

PosturAroma

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ABSTRACT

This project looks at the influence of scent on body posture and how this can make people feel more confident and therefore safer. Research is done on the effect of body posture on the feeling of safety, the effect of smell on emotion and the way that posture can show emotion. A concept of a necklace is proposed which detects women's posture. When they are slouching a pleasant smell is emitted and the user is reminded that she has to stand up straight. This will make her feel and seem less vulnerable to possible perpetrators. After conducting an experiment to find out whether a certain scent can have positive impacts, it was found out that scent is directly associative. After the user tests, it was found that scent can trigger people to change their body posture and sit up straight. This is due to the fact that people become more aware of their body posture and make the connection between scent and their body posture. It is yet unclear if the users experience more safety when wearing the necklace. This is to be found out through further research.

Author Keywords

Embodiment; emotion; scent

INTRODUCTION

This paper focuses on the development of a prototype to change posture by using scent. In the end the improved posture should make one more self confident which in turn will make one feel safer. For exploratory research, Amsterdam Nieuw-West was used as an area for research. The Safety Index, created by the government, that depicts the subjective, or feeling of safety and objective, or actual safety, shows the following. People feel relatively unsafe compared to their actual safety [1]. Government reports support this, by looking at other factors, such as trash and social cohesion [2,3]. People tend to feel less safe when there is an excess of trash and untidiness on the streets. Another problem that is often mentioned, is the lack of social cohesion. Also, due to a lack of money, new buildings do not get finished which causes there to be a gap between the old and the new inhabitants. Next to the government reports, additional questionnaires were conducted and focus groups were set up to find out that a fair amount of people complain about burglaries and youths

hanging around. 34% of the women that answered the questionnaire complained about youth hanging around, but only 4% encountered actual problems regarding the youth. These findings require a solution that improves the feeling of safety, which can be tackled in various ways. One way to approach the problem, is by using scents which will trigger certain emotions and thereby change the posture. Body posture can have a great influence of the feeling of safety, since it reflects someone's confidence (McCaughy 1997: p.73).

RELATED WORK

Effect of body posture on the feeling of safety

Body posture can have a big influence on the feeling of safety as the attacker chooses the most vulnerable victim that is present (Foncke 2002: p.22). This is done during the selection phase. In general, this is the one with the most insecure, vulnerable body posture. Research has been done on who victim convicts in prison in California choose when they are presented with pictures of girls. Nearly every one of them chose the girls with the vulnerable body posture and charisma: looks, age and sexy clothes did not affect their choice (Foncke 2002: p.22).

When there is only one possible victim, the perpetrator will start with the second phase immediately, which consists of testing the victim. This is when the perpetrator will further find out whether the girl or woman is an obedient victim. He will make eye contact to find out whether the woman becomes insecure or confused. He can also try to flatter or intimidate her in order to show her his superiority. The woman's reaction will influence the attacker's final decision to attack her or not. If she shows the attacker that she does not feel intimidated or scared, the attacker will stop trying. This shows that she can improve her own safety by reacting effectively to the possible attacker (Foncke 2002: p.22).

Small gestures, a look, or body posture can give a lot of information about the mood of a person. It is important to make the body's message and the intention of the person correspond. Some women are not even aware of their own body language and this can get them into trouble when they show something that they do not actually mean (Foncke 2002: p.54). They can for example show vulnerability, while they actually do not feel like this.

Effect of smell on emotion

Connotation

Smell is often associative which can explain how odors come to be liked or disliked as well as how their presence can elicit emotion and influence thinking and behavior (Herz 2005: p.1).

An experiment by Robin shows that scents of eugenol can evoke emotions of fear when the scents are associated with fear. The odorant was considered fearful by respondents who were scared of the dentist, whilst experienced as pleasant by non-fearful subjects of the dentist. These results show that eugenol can be responsible for different emotional states depending on the subjects experience with the dentist (Robin 1999: p.1).

