the focus on the wake up concept. Some other possibility is that too much repetition is used, therefore increasing the chance that a participant becomes consciously aware of the primed concept. Constructing a stronger prime is preferable, because it increases the chance of activation to occur (Bargh & Chartrand, 2000). However, in supraliminal priming repetition is not per definition a good choice, because participants can due to the understanding of the topic of the test be, willingly or not, less expressive in their answers.

Thirdly, we tested the hypothesis that primed participants will rate alarm clock wake up properties related to waking up as more important, in comparison with not primed participants. We discovered a significant difference within the preferences for wake up properties (e.g., *light to wake you up)* and not wake up related properties (e.g., *automatic radiofrequency setting)* between the three conditions. Further analysis suggest that in the physical condition people rate wake up properties as more important than not wake up related properties compared with the control and cognitive condition. Remarkable is that in the control condition people give higher ratings to wake up properties. Apparently, people have a preference for wake up properties in general. However, in the cognitive condition people do not have a specific preference for the type of properties of an alarm clock. We also analysed the ratings people gave to the items they indicated as least important this resulted in no significant difference between de three conditions. Further analysis showed that in all conditions more not wake up related properties are ranked as least important in comparison to wake up properties. This confirms the idea that people have a general preference for wake up properties.

Fourthly, we tested the hypotheses that primed participants would rate needs that are closer to the moment of waking up as more important, in comparison with not primed participants. We discovered no significant difference in the ratings of most and least important wake up needs and out of bed needs between the three conditions. Further analysis showed that wake up needs are rated by more participants as most important needs, but that the wake up needs are also rated by more participants as least important needs in comparison to out of bed needs. This looks somewhat curious, because how can a wake up need be rated as most and least important? Further analysis indicated that the participants do not unilaterally agree. Some of the items were rated as an important need by one part of the participants and the same items were rated as an unimportant need by another part of the participants. These were items such as: *waking up before the alarm goes* and *being able to step out of bed immediately.* In this analysis we also discovered that most of participants, independent of the condition, indicated that they want to wake up with a relaxed feeling. There is a possibility that because this was the last question of the questionnaire, the priming effect was not so strong anymore. Bargh, Lombardi & Higgins (1988) indicated that when the time period between the prime and the task is lengthened the chance a participant used the primed concept instead of a chronic concept becomes smaller. They used three time periods: 15 seconds, 120 seconds, and 180 seconds, as the time period became longer the strength of the priming effect became weaker. This could also happen during this experiment, the duration between the prime and the last task is around 15 minutes. In the mean while many other influences could have crossed the person's mindset resulting in a weakening of the priming effect.

In summary, we studied the availability of people's waking up needs due to the effect of priming. Primed participants who write down what they need and expect of a new alarm clock were able to express more arguments related to waking up than participant who were not primed. This indicates priming people with a waking up concept helps those people to communicate their needs regarding an alarm clock. Letting primed participants write down their direct thought after seeing a real alarm clock will not stimulate them to express their needs regarding alarm clocks more than not primed participants. Primed participants that indicated their preference for alarm clock functions indicated that they preferred functions of an alarm clock that are related to waking up. Participants of all three conditions indicated that they found alarm clock features less important than alarm clock wake up properties. This suggests that people prefer to have an alarm clock with properties mainly for waking up and less for their extra features. There was no difference between primed and not primed participants in preference for needs regarding waking up or needs regarding activities out of bed. Physically primed participants provided more wake up appliance descriptions that are related to waking up and preferred more properties of a wake up appliance that help waking up in comparison with the control group. However, in all significant differences the cognitive type of prime scored equal or lower than the control condition and both the cognitive and control condition scored lower than the physical condition. This indicates that physical priming is more effective than cognitive priming in studying people's waking up needs.

5. Discussion and Recommendation

5.1. Discussion

The intention of this study was to investigate the influence of the environment on a consumer's mindset during an appliance test. More specifically, the influence of a bedroom environment during a user test of a Philips Wake-up Light (WUL) in the availability of needs related to waking up. WUL user tests are often performed in an office environment, but the normal context-of-use of the WUL is the bedroom environment. WUL user tests performed in an office environment are susceptible to giving deceptive results. All user appliance tests should therefore be conducted in the natural context-of-use. A drawback of this statement is that the natural context-of-use is not always easy to reach. We therefore searched for a solution to replicate the effect of the natural context-of-use. In this case the context–of-use is the bedroom environment. To investigate the effect of an environment on the mind set of a person we conducted two experiments in which we attempted to activate concepts and study the availability of needs related to waking up. To activate knowledge without the presence of the natural context-of-use, priming techniques were used as a basis for our experiments, because priming is a widely used method to activate stored knowledge (Higgins, 1996).

