Master Thesis

Fidgeting for Creativity

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Faculty of Engineering LTH • Lund University • 2016

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Preface

I would like to thank my family and friends for their support and encouragements throughout my studies. Especially my significant other, Viktor Larsson for all the help with proofreading and fine-tuning, and my brother Nikolai Nyqvist for discussing ideas and prototypes.

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Rebecka Nyqvist

Abstract

Fidgeting is a common behavior, though often with negative associations. In this master thesis positive effects of fidgeting, and possible connections with creativity are investigated. By conducting both literature research and several studies, four main reasons for fidgeting were identified. Relax, when fidgeting is done to decrees stress and anxiety; Focus, when increased attention and focus is desired; Explore, to facilitate mind wandering and enhance incubation; and Active, if bored or understimulated. Based on the findings different fidgeting prototypes were explored. This was done to investigate the possibility that different objects might perform better at increasing creativity. Selecting a suitable fidget object was found to heavily depend on personal preference, type of activity and desirable benefits. Therefore, no unbiased method of comparing objects could be found. Instead, the final proposition is a webpage that both contains information about benefits from fidgeting, and a way to acquire fidgeting objects more suited to an office environment. The webpage also helps validate the need for fidgeting in adults and inspire to fidget for creativity.

Keywords:

Creativity, fidgeting, stimulating creativity, cultural probe, mind wandering, increased focus.

Sammanfattning

Genom att undersöka kopplingar mellan kreativitet och beteende att fibbla *(eng. fidget)* med prylar, har fibblandets påverkan på kreativitet studerats. Speciellt har arbetet riktat in sig på vad man själv kan göra på sin arbetsplats.

De två områdena utforskades för att hitta hur kreativitet kan påverkas samt vilka effekter fibblande kan ha. Baserat på den litteratur som studerats, konstruerades tre olika studier.

En dokumentärstudie av en öppen blogg vid namnet *Fidget widgets*[1] där vem som helst kan lägga upp bilder och beskrivningar av hur de använder olika produkter för att fibbla med i sin vardag. Bloggen har varit en väldigt värdefull källa för att studera redan insamlad information från över 70 olika personer världen över.

För att undersöka hur en produkt avsedd för att fibblas med kan introduceras på en arbetsplats valdes metoden *Cultural probe*. Studien gjordes på sex stycken deltagare, vid två olika företag.

Till studien konstruerades en *probe* innehållande en av tre valda produkter, en dagbok med tio frågor, en penna samt en liten komihåglapp. Innehållet placerades sedan i en låda som delades ut till deltagarna, se bild nedan.

[1] http://fidgetwidgets.tumblr.com/

En öppen diskussion inledde och avslutade studien. Först för utdelning av lådorna och efteråt för insamling av dagboken för senare analys. Diskussionen i slutet möjliggjorde även tid för deltagarna att diskutera studien med varandra.

Den tredje studien som genomfördes var en kort observation som gjordes i en cafeteria vid Lunds universitet. Detta för att få en bredare insikt av beteendet att fibbla med saker. Genom att observera personer arbeta, främst i grupper, så kunde vissa återkommande fibbelmönster identifieras. Till exempel att man undviker att fibbla när andra vänder uppmärksamheten mot en.

I studierna hittades flera anledningar för att man fibblar. Dessa grupperades i fyra olika kategorier, med olika anledningar och fördelar. För varje grupp identifierades flera kopplingar till hur de kan påverka kreativitet. Nedan följer en kort beskrivning av varje grupp.

Relax: Man kan fibbla för att det gör en avslappnad och mindre stressad. Det kan också minska nervositet och orolighet. Rörelsen ska gärna vara enkel, mjuk och lugnande. Objektet kan då t.ex. vara deformerbart.

Explore: Fibblande kan också användas för att få tankarna att vandra. Det kan vara bra om man sitter fast på ett problem och man behöver lite tid ifrån det. Ett mer komplext objekt som är väldigt intressant så att det upptar mycket uppmärksamhet är lämpligt.

Active: En del fibblar för att de är rastlösa, vill röra på sig eller för att sträcka på musklerna. Detta kan vara bra om man sitter mycket framför datorn då det kan minska risk för skador. Produkter som kräver mycket rörelse eller ses som en aktivitet i sig passar.

Focus: Att fibbla kan i situationer hjälpa en att fokusera på det man behöver göra. Det kan vara att man aktivt tänker på ett problem eller arbetar med något som kräver mycket uppmärksamhet. Därför passar produkter som är enkla och erfordrar en upprepande rörelse som inte kräver uppmärksamhet.

Under projektet utvecklades många prototyper som passade in på de olika behoven. Men att utvärdera och jämföra prototyperna mot varandra visade sig vara svårt att göra objektivt. Detta insågs till sist bero på att personlig smak spelar stor roll. Allt från favoritfärg till behov, och handstorlek till arbetsplats.

Eftersom det inte just nu går att jämföra effekten av olika objekt, både för att metoderna anses var otillräckliga samt kunskapen om exakt hur objekten påverkar kreativt arbete saknas. Det verkar som objekten påverkar olika personer olika, vissa gynnas helt enkelt mer av att ha något som minskar deras stress, medan andra kan ha mer nytta av bättre fokus. Alltså personlig smak och behov är det som bestämmer vilka objekt som kommer passa bäst. Man får testa sig men de fyra olika anledningarna vilket kan hjälpa till att identifiera hur man själv fibblar.

Utifrån detta har ett konceptförslag på en hemsida där man kan hitta olika objekt gjorda för fibblande men som eventuellt har anpassas mot vuxna och arbetsplatser. Där materialen och färgvalen ändrats något så att objekten inte ses lika mycket som leksaker, utan upplevs och marknadsförs som verktyg för att stimulera kreativitet och arbete.

På hemsidan hittar man också information och länkar till studier som stödjer påståendet att fibblande gynnar kreativitet. Detta skulle då bidra både till ökad kunskap inom området. Samt till att validera behovet hos de som aktivt fibblar och upplever fördelarna med det, då det finns andra som har svårt att se det positiva i det och kan ha invändningar mot beteendet.

Det finns också möjlighet på hemsidan att konstruera lådor innehållande flera olika objekt. Antingen för att man själv vill ha olika objekt för olika anledningar, eller större lådor som skulle kunna delas mellan flera i t.ex. ett fikarum eller ett grupprum. Vilket skulle då medge möjligheten att prova på att fibbla. Ett exempel på en sådan låda kan ses i bilden nedan.

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1 Introduction

An introduction to the topic and my previous experiences with it. Brief overview of related work that were found.

1.1 Background

The behavior to fidget and constantly do something with our fingers when thinking is a common occurrence. What if this behavior actually is beneficial for the thought process?

In this master thesis, or project as it will also be referred to, I will look at connections between fidgeting and creativity, with the goal of finding new ways to stimulate creativity.