The associative characteristic of smell can be based on memories from a long time ago. It happens to be that certain memories get evoked by smell that wouldn't seem essential to remember. To give an example, an insignificant retail store can stick to someone's memory, only because the smell has a powerful command over someone's memory (Smith 2008).

In 2004, the Nobel prize was won by someone who did discoveries on the odorant receptors and the organization of the olfactory system (Press release). One of the findings had to do with how the memory of smells work. Again, the same claim was made which means that certain smells are remembered when a positive or negative experience is associated with it.

The associations connected to certain smells, don't have to be personal, as it may have to do with cultural differences. This is shown by the fact that there are no empirical examples of cross-cultural consensus on odor hedonic evaluation among adults (Herz 2005: p.1). An interesting example is how the US military failed to make a stink bomb that was unanimously considered repulsive across several various ethnic groups (Herz: p.1). Another interesting study has been conducted in the late 1970's. Wintergreen was used during this study, which is scientifically called methyl salicylate. Two studies were done which was one in Britain and one in the US. In the British study, this smell was considered as unpleasant, while in the US it was experienced as pleasant. This big difference is due to the fact that British people associate the smell with medicine and especially the participants that were asked in 1966 used this medicine often during World War II, which brings bad connotations with it. On the other hand, the smell of wintergreen in the US is a candy mint smell and only has positive connotations.

To give another example, the scent of root beer is experienced pleasant in the US, while in the United

Kingdom it is associated with a disinfectant (Kaye 2010: p.60).

Context

It is not only association, but also context, which is important when considering scents. If someone smells pizza in front of a pizza store, one can recognize it. However, when this is done in a lab, it has a different effect as people cannot recognize the scent (Eysink Smeets: p.33). This can have influence on the design of our product as the context in which it is presented can influence the user's product experience. For example, when a certain color is used in a product, it may remind the user of a certain object and thereby influence the experience of the scent.

Another example of where the context plays a vital role is when people were asked to smell the aroma of cheddar cheese. When they smelled it, they were sometimes told that it was cheddar cheese and at other times that it was a body odor. In the first case they liked the scent, whilst in the latter they did not like it. Changing the context can influence the experience of smell (De Araujo 2005: p.1).

Smells perceived as pleasant

Although everyone will not consider a certain scent nice, there are odors that are experienced as pleasant by most women. All scents can be divided into families, which can be seen in figure 1 (Donna 2012).



Figure 1. Scent categories

Donna did a study on how scents favored by women, fall into different categories (Donna 2012). 372 women joined who were asked what smells they ever enjoyed or are their favorite. Each woman had to pick three which all fit in one of the categories that Donna established. The interesting finding is that Ninety-three percent of women in the study

had half or more scents identified as “ever enjoyed” and “favorite” falling into a single cluster of families (Donna 2012: p.29). 60% of the women mentioned fragrances that fitted in the category floral as can be seen in figure 2. From this experiment, it becomes clear that most women experience floral scents as pleasant.

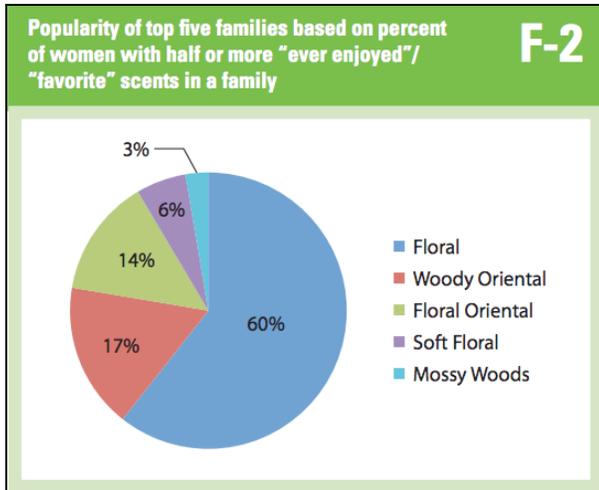


Figure 2. Popularity of scents

Next to floral fragrances, there are several other scents that are considered pleasant in general. These are vanilla, apple and orange. Also, the smell of baby care products is considered pleasant. In general people choose natural smells over synthetical scents. Synthetical scents often bring negative associations, while smells of flowers and plants cause positive associations (Eysink Smeets: p.34).