In the first experiment, we investigated the effect of priming techniques on the activation of stored knowledge of environment concepts. We aimed to mentally activate bedroom and office concepts by replicating these real environments using priming techniques. Participants were primed by either cognitive priming, in which they had to imagine aspects of their own bedroom or an office environment; or pictorial priming, in which they had to watch pictures of a bedroom or office environment; or physical priming, in which they visited a replicated bedroom or office environment that is not owned by the participant. Concept activation in peoples mind set as reaction on the priming techniques was measured by means of a Lexical Decision Task (LDT). Response latencies on words related to the environments were compared between the priming techniques. The main point we learned from this experiment is that it is possible to activate the bedroom concept by use of cognitive priming, pictorial presentation, and by having participants passively sit in a physical environment. No significant difference was found between the three priming techniques. This indicates that activating an environmental concept can be achieved by multiple priming techniques, measured with a LDT. As the results of this experiment indicate that cognitive and physical priming can be used to active environmental knowledge in the mindset, we further investigated the effects of cognitive and physical priming on the mindset of people when dealing with properties of alarm clocks. For this a second experiment was conducted.

In the second experiment, we investigated if people's expressions of waking up needs depend on the environment. We aimed to activate the waking up concept by priming the context-of-use of an alarm clock in the morning. The experiment had similarities with the previous conducted experiment, but this time the centre of attention was on elicited needs and evaluation of a wake up appliance. We used two priming methods that were based on the previous conducted experiment. In the second experiment we used again cognitive priming, but because the result of the previous experiment was not very strong we attempted to enhance the cognitive priming

technique with other priming techniques. Van den Hoogen (2007) showed that adding a visual stimulus to a textual stimulus increased the strength of the priming effect and Aarts & Dijksterhuis (2003) showed that adding a goal stimulus to a visual stimulus also increased the strength of the priming effect. We therefore tried to make the prime more salient by adding two techniques to the cognitive priming technique. To make the effect of the cognitive priming technique stronger we added pictorial priming and goal priming. We added pictorial priming to make the priming more personal; a picture of the participants own bedroom could help in reminding experiences of the bedroom. We also added goal priming to activate the bedroom environment, by indicating the presence of a bedroom nearby. In the second priming method we used the physical priming technique and added embodied experience. Participants had to imitate waking up activities. We measured the concept waking up activation by comparing the need related to waking up in the qualitative answers. The main point we learned from this experiment is that people who were physically primed and therefore had a bodily experience of a bedroom environment, were better able to express arguments that are related to needs regarding to waking up in comparison with participants who were cognitively primed or participants form the control group.

The outcomes of both experiments are interesting, because they are slightly different from what we had expected. In the first experiment we managed to mentally activate a bedroom concept with the use of priming techniques. In the second experiment, physically primed participants gave more waking up related arguments in comparison with the control condition. In the first experiment no difference in the effect of the priming techniques was found, but in the second experiment the physical conditions had a stronger priming effect. A possibility of why the physical condition in the second experiment had a different effect than the cognitive condition, whereas no different effect was found in the first experiment, is that the physical priming technique of the first condition was a passive condition. Participants experience the environment by being in the room and looking at the furniture, whereas participants of the physical condition of the second experiment were not only passively present in the environment. They also performed activities that potentially activate the wake up concept. In this way the participant has a richer immersive experience of the environment.

Another possibility for the difference between the outcomes of the two experiments is the discrepancy between the concepts and the priming method. One could argue that the difference between the activated concepts (i.e., bedroom & waking up) is larger than expected. The bedroom concept is about an environment, but the waking up concept is actually about an activity. Priming with a physical experience in which participants act out the process of waking up is therefore much more likely to activate the waking up concept than cognitive priming in which a person has only mental process related to waking up. When the modality of the priming technique and the to be activated concept are similar, then the chance of activating the concept can possibly be larger. The modality of the physical priming and an action are more similar than the cognitive priming and an action. Further research could be conducted to analyse the enactment of an action and the activation of the concept of an activity.