My exploration on the topic started during an earlier course in Industrial design research. Below follows a summary of the most relevant parts and interesting findings.

1.1.1 Choosing a topic

The idea emerged after watching an interesting video clip on the topic of stimulating creativity [1]. The video illustrates how diverting attention or activities such as walking can increase creativity. This triggered me to think that surely there must be other activities with similar effects?

When continuing the search for ways to increase creativity, one interesting paper mentioned how participants had gained increased creativity after squeezing a small ball [2]. Which led to the idea that perhaps fidgeting with an object can increase creativity.

1.1.2 Choosing a space

Having a creative workspace is considered the most important factor to be able to perform at their fullest potential, by as much as 65% of employees in a recent Nordic study with over 4000 participants [3]. However, only 42% report that their workspaces are designed to support innovative work.

Hence, there are people who find themselves in a situation where their employers might not have the funds, resources or intention to transform their offices to creative islands of innovation. In the same study they also found that new ideas at work most frequently emerge when talking with colleagues or working at their own desk. Therefore, I am interested in what people can do to help themselves improve their creativity at work while still at their desk. And if possible promote coworker interaction.

1.1.3 Previous findings

To find out what objects are preferred when fidgeting, a test with a collection of 12-13 objects see Figure 1.1, was conducted during the course. The test was set up as an informal semi-structured discussion during which the participants could freely use the different objects. In total two sets of discussions with two participants each were performed. They were video and audio recorded with permission and later analyzed.

Figure 1.1 The objects used in the fidgeting study

The most important finding was the distinction made between activities that took up too much focus, such as building with the wooden magnetic parts and those that could continue to be used while working/thinking, e.g. the repeatable motion of opening and closing the empty match box. Another valuable insight was that fidgeting tendencies much depended on personal preference, yet a few inclinations were more general. Such as not having too loud or too childish looking objects.

1.2 Related work by others

On the very specific area of how fidgeting relates to creativity in a work environment only one related study has been found. Michael Karlesky and Katherine Isbister from New York University [4] developed a product that they market as a “indirect productivity tool aiming to subtly enhance your creativity, or give you focus, or decrease stress just when you need it.”. It is a digital device consisting of a small touch screen with different apps on it that uses speakers to produce audial feedback. The device is aptly named Fidget Widget and also responds to shakes, movement and several of them together can be used together.

2 Aims

What the main goal of the project is, and what personal goals I have.

2.1 Main goal

For this project the main goal is to find out connections between fidgeting and creativity. One specific question I have asked is: can fidgeting stimulate creativity? If the answer to the question is yes, I aim to develop fidgeting products that can enhance creativity at the work desk.

2.2 Personal goals

A personal goal for this project has been to try out a more research oriented approach, and to see how it could feel to continue into academia at a higher level.

I also wanted to use this opportunity to dive unhindered into whatever caught my interest at the time. Consequently, the time constraints have been flexible, and much of the explorations did not fit into the pages of this thesis report.

3 Method

Explaining the structure of the project, the three main parts of the project, and the scope of each part.

3.1 Structure

The project consists of three main parts. Each of the parts are discussed below separately. The work was fluid, iterative and heavily dependent on previous findings. Therefore, results are presented throughout the report to explain findings that are relevant for the next part of the project. A visualization of the project was done during the planning stage, see Figure 3.1.

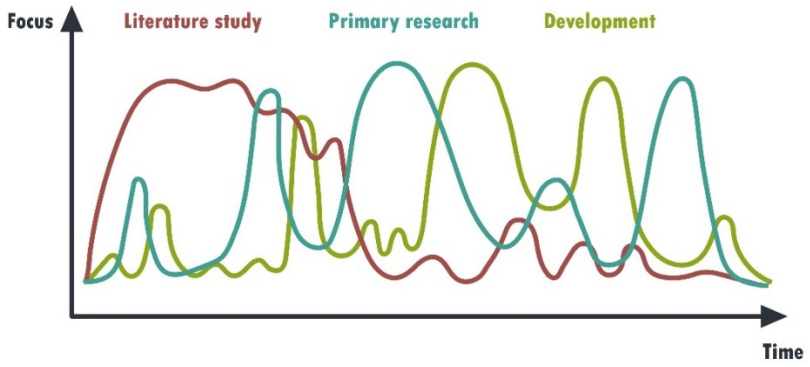

Figure 3.1 Possible disposition of the project's three different phases

3.1.1 Literature study

The literature research consisted of finding relevant papers, articles, books and other literature on the topics creativity and fidgeting. Mainly done by using Lund University's online libraries search tool LUBsearch [5]. Several different keywords were used when searching, for an overview see Figure 3.2.

During the literature research it became clear that I lacked knowledge to understand some of the articles. Namely the ones with a neurological background. Since I also find the topic interesting I opted to take a course in neuroscience during the project, to gain the necessary knowledge.

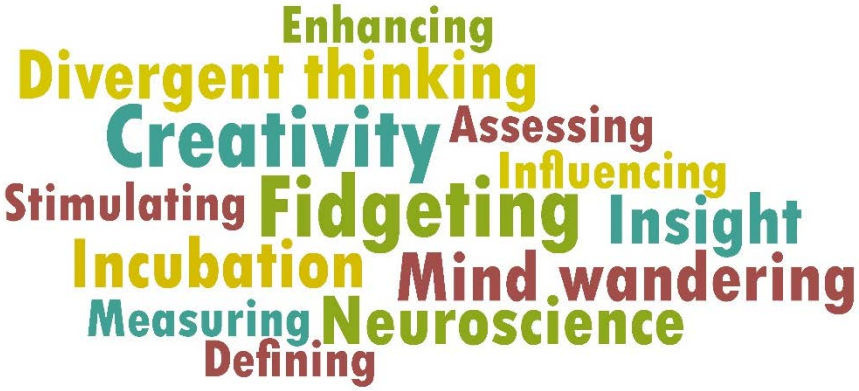

Figure 3.2 Word cloud of keywords used when searching for articles

A broad understanding of the topics was presumed necessary to get sufficient knowledge to support decisions regarding the project's direction. To gain depth, articles from references in previously read papers were explored. Due to the large scope of the literature, the topics creativity and fidgeting will be thoroughly explored in Chapter 4 respectively Chapter 5.

3.1.2 Primary research

By exploring quantitative research methods to assess creativity, I had hoped to find a way to measure the effect of fidgeting on creativity for individuals. Instead I found that measuring creativity is complicated, uncertain and outside the scope of this project. Due to the amount of resources and additional knowledge needed to gather statistically significant data.

Therefore, a qualitative approach has been taken. Since the investigation of how fidgeting affects creativity at a desk is the main goal, a test where an object is being used for fidgeting in the intended environment is ideal. Furthermore, the method should use few resources, not interfere too much with the work and be time efficient.