Positive effects of scent

There are certain scents that have a positive effect on human beings. The amygdala is especially stimulated by smells, of which especially the smell of fear and stress. The smell of stress can be detected via their body odor (Eysink Smeets: p.37). Women appeared to be able to recognize the smell of fear in sweat.

This stress can be diminished by specific scents. It has been proven that ambient odor of orange can reduce anxiety in dental offices. Compared to the control variables, women who were exposed to the odor had a more positive mood, a higher level of calmness and a lower level of anxiety (Lehrner 2010: p.1). When it comes to safety, it is not only about the positive smells, but also about the undesirable scents. The unwanted smells can cause unwanted aggressive behaviour and unwanted feelings (Eysink Smeets: p.38). This means that scents should be used carefully as aggressive behavior is not wanted.

Posture showing emotion

Oosterwijk did an experiment on how words that had to do with pride and disappointment can change someone’s body posture. First, participants were asked to write down words

that they thought of when they thought of disappointment. After that they were asked what words they would think of when they thought of pride. To give accurate results, it wasn’t always in this order since it could influence the results. Before generating the words, the participants were asked how they felt. There were 28 descriptions, which ranged from emotional states to physical states. So it could be ‘I feel cheerful’, but also ‘I feel dizzy.’ For each description, the participants were asked to give a grade from 0 to 6, 0 being not at all. This was asked before first word generation began, but also after each following up word generation (Oosterwijk 2009: 460). After each word generation, the body posture was measured. There was nothing said about pride and disappointment, since this would inform the participants too much about why the experiment was set up (Oosterwijk 2009: 461). Then the experiment started. The participants were put on a chair that was bolted to the floor, so they didn’t move accidentally with the chair. There were four rounds during which participants were asked to think of words that had to do with kitchen, bathroom, success/pride and failure/disappointment. For pride, they gave words like ‘good marks’, ‘winning a game’ or ‘did well’. Also, they mentioned the consequences of pride and success like ‘applause’. Also, they listed words connected to emotional reactions like ‘feeling happy’ (Oosterwijk 2009: 463). For disappointment, words like ‘doing bad’ or ‘losing’ were mentioned. To get more specific, they also mentioned ‘getting an F’ or ‘failing psychophysiology exam’. Many participants listed different emotion words, such as “shame,” “fear,” “feeling angry,” “depression,” and “crying.”

The results show that there were differences in vertical movement, but not in horizontal movement. This means that people differed in body posture by sitting more straight or slouched, while it did not significantly influence the tilting of the body.

Looking at the posture changes during the disappointment round, conclusions can be drawn since the posture gets more slouched. For pride, there are only weak results, so it should be interpreted with caution. There are two factors that could have influenced the pride round. The general effect of slouching could have inhibited an increase in posture height. It seems that participants relax during the word generation, because they take a more comfortable position in the chair. Also, most of the participants were women and former research shows that men are more sensitive to posture changes. When only male participants were used, the decrease in height could’ve been more visible (Oosterwijk 2009: 464).

Another research shows how emotions are shown during certain postures. Figure 3 depicts the postures that are

connected to certain emotions (Coulson 2004: p.128). Fear is depicted by a slightly slouching person.

After finding out that scent can trigger emotions and body posture can show emotions, the next question is whether it is possible to influence body posture with scents. By improving the body posture, women will feel more confident and therefore more safe. User studies will have to be conducted to find out whether this will work practically.