The presented study has two limitations. The first one relates to the experimental set up of the first experiment. The first experiment contained six conditions, three priming techniques by two environments. Due to the number of participants no control condition was used to control for the response latencies on the environment related words used in the LDT. The other limitation relates to the inspection of the activation of the waking up concept. The second experiment did

not contain a LDT to check directly for the activation of the waking up concept. The LDT was not included in the experiment, because this would influence the priming effect and therefore the outcome of the tasks in the experiment. However, similar priming techniques were used in the first and second experiment and the results of the first experiment suggest that it is possible to activate an environmental concept using those priming techniques.

5.2. Recommendation

These results suggest that cognitive, pictorial and physical priming has an effect on the activation of mental bedroom and wake up associations without the presence of the real environment. Priming can be used to get people in the right mindset. For the understanding of peoples waking up needs, the physical priming methods in which people have to enact their morning routine has the most potential, because people then provide more valuable information by giving more arguments about what they need related to waking up and the wake up appliance. It is therefore advisable to use an artificial bedroom and thereby not only showing the room but also letting people experience the room and letting them act out what they normally would do at home, before they have any interaction with the WUL. However the results suggest that the priming effect only lasted for a small period. More research should be conducted to analyse the effect of concept activation on people's appliance evaluation.

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APPENDIX A – Questions of experiment 1

Design question

Dutch wording:	**Scale**
Geef (hieronder) aan welke aspecten bij je opkomen bij het denken aan een mogelijke toekomstige generatie wekker. Probeer alle aspecten die in je opkomen op te schrijven.	Open

Impression questions

Dutch wording:	**Scale**
Je hebt net een ruimte gezien/beschreven. Schrijf (hieronder) de gedachten en gevoelens over de ruimte op die je toen had.	Open
De ruimte die ik gezien/beschreven heb deed mij denken aan mijn eigen slaapkamer.	Helemaal mee oneens/ mee oneens/ beetje mee oneens/ er tussen in/ beetje mee eens/ mee eens/ helemaal mee eens

Funneld debriefing

Dutch wording:	**Scale**
Had je tijdens het beantwoorden van de vragen het idee dat onderzoeken gerelateerd waren aan elkaar?	Ja/ nee
Op welke manier waren ze aan elkaar gerelateerd?	Open
Heeft wat je in een van de onderzoeken deed invloed gehad op wat je in een ander onderzoek deed?	Ja/ nee
Op welke manier had dit invloed?	Open

Demographics

Dutch wording:	**Scale:**
Wat is je leeftijd?	Number
Ben je vrouw of man?	Man/ vrouw
Wat is je hoogst afgemaakte opleiding of welke opleiding volg je nu?	MBO/ HBO/ WO/ Anders
Namenlijk?	Open

APPENDIX B – Questionnaire of experiment 2

Vervolg van het onderzoek:

Het volgende deel van dit onderzoek bestaan uit het beantwoorden van 5 vragen. Neem per vraag rustig de tijd om deze goed door te lezen voor u eraan begint. Beantwoord de vragen 1 voor 1 en sla de bladzijde pas om als u klaar bent met de vraag.

Bij sommige vragen heeft u na het lezen van de instructies 2 minuten de tijd om de vraag te beantwoorden. Hiervoor moet u het klokje gebruiken, zodat u wordt herinnerd wanneer de tijd voorbij is.

In het kort:

- Leest u eerst de vraag
- zet het klokje op de juiste tijd
- druk op 'start'
- u heeft de tijd totdat het klokje afgaat om uw antwoord te geven
- ga daarna verder met de volgende vraag.

Vraag 1:

Lees onderstaande verhaal goed door.

Uw oude wekker is kapot gegaan. Tijdens het winkelen staat u voor een etalage met daarin de nieuwste van de nieuwste wekker. Wat zou deze wekker voor u kunnen betekenen?

Schrijf op onderstaande regels waar u aan moet denken. Hiervoor krijgt u 2 minuten. Zet het klokje op 2 minuten. Druk op start en begin.

Vraag 2a:

Hieronder staan 10 eigenschappen van een wekker. We willen u vragen om aan te geven welke eigenschappen u het *belangrijkst* vindt voor een wekker.

Kies 3 eigenschappen uit die u het *belangrijkst* vindt en geef dit aan in onderstaande tabel. Gebruik de cijfers 1, 2, en 3, waarbij 1 de *belangrijkste* eigenschap is. In de rangorde kolom kunt u aangeven op welke positie de eigenschappen komen te staan.