Accordingly, a cultural probe seemed like a perfect fit. The cultural probes were first developed in [6], to provoke inspirational responses. In this project the method has been adapted to fit the project. Due to the possibility to carry out multiple instances at once with the probe test, a larger group could be reached with no additional effort compared to e.g. interviews or observations.

In addition, a blog was found during the literature research and used as a documentary study. Also to complement the probe test's specific nature, a fly on the wall observation was carried out to gain a broad perspective of the behavior of fidgeting. The studies will be described in detail in Chapter 6.

3.1.3 Development

Prototyping and idea generation was mostly based on the primary findings from the literature and studies. Though, ideas have also been generated throughout the project and written down on post-it notes to be analyzed later. Some ideas were refined with sketching, others made into prototypes with available materials.

Necessary properties were also explored through prototyping and sketching; such as how objects can be manipulated. Furthermore, the aesthetics of objects were investigated to find suggestions on how the fidget objects could be made appropriate for an office setting. Different approaches for evaluating the prototypes were tested.

4 Literature study: Creativity

Defining and understanding creativity by reading relevant articles. Exploring different ways creativity can be influenced.

4.1 Defining creativity

Defining creativity is an art of its own and there are as many definitions as there are authors on the subject [7]. Though there is some general consensus that creativity is the act of creating something novel and useful [8]. Hence both divergent and convergent thinking is required for creativity; divergent to generate novel ideas, and convergent to select the most useful.

Even though creativity can be hard to define, Amabile [9] found that creativity is often easy to identify and agree upon. In several tests she saw that creative efforts were judged similarly, even without any guidelines. This suggests that while the defining properties of creativity is hard to put into words, our mental image of it is very similar.

To me creativity is the act of coming up with an idea, solution or product that carries new meaning, emotion or function to someone. Meaning that the perceived novelty might be as important as the actual novelty. And that one's perception of what is creative changes over time.

4.2 Assessing creativity

While there are many ways to evaluate creative results qualitatively, there is a debate on whether creativity can be measured quantitatively. Though, there seem to be an agreement that at least some aspects of creativity can be measured [10], but exactly how much those aspect say about creativity as a whole is hard to determine. One such aspect is divergent thinking.

Divergent thinking tests are commonly used for measuring creative potential in individuals [11]. Most divergent thinking tests builds on work by J.P. Guilford, known for coining the term divergent thinking [12]; and E.P. Torrance, known for developing the Torrance tests of Creative Thinking (TTCT) to asses gifted children [13]. Two examples of divergent thinking tests are unusual uses for common objects, such as a brick or bucket; and name/draw objects that have some basic shape in common, e.g. things that have a circle or square as a major part.

One of the major difficulties with creativity tests is how they are scored [11, 14-16]. Another issue is that divergent thinking test results shows a high correlation with IQ [16, 17]. Though variations of scoring with modifications to minimize the influence of

IQ has been made [18]. Even though there is a lot to criticize about divergent thinking tests, they continue to be widely used [19].

4.3 Where creativity resides

In 1962 the first patient undertook a corpus callosotomy, severing the connection between the two brain hemispheres. By studying the results of different tests after the surgery, some asymmetries in the brain could be found. This is the origin of the common misconception that the left side is logical and the right side is creative [20].

Over the recent twenty years several studies using i.e. fMRI and EEG to measure brain activity has found that creativity is not located in any one specific part of the brain [21-23]. Rather, creativity seems to operate in an intricate network with parts of both increased and decreased activity. Though exactly how this network works or the precise structure of it is yet to be determined.

Furthermore, there are several problems with many of the studies. A review of 62 different articles about the neurological structure of creativity was done in [22]. They found that there is little consistency among the studies, not much overlap and very few cross-references in respectively field.

Additionally, I argue that the studies using creativity assessment or tests can only be as good as the tests they use. Since the creativity tests and assessments have several flaws as discussed in Chapter 4.2, there is concern with the reliability of studies that use them to locate creativity in the brain.

Instead an alternative approach is to take measurements on the brain during creative performances. In [21] jazz musicians where asked to perform both a learned and an improvised pieces during a fMRI scan. Then the two sets of images could be compared to find changes in deactivation and activation of areas in the brain.

In common for several of the above mentioned studies is a deactivation of multiple parts of the pre frontal cortex [22]. This is theorized to have several implications, among them is that it helps loosen attention and relax self-monitoring [21]. Making us less likely to fixate and criticize our ideas. This supports the common notions that withholding judgment, being open and relaxed is important for creativity.

4.4 How can creativity be influenced

When looking at ways to boost creativity there is no product that can increase creativity directly on demand. Though there certainly is no lack of books, tips and tricks on the topic, for example Amazon have 9,560 books on the subject [24].

Most of the advice found is centered around how to be a more “creative person” that aims to change behavior over time. What I am interested in is to find ways that directly affects the creative process. I will illustrate what I mean by this with an example.

The advice “try more new things” might enhance creative performance over time but does not directly affect the work at the moment. While the more specific advice “try a new workplace for the day” can be done during work, and therefore both have a more

direct link to creativity and is more relevant for this project. Below some direct links that were found during the project will be presented and discussed.

4.4.1 Exercise

As mentioned in the introduction, a study indicates that muscle activation in the left hand can improve verbal association, that in turn is linked to creativity [2]. It is suggested that activation of parts of the brain can activate nearby parts, thus preemptively increasing activation and thereby performance.

Another physical activity that is both commonly said to increase creativity and has been found to increase score on divergent thinking tests is walking [25]. Interestingly, scores on convergent thinking tests decreased when walking; suggesting that more movement might be appropriate for divergent but not convergent thinking.

4.4.2 Social

It is no secret that collaboration and idea sharing are important for a creative climate. Also working in pairs and teams is often key for success in both arts and academia [26]. Social interactions benefit from spaces that allow casual interaction, since they more easily afford open discussions and produce less pressure.

4.4.3 Playfulness

An attribute that is generally associated with creativity is playfulness. It is often said that children are more imaginative and creative because they are more playful and have less restraints. Companies such as IDEO promote playfulness and firmly believe it to be an important part of creativity, both to promote openness and allow for taking risks without feeling judged [27].

4.4.4 Incubation

Taking a break and allowing for incubation is commonly known to facilitate creativity. It has been shown in [28] that doing an undemanding task compared to a break or no break, has an even better effect on creative problem solving. This goes hand in hand with [29], where they suggest that “engaging in simple external tasks that allow the mind to wander may facilitate creative problem solving”. Hence, mind wandering and small incubation breaks could increase creativity.

4.4.5 Mood

Mood has often been hypothesized to affect creativity, though there are reports of negative mood, i.e. depression enhancing creativity. It’s more common that positive mood facilitates creativity [30-33]. Exactly how positive mood or affect actually increases creativity is not determined, though several theories exist. One reason mentioned in [31] it is thought to be due to positive moods effect on reducing anxiety, since anxiety is said to narrow attention and inhibit divergent thinking. Hence, providing positive mood and reducing anxiety should facilitate creativity.