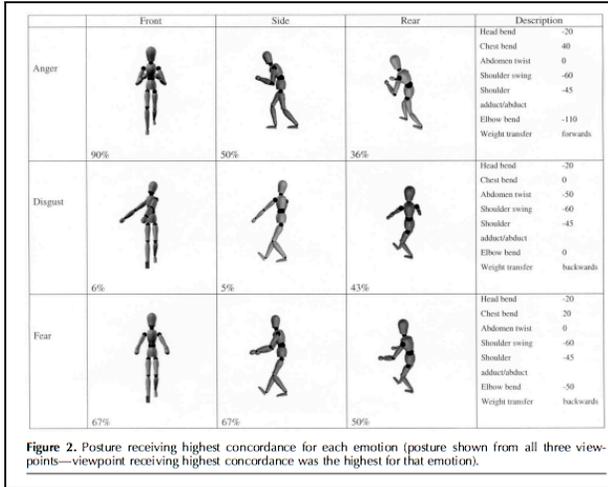


Figure 3. Fear is depicted in the 3rd row

RESEARCH QUESTION

The related work showed how emotions can be triggered by smell and how posture can show emotion. This implies that the right smell might be able to make someone stand up straight. Research is needed to find out what smell this would be and therefore the following research question is created:

How can scent be used as a trigger to improve body posture, and thereby improve confidence and feelings of safety?

After this research question has been answered, it will become clear whether the proposed concept has the intended effect on its users and what further research is necessary.

CONCEPT

Necklace that improves the feeling of safety

The PosturAroma is based on the idea of getting more confidence through standing up straight which will enhance the feeling of safety. It is a necklace, which emits pleasant aroma when the user has a bad posture. It informs the user

about the wrong posture naturally, not obtrusively. In this concept, the mechanism will be automatically detecting the body posture and emitting aroma. Figure 4 depicts the effect of the PosturAroma. First the user walks with a slouching body posture and feels less confident. The necklace detects the body posture, which causes a smell to be emitted.

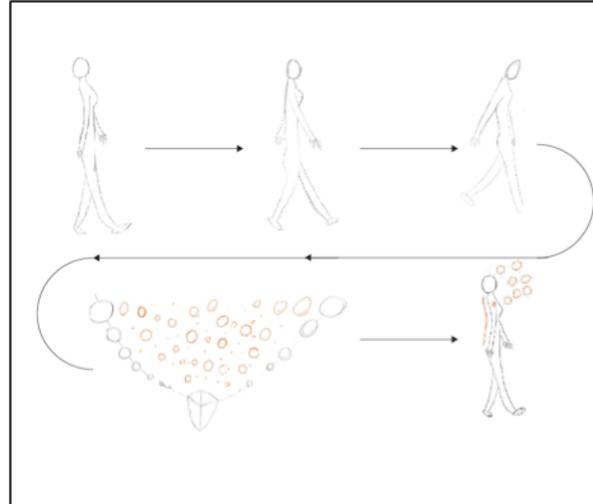


Figure 4. Effect of PosturAroma

This concept gets its strengths from several points. The most important is that there is a feeling of embodiment, which makes the confidence, come from the user herself. There is an external factor that improves the feeling of safety, which is scent, but in the end the user has to do it by herself. Second, the necklace is preventive and not defensive, which is intended to improve the feeling of safety and not the actual safety. Unlike a stink bomb, which gets rid of harassers, the preventive method uses scent to make users more confident. In the end, it does improve the actual safety, since certain situations are avoided, but this is not the main purpose. The third strength has to do with the scents that trigger an emotional response.

Sensor

In order to make the necklace work, the body posture has to be detected, which is done by an ADXL 335 Accelerometer. When the accelerometer gets tilted, the aroma mechanism is triggered. This means that when the position is changed to a certain point on the x, y and z axes, the aroma comes out. The x, y and z axes are taken into consideration, because the necklace can change position when someone turns it around. In this case, not only the y axis changes position.

Calibration

The difference between standing straight and slouching is to be calibrated by the user herself. First, she sits up straight and presses the button on the necklace. Then she slouches and presses the button again. The necklace can now be used automatically as, with this information, the Arduino can now calculate whether the user is slouching.

Aroma vaporizer as trigger

In order to vaporize the aroma, a technique is needed. This consists of a filament from an e-cigarette for the purpose of prototyping. The filament gets heated which in turn heats the cloth that is drenched in e-liquid. Normal perfumes are flammable, so we are restricted to scents available in e-cigarettes for the prototype. When using the e-cigarette in the habitual way, smoke comes out, but in this case there is only a small amount of smoke. This is due to the fact that there is not enough pressure that would be able to give out the smoke.