Eigenschappen	**Rangorde**
Zelf in te voeren wekgeluiden	
Geleidelijk luider wordende geluiden	
Automatische tijdinstelling	
Motiverende werking om uit bed te komen	
Mogelijkheid om te snoozen	
Automatisch radiofrequentie instellen	
Natuurlijke wekgeluiden (bijvoorbeeld, boerderij geluiden)	
Licht om wakker van te worden	
Zeven wektijden	
Tien radio voorprogrammeringen	

Vraag 2b:

Hieronder staan dezelfde eigenschappen als bij vraag 2a.
Geef dit maal aan welke eigenschappen u het *minst belangrijk* vindt.

Kies 3 eigenschappen uit die u het *minst belangrijkst* vindt en geef dit aan in onderstaande tabel. Gebruik de cijfers 1, 2, en 3, waarbij 1 de *minst belangrijkste* eigenschap is. In de rangorde kolom kunt u aangeven op welke positie de eigenschappen komen te staan.

Eigenschappen	**Rangorde**
Zelf in te voeren wekgeluiden	
Geleidelijk luider wordende geluiden	
Automatische tijdinstelling	
Motiverende werking om uit bed te komen	
Mogelijkheid om te snoozen	
Automatisch radiofrequentie instellen	
Natuurlijke wekgeluiden (bijvoorbeeld, boerderij geluiden)	
Licht om wakker van te worden	
Zeven wektijden	
Tien radio voorprogrammeringen	

Instructie:

Op tafel staat een doos met daarin een wekker. De volgende vragen gaan over uw gedachten bij het zien van deze wekker.

U mag nu de doos van het apparaat afhalen.

Ga daarna verder gaan met vraag 3.

Vraag 3:

Kijk naar de wekker die u net onthuld heeft.

Schrijf in 2 minuten zoveel mogelijk op van wat u bedenkt bij het bekijken de wekker. Zet het klokje op 2 minuten. Druk op start en begin.

Vraag 4a:

Deze vraag gaat over wat voor u belangrijk is als u 's ochtends opstaat. Hieronder staan 10 behoeften die u zou kunnen hebben in de ochtend. We willen u vragen om aan te geven welke behoeften u het *belangrijkst* vindt.

Kies 3 behoeften uit die u het *belangrijkst* vindt en geef dit aan in onderstaande tabel. Gebruik de cijfers 1, 2, en 3, waarbij 1 de belangrijkste behoefte is. In de rangorde kolom kunt u aangeven op welke positie de eigenschappen komen te staan.

Behoeften	**Rangorde**
Ongestoord kunnen aankleden	
Direct uit bed kunnen stappen	
Uit kunnen strekken	
Ontspannen uit bed kunnen komen	
Tanden kunnen poetsen	
Naar radio luisteren om wakker te worden	
Lekker kunnen doezelen	
Lekker kunnen douchen	
Wakker worden voordat de wekker gaat	
Genoeg tijd voor persoonlijke verzorging	

Vraag 4b:

Hieronder staan dezelfde behoeften als bij vraag 4a.
Geef dit maal aan welke voor u het *minst belangrijk* zijn.

Kies 3 behoeften uit die u het *minst belangrijkst* vindt en geef dit aan in onderstaande tabel. Gebruik de cijfers 1, 2, en 3, waarbij 1 de *minst belangrijkste* behoefte is. In de rangorde kolom kunt u aangeven op welke positie de eigenschappen komen te staan.

Behoeften	**Rangorde**
Ongestoord kunnen aankleden	
Direct uit bed kunnen stappen	
Uit kunnen strekken	
Ontspannen uit bed kunnen komen	
Tanden kunnen poetsen	
Naar radio luisteren om wakker te worden	
Lekker kunnen doezelen	
Lekker kunnen douchen	
Wakker worden voordat de wekker gaat	
Genoeg tijd voor persoonlijke verzorging	

Vraag 5a:

Het apparaat dat op tafel staat is een Philips Wake-up Light. Had u voor u meedeed aan dit onderzoek hier enige gebruikservaring mee? Kruis uw antwoord hieronder aan.

□ Nee

□ Ja

Vraag 5b:

Wat is uw leeftijd? …….

Wat is uw geslacht? ……..

Dit was de laatste vraag, bedankt voor het beantwoorden van de vragen.

U bent klaar met het beantwoorden van de vragen. Wilt u op de deur kloppen om aan te geven dat u klaar bent?

Bedankt voor u medewerking.