4.4.6 Stress

Stress has a high negative correlation with creative climate, shown in [34]. The study was done by distributing a creative climate questionnaire to 200 employees, mostly managers, at a large organization. Therefore, reducing stress should negate some of the negative effects of stress on creativity.

5 Literature study: Fidgeting

Explaining the behavior fidgeting and presenting positive effects from fidgeting. Understanding fidgeting better by analyzing a secondary source.

5.1 Fidgeting

A child who can't sit still to listen or someone nervously twisting their ring when talking are two examples of fidgeting. Both often seen as something negative that needs to be corrected. Yet it's something that most people do from time to time, such as fidgeting with hair or facial hair, picking up a nearby interesting object, checking the watch for no real reason or bouncing one's leg while sitting. Fidgeting is typically more common when understimulated, bored, sitting still, waiting, uneasy or nervous.

For this study, small or micro fidgeting that refers to fidgeting with the hands have been the main focus. Since it's more applicable and appropriate in an office environment compared to large or macro fidgets, e.g. pacing, bouncing one's leg or rocking in the chair.

5.2 Attention

In [35] attention is defined as the ability to focus awareness on a stimulus, thought or action while ignoring other irrelevant stimuli, thoughts and actions. A novel object that stimulates all our senses will typically require more attention than a well-known object that only provides tactile and visual stimulation.

5.2.1 Focus

Fidgeting is often seen as a sign of not paying attention, but for some it actually has the opposite effect. In one study [36], sixth-graders used stress balls during a class for seven weeks. The result was a perceived and observed increase in attention and focus. They also measured better grade scores, and experienced a more positive attitude in the classroom.

Other types of fidgeting also exhibit similar positive effects. In a study, doodling while listening on the phone caused an increase in the amount of information retained [37]. In another study, gesturing was found to increase word retrieval for children when images of objects was shown, compared to being prohibited to gesture [38].

Hence, if fidgeting can increase focus it would suggest that it can in some scenarios enhance cognitive functions as mentioned above.

5.2.2 Mind wandering

Opposite to focus we have mind wandering. When focusing on a task, thoughts that are unrelated to the task are instances of mind wandering. An example is realizing that you have re-read the same sentence over and over because you thought of something else. Task unrelated thoughts are more frequent when attention and focus is low.

Mind wandering has in several cases been connected with creativity. For example, creativity is often attributed to the labors of the unconscious mind [28], and diffuse attention is a trait that creative individuals is said to possess [31]. As mentioned in Chapter 4.4.4, mind wandering can facilitate incubation. Further discussion of the relation between creativity and unconscious elements, such as mind wandering and incubation can be found in [39].

Therefore, if fidgeting can function as a tool for mind wandering and stimulating unconscious thoughts, it could enhance creative thinking. Perhaps mind wandering can be both the cause and effect of fidgeting. Where unconscious fidgeting could be a result of mind wandering whereas conscious fidgeting might be an attempt to let the mind wander off.

5.3 Secondary literature study

The previously mentioned study [36], where a school class used stress balls during one class for seven weeks had several valuable insights about fidgeting. Throughout the paper several quotes from the children and observations from the researchers are stated. The quotes were valuable in gaining a better understanding of fidgeting. Below some of the quotes will be briefly discussed.

By using stress balls as a fidget tool, the goal of the study was to observe if it could improve attention, performance and attitude in the classroom. Their performance and focus were assessed both in school and at home. In both instances a measurable increase could be seen. Though, I think that the most interesting part is that several of the participating children themselves felt that it helped.

“The stress ball helps me with attention and concentration.”

“I didn’t talk as much and the work seemed easy.”

“It helps me think of what to write.”

Several statements said that using stress balls helped them with battling bad habits e.g. biting on finger nails, or fidgets that were disturbing to classmates e.g. hammering the desk. Suggesting that providing dedicated fidget objects reduces fidgets that might have negative impacts to oneself and others.

“My feet don’t bother people anymore.”

“I don’t bite my nails when I am using the stress ball.”

“The ball helped me stay in my seat. Stress balls rule!”

These last quotes are the ones I found especially interesting. Showing that just the knowledge of have a fidget object that is believed to help, can improve confidence. Whether or not a there is a measurable effect; it is perceived as such by the user, and that is just as important.

“I feel like I can ace anything when I have my stress ball.”

“Just looking at the stress ball helps me think.”

“I was having trouble with my work, and the answer just popped

into my head after squeezing the stress ball.”

“It helps me do makeup work.”

One other valuable insight was that the ability for the user to choose color and shape of the stress ball was seen as very important. Suggesting that fidget tools should afford for different personal preferences.

6 Primary research

Detailed account of the three primary research methods. Analysis of the large documentary study, a thorough explanation of the cultural probe and a summary of the concise fly on the wall study.

6.1 Documentary study

Fidget widgets [40] is a blog were anyone can submit pictures and stories about different objects and things they fidget with during work. The blog has been immensely valuable for understanding why people fidget, what they fidget with and how it affects them at work. Therefore, some quotes from the blog will be shared and discussed. All the quotes in this chapter are directly taken from the blog without editing, except for a few spelling errors.

People that fidget a lot are very passionate about their fidget objects, almost to an obsessive extent. Emotional connections can be formed to the objects and having other people fidget with their object can feel intrusive.

> *"…more than a few times people have taken it off my desk and started playing with it, which felt a little personal, as my hands are on it all day, and after which I immediately took it to wash it off."*

Several comments state that fidgeting help with concentration on another task. Though themselves experience this increased focus there is concern that others might view it as disruptive or wish them to stop.

> *"I strongly believe that this action increases my concentration in my work. Good thing my employer doesn't mind."*

There are not only worries from employees that their employers might have objections. People also worry about fidgeting being seen as a sign of nervousness or stress; thus making them hide their fidgeting or becoming less likely to fidget.

> *"Working in a corporate environment I have to fidget discreetly and so I find myself reaching for the post it pad and bending it back and forth nonstop all day. I have an interest in body language and am aware how this may come across as stress, while this may be subconsciously. Consciously I do not feel*

stressed. I just need something to keep my hand occupied with as I process my thoughts."

Though for some, stress and anxiety relief is exactly what they seek from fidgeting.

"Nothing copes with daily work stress like a shape-shifting widget, this is more elaborate than those elastic stress reliever balls."

"Sometimes it helps me focus, I do it subconsciously, other times it's a conscious action that reduces my social anxiety."

For some fidgeting is not connected with stress, rather just something to do while performing a simple task.

"Interestingly enough I don't do this when I am stressed or working hard, usually just when I'm working on something easy or reading something."

Fidgeting can be used as exercise for the fingers, hands or arms.