Arduino Nano

The Arduino nano is used to program the accelerometer to make the aroma come out when someone really has a bad posture.

CONTEXT STUDY

Study of aromas

The experiment will test how various smells affect women's feelings and how this is connected to safety.

Apparatus

The participant is given 11 scents in total. The scents consisted of strawberry, lemon grass, cappuccino, neroli, mint, vanilla, apple, mandarin peel and pheromones. One scent consisted of neroli, lemon grass, mandarin peel, pheromones and alcohol. One of the bottles was filled with water as a control variable. Erich Berghammer, who is a scent artist, created the mixed scent. He stated that neroli would make people feel less scared, lemon grass is favoured by almost everyone, mandarin peel wakes you and thus makes you feel more powerful and pheromones give you self confidence. These ingredients are also tested separately to examine their effects. The other scents were chosen, because they are often used in e-cigarettes. Not all scents can be used in the necklace, as they are oils that contain alcohol and are flammable when used with the hot filament. If one of the recommended scents appears to have the best influence on safety, it will therefore be difficult to use. One of the scents from the e-cigarettes will be used as this is the only possibility. If the mechanism is further

developed, it may become possible to use the most effective scent.

Participants

6 participants of mean age 41 joined the experiment. Three of them were raised in Amsterdam, one in Hoofddorp, one in Suriname and one in Morocco.

Procedure

11 bottles with scents were situated on the table each showing no color of the scent as the color is covered with paper. Some questions were asked to the participant, which make it clear whether the participant smokes, whether she has a cold, what her age is and where she grew up. This is asked, because scents are dependent of memories, which are influence by someone's past. The first bottle was given to the participant, which she smelled. In order to make sure her emotions were examined well, she got to see a computer screen that depicted 12 emotions. For this, the Premo tool was used (Huisman 2013).

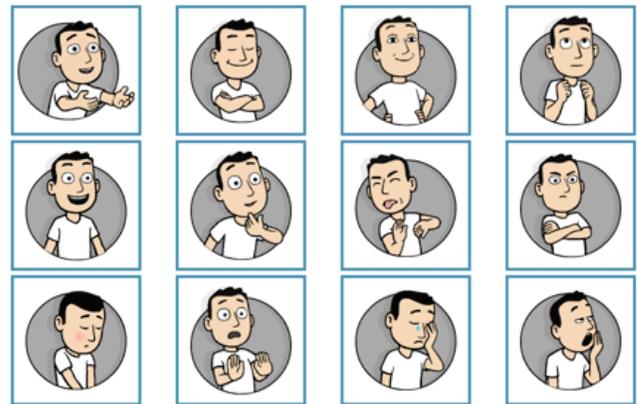


Figure 5. Emotions used in experiment.

Each emotion was to be clicked on to rate it on a scale from 0 to 4. This can be seen in figure 3. 0 means I don't feel this and 4 means I really feel this. After she has rated all 12 emotions, several questions were asked which had to do with her emotion and association of the smell.

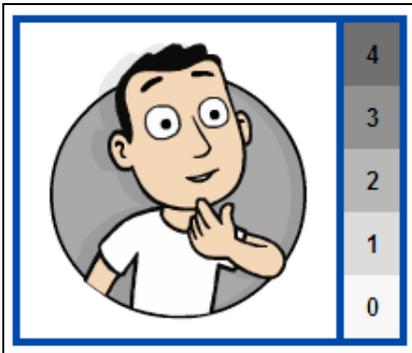


Figure 6. Close up of emotion with scaling

The first question was ‘What emotion is connected to this scent’, the second one was ‘What do you associate this scent with?’ and the third one was ‘Are there any place or events connected to this scent?’.