"Knowing my tendency to fidget at my desk, I keep this around to improve my rock climbing."

"I have muscle issues in my left shoulder, so the stress ball also helps me from cramping up at the computer."

Doodling is another instance of fidgeting, and displays similar benefits.

"I have to prepare for meetings when I know they are going to be long……. I take a pen and paper with me and I doodle, it helps keep me in the meeting. I find that I listen better and retain the information when I am fiddling."

Fidgeting can help battling bad habits as was also mentioned in the secondary literature study.

"If I'm fidgeting, I'm not biting my nails"

Some specifically mention that they feel that fidgeting increase their creativity.

"The reason that I really like this toy is that it is open-ended and I get to actually create new things. It is a bigger creativity escape than a polished rock for example, but not as long as a walk outside."

"Absentmindedly playing with this toy seems to jump-start the creative process. I usually play with it until my fingers need to jump to the keyboard."

For some fidgeting has gone so far as to be synonymous with creative work, in this case chewing which is also a type of fidgeting.

> *"I'm a writer and creative-type, so I find the mindless chewing a must while I'm working or doing just about anything on the computer. I have come to associate it with creativity and writing, and I'll mindlessly reach out to grab one whenever I begin typing an email or content project."*

One thing to note is that these responses are mostly from people who already actively fidget a lot, and already have dedicated items for that purpose. Therefore, the primary study should aim to also cover people who don't actively fidget as much.

6.2 Study: Cultural probe

Since the wish of creating a test to measure creativity while fidgeting had proven problematic, a new approach was needed. Most promising and interesting would be to test fidgeting products in the field.

When choosing a method for the study, knowledge from the previously mentioned course in Chapter 1.1 was valuable. Several methods including observations and interviews were briefly considered, but later discarded because they were both time-consuming and intrusive. Therefore, it was decided to use a cultural probe for this study.

Several benefits of this method made the choice easy. Since the participants are carrying out the data collection the method is both time efficient and non-intrusive. It also makes it possible to test several objects at the same time.

The goal of the study is to find out what people actually think about having a desk toy for fidgeting at work and possible effects from it. Since no functional prototype had been developed, existing products on the market were used. The probe consisted of a box, see Figure 6.1, containing:

- a notebook with ten questions, two questions for each day over five days
- a pen
- the test object

Figure 6.1 The boxes used for the probe with its content

6.2.1 Target group

Before finding participants for the cultural probe, a target group was defined for the sake of selecting participants for the study. When discussing who might benefit from the types of product two different scenarios leapt to mind. Those who just start a new job and are uncertain in their new position, and longtime employees who are stuck in the same routines.

To some extent the second group might have a larger need for fresh insights to help them innovate. Though they might be reluctant to try something new or even admit that they have a need for such a product. Being open towards a new product is of importance if the product is to be considered at all. Therefore, the first of the previous mentioned groups, of younger newly employed, appear more suitable.

Hence, the target group for the probe consists of recent graduates with a master of science degree, in their mid-twenties to mid-thirties. Newly employed at a medium or large company, working with development in some way. Furthermore, to fill the gap mentioned in Chapter 5.3, the target group should consist of people that fidget to varying degrees. Therefore, a question in the notebook should assess the participants pervious fidgeting experience.

6.2.2 Participants

When finding participants for the probe, I turned to acquaintances that fit the target group. By adopting a snowball sampling method, I asked two friends to participate as well as asked them to find two colleagues at their workplaces that were willing to participate. With this method a total of six participants were found, three at each company.

Two females and one male working with CAD at a consultant firm made up the first group. The second group consisted of three males at an electronic company. The diversity and number of participants was deemed adequate for the purpose of the study.

6.2.3 Introduction

Before beginning, an introductory meeting was held. The participants were further introduced to the study and supplied with the probes. Consent was obtained via a consent form, see Appendix A.1. They were encouraged to use the object as much as they liked, take pictures if they could and answer two of the questions each day consecutively for a week.

6.2.4 Objects

Three different objects were used for the purpose of the study. The objects were selected to be different from each other in shape, material and structure. In short, they were chosen because each of them differ from the other two in several aspects. Though one trait that they all share is that they can be used with both low and high focus, i.e. unconsciously and consciously.

They were selected qualitatively by me based on research of available fidgeting objects on the market, knowledge from the previously mentioned test in Chapter 1.1.3 and analysis of the fidget objects submitted to the blog in the documentary study. Though I was limited to available objects in local stores due to time restrictions.

6.2.4.1 PlusPlus

The first object, is a Lego like toy that consisted of several puzzle-shaped parts named PlusPlus, see Figure 6.2. I selected 8 pieces, each in a different color to act as one object. My guess was that this object would be seen as a high focus object that required a lot of attention if used for building, but low focus if only a few parts were held in one hand.

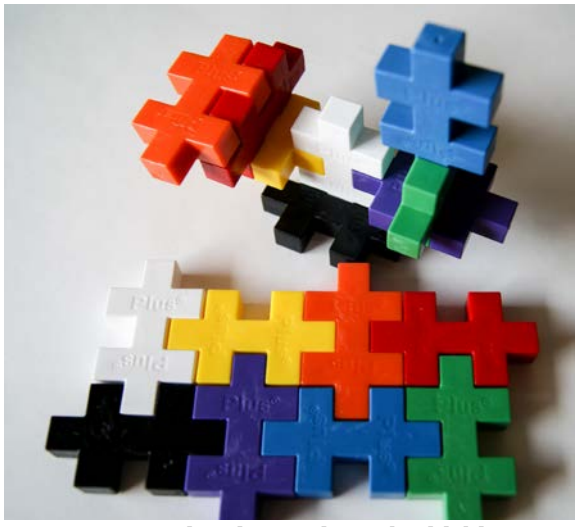

Figure 6.2 PlusPlus, a plastic buildable toy

6.2.4.2 Twisty puzzle

Secondly, a wooden twisty puzzle, see Figure 6.3, with movable parts was selected. More restricting than the PlusPlus, but also more convenient since they are bound together with an elastic cord. During a high focus activity, it can be manipulated into shapes. For a low focus activity, the object can be spun, twirled, snapped, clicked or stretched.

Figure 6.3 The wooden twisty toy with individually movable blocks

6.2.4.3 Soft plush balls

Lastly I decided on two soft plush balls, see Figure 6.4. One with depressions and the other one with protrusions. Aimed towards low focus activities, but can still be used to throw, bounce, stack and balance for higher focus activities. They allow for several common lower focus activities such as, squeezing, spinning, rolling, touching and holding.

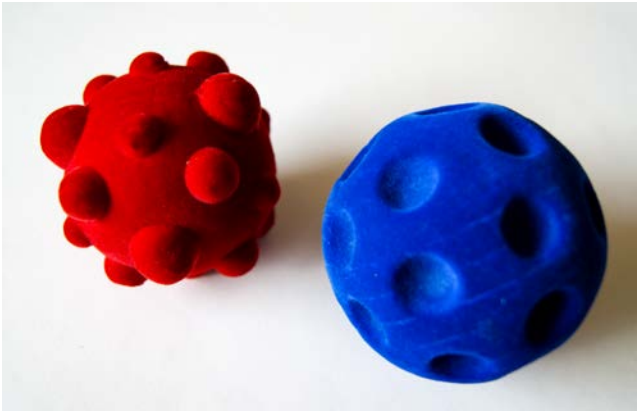

Figure 6.4 Two soft plush balls with different shape and color. The image shows only one set of the objects. The second set was an exact copy, except the red one was colored neon pink, as seen in Figure 6.1

The boxes were wrapped up before they were handed out, see Figure 6.5. This was seen as positive and added to the excitement of starting the study, since the probes were delivered on Friday and meant to be opened and started on the following Monday. Each group got a set of the three different items, the boxes were handed out randomly.

Figure 6.5 Boxes all wrapped up and ready to be handed out

6.2.5 Notebook

Great care was taken so that only the most meaningful questions were selected. By writing lots of possible questions on post-it notes several different dispositions could be tried, see Figure 6.6. The decision fell on a total of ten questions, making the one-week long study only having two questions each day. Furthermore, the questions were written in a way so that the second question was thought to be easier to answer after having pondered the first question. The questions also grew in complexity and depth over the week. The questions can be found in Appendix A.2.

Figure 6.6 Question selection process

6.2.6 End meeting

After the week, I organized a semi-structured discussion over coffee about the study. Both to gather in the notebooks and to let the participants have some dedicated time for discussion about their experience with each other. I tried not to steer the conversation too much, but asked probing questions to keep the conversation going.

The discussions lasted for about 15 minutes, the first one was with permission recorded and later transcribed. For the second discussion I resorted to only taking notes, due to the realization that the audio recording and transcribing did not add anything extra compared to my notes.

6.2.7 Results

When all notebooks had been gathered in, I read and analyzed the comments. It was done by first grouping up all the comments by object, and then sort them into two different categories: uses and likes & dislikes.

In separate parts, quotes from the notebooks and the end discussion will be shared with comments and implications. Note that the quotes have been translated and in some cases reworded for clarification.

6.2.7.1 Uses

The most common usage of the object was during a small break when bored or understimulated. Here are two examples of answers to “Question 5: How and in what situations do you use the objects?”.

“When bored I take a break and throw them at a wall.”

“When I need a break from work. When I get restless or just see it lying on the desk.”

Other answers included uses for a social interaction. Suggesting that even if the object per se does not allow for several people to use it simultaneously, it can still provide positive social effects.

“When someone enters and want to discuss something.”

“As a conversation starter with colleagues.”

It was discussed that the objects allowed for smaller breaks that substitute picking up the phone, browsing internet, grabbing a fruit, getting coffee or going to the toilet.

“Sometimes when I usually pick up my phone when I have gotten bored/stuck/unmotivated I pick up the object instead.”

Other uses were when thinking or to rest the brain a bit.

“When I don’t have anything to do or when thinking on a complicated problem”

“To let the brain recharge”

It seems that when you have a lot of things to do and are busy you don't fidget much. On the other hand, it was appreciated when thinking, during downtime or when talking to co-workers. So as serving as a fun toy or something for the fingers to play with when the mind is occupied it seemed to work.

6.2.7.2 Likes & Dislikes

It was appreciated that the objects were colorful.

"I like that they add a little color to the surroundings"

"If you have a messy desk it's good that it stands out and is visible, for example with colors"

All of the participants reported that the object was fun to use and have around.

"Fun to have it on the desk"

"I get energized when I see it lying on the desk"

Though it was a concern for some that they liked it a bit too much.

"I get pretty happy from it, but also a bit stressed when playing with it too much instead of working"

"Sometimes it feels like I spend too much time with it, instead of working"

The novelty of the object faded, during the end discussion it was brought up that testing several different objects might have been good. Also that different objects fit different scenarios better.

"In the end of the week, the object did not feel as exiting anymore"

In general, all the objects were perceived as fun, playful and colorful, even though the objects were very different from each other.

6.3 Study: Fly on the wall

To complement the probe test and get broader insights into fidgeting a fly on the wall test was decided on. It provided a simple way to study the behavior of fidgeting by casually observing multiple people in a non-intrusive way. The goal was to find out how, when and with what people fidget.

The study was conducted at Studiecentrum, a café/restaurant/study place at Lund University. During half an hour I continuously wrote down all the things people around me fidgeted with, how frequently they did so and how they went about it. About 30 people were present, observed to be around the ages 20-30 years old.

Most of the people were seated in small groups of 2-4 people around tables, only a few worked alone. In the end of the observations a short qualitative summary of the findings was written. Below are some of the more prominent observations.

People fidget with whatever is present and especially with themselves. Such as their chin, ears, hair, facial hair, or hands. Also fidgeting movements with the legs e.g. tapping, bouncing or moving the feet around are common. Fidgeting seemed to be more frequent when listening to others compared to talking.

Even though people fidgeted less when they actively talked, gesturing did occur. People who were listening to a conversation more often fidgeted with themselves rather than an object, such as a pen or jewelry.

The observations are consistent with earlier findings. Fidgeting is done with whatever happens to be nearby and occurs more frequently when not fully engaged in an activity. It is also done with an air of discretion, and ceases if others at the table turn their attention towards them. The one’s that worked alone seemed more focused on work and fidgeted less, perhaps as a consequence of being more concentrated.

7 Literature and study findings

Summary of the literature and study findings, a way to classify reasons for fidgeting with examples and uses. A discussion on how fidgeting increases creativity.

7.1 Why we fidget

There are several different reasons for fidgeting, as could be seen in the literature and primary studies. Though, a pattern of four main underlying reasons was reoccurring. The reasons were: to reduce stress or nervousness, open up the mind, venting excess energy or to gain focus, see Figure 7.1 for an illustration.

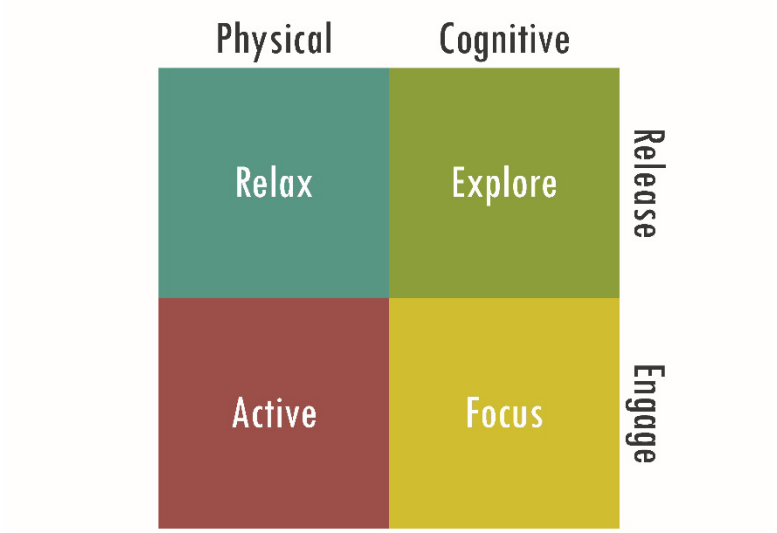

Figure 7.1 The four main reasons for fidgeting

What is important to note is that the reasons are based on personal reports, and fidgeting seems to help individuals differently. The same motion/object can be used for different reasons depending on the person or situation.