After all scents were evaluated, several question about safety were asked. The participant was asked how safe she feels during the day in public space on a scale from 1 to 10. One being the safest. Also, she was asked how safe she feels near youth on the street, how safe she feels on her own in public and how safe she feels when she is alone in public space in the dark. These questions are asked to find out whether people who feel less safe, experience certain scents differently.

Results

First of all, it was found that scent is directly associative. When people got hold of a scent, they would immediately say that it reminded them of something. To give an example, when one woman smelled the scent of mint, she thought of the hospital, while another woman thought of chewing gum. The first one got a negative feeling from this, while the latter one did not. One woman, whose parents were Moroccan, thought of a liquid that is put on babies in Morocco when they are born. This reminded her of holiday, which made her happy. This means that people determine their emotion connected to a certain scent after they thought of their associations.

It was also found that people experience rather mild emotions as they often, on a scale from 0 to 4, gave a 0,1 or 2 for most emotions. When people could not think of an association, they also found it difficult to evaluate their emotions.

We found that emotions evoked by scents are very subjective as former experiences have a great influence on them. It will therefore be difficult to find a scent that evokes positive emotions for every women.

User study with prototype

Apparatus

User testing was conducted to find out what users experience when wearing the necklace.

Procedure

Users were given the necklace for 30 minutes. They were asked to where it where they were sitting at that moment. For all participants this meant that they were sitting behind a desk. After they wore it for half an hour, they were asked several questions. These were the following:

How often did you smell it?

Did you sit up straight?

Did you think about it in between when you were wearing it

Do you think the scent is a pleasant way to be reminded of standing up straight?

Does it work properly?

Would you wear it?

Do you have any comments?

Participants

5 participants

Results

All participants thought that scent is a pleasant way to be reminded of a bad body posture. It reminded the participants that they had to sit up straight, because the connection between scent and body posture was made. The participants experienced that the mechanism was not working completely and that it should still be improved. They smelled the scent inconsistently, because they sometimes smelled it when they sat up straight. This can be due to the fact that there is a lack of control over the distribution of the scent. It can also be due to a delay, which means that the scent is released, but it takes time for it to travel to the user’s nose.

DISCUSSION AND CONCLUSION

From the literature it became clear that scent can affect emotion, that emotion can be shown through body posture and that body posture can enhance the feeling of safety. Based on the literature, the aim was to create a concept that would enhance safety through improving body posture by scent. The concept that was created is the PosturAroma necklace that detects someone’s posture and when someone is slouching, she is reminded of it by a scent. To find out what scent to use, an experiment was conducted which showed that scents are directly associative. This means that personal scents have to be offered to users, so they can decide which scent they like. Through user testing, it was

found out that scent can work as a trigger to detect posture, because people make the connection between scent and body posture. They found scent a nice way to be reminded of their body posture.

These experiments and user testing helped us to answer the following research question:

How can scent be used as a trigger to improve body posture, and thereby improve confidence and feelings of safety?

It was found that scent could influence body posture through the PosturAroma necklace. Yet it has not been proven that the necklace can make women feel more confident and therefore safer. This still has to be found out through further research.

SUGGESTIONS FOR FURTHER RESEARCH AND DEVELOPMENT

More research has to be done on the intended safety that the necklace brings. Longer experiments have to be conducted in the user's natural environment, which means outside and by night. At the moment, it has become clear that scent can positively affect body posture, but not that it can make

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people feel more safe. More research has to be done on the aesthetic preferences of the user. Also, more has to be found out about scent to see if there is a correlation between positive and negative connotations with a scent and successful conditioning of the user's behavior.

For further development, there should be better control over the presence of the scent. At the moment, the users sometimes smell it when they do not slouch. This can be due to the delay of the scent, but it could also be that the scent isn't spread properly. When the size of the electronics is decreased, it would allow for smaller and therefore more flexible designs. For safety and durability, aroma mechanisms that don't require heat should be deployed. The market value of a Do It Yourself kit could be explored, so women can make their own working necklace.

ACKNOWLEDGMENTS

We would like to thank everyone who contributed to the concept. These are women centre Vrouw en Vaart, Amber Slooten and Erich Berghammer.

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