The categories are based on the *intent* of the performed activity and does not define objects. Though, from the study findings we can see that certain objects more easily afford some activities than others. For example, fidgeting with something simple such as a stress ball, is more likely to increase focus and benefit convergent thinking. But could also function as an exercise tool for flexing muscles in the hand. While fidgeting

with open ended and complex objects are more likely to increase mind wandering and benefit divergent thinking; they could also function as an activity when bored.

Here physical refers to anything physical/bodily such as muscle use, feelings, emotions, or social. While cognitive/mental refers to thought processes or work. Engage and release refers to an increase or decrease in intensity regarding the concerned aspect i.e. physical or cognitive. Next a detailed explanation of the categories, benefits and example uses and objects will follow.

7.1.1 Relax: Physical release

Stress relief, reduced social anxiety, muscle relaxation, meditation, calmness, reduced nervousness are examples of what here is referred to as physical release.

When fidgeting for this reason simpler and softer objects seems to be preferred e.g. stress balls, jewelry, coins, worrying stones. It can also be done even though there is no stress or anxiousness present just because it feels nice or increases happiness/mood.

The fidget object can also be something that carries emotional meaning or reminds you of a person, scenario or memory that makes you feel better.

7.1.2 Explore: Cognitive release

Fidgeting for cognitive release can be to induce mind wandering, create a break for incubation, or provide mental rest. These activities are not meant to be performed while working. Instead they should be used when stuck, mentally exhausted or when unconscious thinking is desired.

Doing a mindless activity to recharge the brain can be beneficial after long periods of high mental activity. It can be doodling, a simple fidget toy or something repetitive that is familiar; as long as it grabs your attention without feeling mentally demanding.

If mind wandering or divergent thinking is desired a more challenging object or task should be considered, this to suppress conscious thoughts and instead force unconscious thinking.

7.1.3 Active: Physical engage

A feeling of restlessness or boredom are examples of scenarios when physical engage might be sought. It can be due to feeling understimulated, wanting to flex muscles or just to take a break when stuck.

Most fidget objects can work in this case but the objects should provide multiple ways to move the hands and be complex, since they are not meant to be used during work.

An activity during a break can also have a social aspect, it could for example be a simple fun game with a colleague. Thereby promoting playfulness and coworker interaction.

Taking small breaks to use the muscles in your hands can also prevent injuries from spending too much time in front of the computer. Different stress balls, exercise tools and other larger body movements works in this situation.

7.1.4 Focus: Cognitive engage

Fidgeting can function as a way to increase focus when working, consciously thinking, or otherwise engaging in mental activities.

Achieving focus from fidgeting is often done with a simple repeatable motion, e.g. clicking a pen, closing and opening a lid or twirling something between your fingers. The motion should be simple and consist of one or two repetitive motions and that can be done with one hand to allow continued work.

The amount of attention different tasks and fidgeting objects requires varies between persons. What is seen as an effortless motion for some might be demanding for others, e.g. twirling a pen or rolling a coin over your knuckles. Therefore, there might be a high degree of variance within the objects/activities selected for this reason.

Achieving focus can be especially desirable when convergent thinking is needed in a creative process.

7.2 How fidgeting increases creativity

The most apparent connection between fidgeting and creativity is the *relax* category. It's the most frequent mentioned reason in the documentary study. It also has the most likely and strongest connection.

As mentioned, positive mood and stress relief is of importance for creativity. And it's likely that it can also effect confidence, by having an object perceived as a helpful tool. Therefore, it's important that you are able to choose an object to your liking, something that feels comfortable.

Feeling confident, calm and relaxed can affect various situation. Such as becoming more confident in your ideas and abilities; or being less nervous about sharing your ideas with others. Additionally, being less stressed and anxious is of course good in general, both for work and health.

The categories *explore* and *focus* have the strongest potential impact on creative work and work in general. This because they have the strongest connection with our thought process via divergent and convergent thinking.

Acquiring focus for work is always important. For creative work it can be especially desired during the later stages, when the work need to be made tangible. Though it can definitely be useful during any time when attention dwindle.

For explore the strongest link lies with affecting the incubation period as an undemanding task, by preventing conscious thoughts to facilitate unconscious ones. Basically to promote mind wandering during incubation. This might be most beneficial when generating new ideas, or after a long time of active thought as mental relaxation.

The connection between focus and creativity is somewhat stronger than for explore. Focus is mentioned as a reason more often, and there seem to be more research on how fidgeting can be a tool for increased attention, compared to how fidgeting can affect mind wandering. Perhaps because it's both easier to measure attention than mind wandering, and due to its function as a tool for children with ADHD.

In the *Active* category, social interactions, playfulness and fun are the strongest links with creativity. The link that muscle activity in itself directly affects creativity and thought processes in some way is a bit week, but plausible, in my opinion. Though very interesting and definitely worth more investigation.

Playfulness is always important for a creative climate, and can be extra important in the beginning of a creative project. To allow for every idea to emerge and provide a positive and energetic environment. Social interactions are relevant during the whole process, though not always. It's important to allow for discussions and idea sharing between collogues, but also time to work and think alone.

There are also several benefits from increased muscle activity that are beneficial, but not directly for creativity. As mentioned before it can be used to reduce wrist and finger pain from computer work. Also it can be used as a substitute for finger nail biting or other bad habits. Or if exercise tools are used, function to build muscles in the hands and arms.

Finally, even if fidgeting is not to your cup of tea, understanding others needs for it might both help others and make you more sympathetic. Which in turn might affect your own creativity positively.

8 Development

Combining the findings from the literature and studies into product ideas and concepts. The development process has been more or less ongoing throughout the project.

8.1 Attributes

Several different prototype attributes were investigated, one of the more important was movement. How many pieces an object consist of heavily controls how much movement is afforded. Four categories were distinguished: non-deformable objects consisting of one part, objects in a deformable material, objects consisting of several parts that are attached together and objects consisting of several independent parts. See examples of prototypes of the different categories in Figure 8.1.

Figure 8.1 Prototypes of the four different categories of movement

When manipulating objects, either one hand or both hands can be used. Also surfaces or other objects can be used in conjunction, e.g. rolling the object against a table, or using a tool to manipulate parts of the object. Objects consisting of only one part are more easily manipulated with one hand, while multiple part objects afford more variation in movement but often require both hands.

Therefore, objects that can be handled with one hand are more suited to be used while working. While objects that use both hands work better for breaks since they require more attention. Thus the number of parts correlate with complexity to some degree.

Objects that consist of several separate parts might be inconvenient unless a box to store the pieces are provided, or if they fit together like the PlusPlus in the probe study. There is also the risk of losing a piece or that it could look messy if loose parts are all over the desk. Also objects consisting of many parts might be less durable. No preference on the number of parts has been observed in the studies.

Friction, and therefore texture, is important to consider when two surfaces are moving relative to each other. Varying degrees of friction can be desirable, either to make the movement smooth and easy or to provide more resistance. Texture can also provide sensory stimulation which can be desirable when fidgeting. In the studies it has been observed that in most cases a smooth or rubber surface seems to be preferred.

8.2 Aesthetics

When asking about what colors and materials were desirable it was clear that personal preference was important, though some general agreement could also be identified. Colorful plastic objects were perceived as childish and creative while black and white colors, wood and metal materials were seen as more adult and luxurious.

A desire for both a creative look, without being childish, that still felt luxurious and not like a toy were expressed. Basically toys that do not look *too much* like toys.

To accommodate this, less colors can be used with plastic materials, or use colors that are less saturated. With nature materials, i.e. wood, stone, leather, steel or glass, it’s easier to mix in colors and still keep a luxurious feeling. Nature, and therefore nature materials, is also something that in itself is often said to be inspirational and relaxing. Therefore, inspiration has been drawn from nature by taking small trips to gather inspiration and pictures, see Figure 8.2 taken in Lund’s botanical garden.

Figure 8.2 Inspirational image that inspired a magnolia leaf fidget pendant prototype

8.3 Sketches

Ideas were continually written down on post-it notes and then placed on a wall. At times some of the ideas were then further processed with sketching. Sketching was also used to explore different attributes and aesthetics as described above, e.g. different variations of pieces that were attached on a rubber string similar to the twisty puzzle used in the probe test, see Figure 8.3.

Figure 8.3 Simple crayon sketch of two ideas

Different mediums for the sketches were chosen to reflect the inspiration from nature, such as water colors, see Figure 8.4.

Figure 8.4 Water color sketch of a spinning pendant toy idea

8.4 Prototypes

Consider these paraphrased statements from the preliminary study in Chapter 1.1.3:

> *"I like something light, preferably in wood and bright colors, and small that is easy to hold and fits my small palm"*

> *"I would like to have something hard, heavy with sharp edges that I can hold with both hands and roll around, perhaps in solid stone or metal"*

Since the requirements are contradictory, it would be near impossible to create one single object that would be preferred over other objects by both. Another reason to consider several objects was the statement from the probe study regarding the reduced novelty and interest in the objects after a week of use. Even if one object was to be designed, the novel feeling of said object might fade and make other newer objects more interesting simply because they are new. Also, more than one third of the posts from the blog [40] contained more than one object. Therefore, the prototyping process focused on finding several different objects, rather than one that fits all.

An effort was done to create prototypes that would fit the four different fidgeting reasons, see Figure 8.5. For example, soft and deformable shapes for relaxing. Sphere with irregular holes with an orb inside that can be rotated, meant to be used when thinking or to facilitate mind wandering. A set of disks with slits made for building with, and possible function as a wearable necklace. Different variations of small objects that afford a repetitive motion aimed for focus.

Figure 8.5 Prototypes based on the four different reasons for fidgeting

8.5 Evaluation

I tried to select the four most appropriate objects, one for each reason for fidgeting. After a few iterations of prototyping I realized I was unable to make strong arguments for or against any of the prototypes. There was no clear way to measure if a given prototype worked better than any other.

Even with additional external constraints, such as a narrowly defined target group or with a specific company in mind, it never felt right to decide for others what object would work best for them.

Instead, this lead to the realization that, for now personal preference dictates what sort of fidgeting objects should be used. The four selected objects were simply based on my personal preference, see Figure 8.6. And that is exactly how it should be. No one else can choose what fidget items someone else prefers.

Figure 8.6 My box of chosen prototypes

Currently the choices are not based on any scientific knowledge that certain objects are better suited for fidgeting than others. Rather personal preference for color, shape, fit and expression dictate what objects are preferred.

To summarize, comparing different objects is not possible at this time. But in the future it might be possible to conduct tests with better ways to measure creative effort and gain a more precise understanding of how fidgeting influences creativity. Therefore, the conclusion will have to be that for the moment, anything goes.

9 Fidget for Creativity

Presenting and explaining the final prototype proposition.

Since no single or even a handful of prototypes could be decided on, the idea evolved towards a larger scale. Namely a web shop where different fidget tools and toys could be amassed under one domain. Where objects can be bought either one by one, or several select together with a container to store them in.

There were still other aspects of the project to consider. Such as how to promote fidgeting as something positive. Since several comments were made in regards to how fidgeting affected others, both from the sound or movement of the action, and how the behavior might come across as not paying attention or looking nervous.

Recently there have been similar examples on the subject of fidgeting for children with ADHD. Web pages have shared information on fidgeting, how teachers can use it as a tool and places to shop for fidget toys [41, 42].

Though, unfortunately when one searches for fidgeting for adults or fidgeting during work the results are quite the opposite. Top results instead state that fidgeting is not considered an adult behavior and instead viewed as a bad habit [43].

Still the need for fidgeting for adults is present. Below are two quotes that further highlight the problem from a post about ADHD and fidgeting in adults [44].

> *"I have ADHD and where I work they don't exactly look upon fidgeting with a smile. But I've found if I fidget with something that looks productive (and sometimes it can be…) they don't mind quite so much on the days where I fidget with something terribly unproductive (like my rubber band ball...) so some nights I will sweep the floor in my workspace repeatedly."*

If fidgeting in adults could be marketed as something productive with a positive effect on work, the behavior might become more acceptable.

> *"Fidgets are my number one answer to fidgeting. They're not always in the most adult-professional-friendly of colors, but they work. I would post some links, but I haven't found the ultimate site yet. When I want to buy a new fidget, I either go to the dollar store section of chain store or do an internet search for "adhd fidget."."*

The second quote suggests that there might be a need for fidget tools that are aimed towards an office environment. Thus suggesting a need for a change in appearance and expression, but not necessarily function.

Hence, if a webpage existed that could provide appropriate fidget tools as well as information and knowledge about how fidgeting can be beneficial, perhaps attitude towards fidgeting can change. Thereby allowing persons who already fidget to do so more freely, and inspire others to try it out. A simple mockup of how the web page could look has been created, see Figure 9.1.

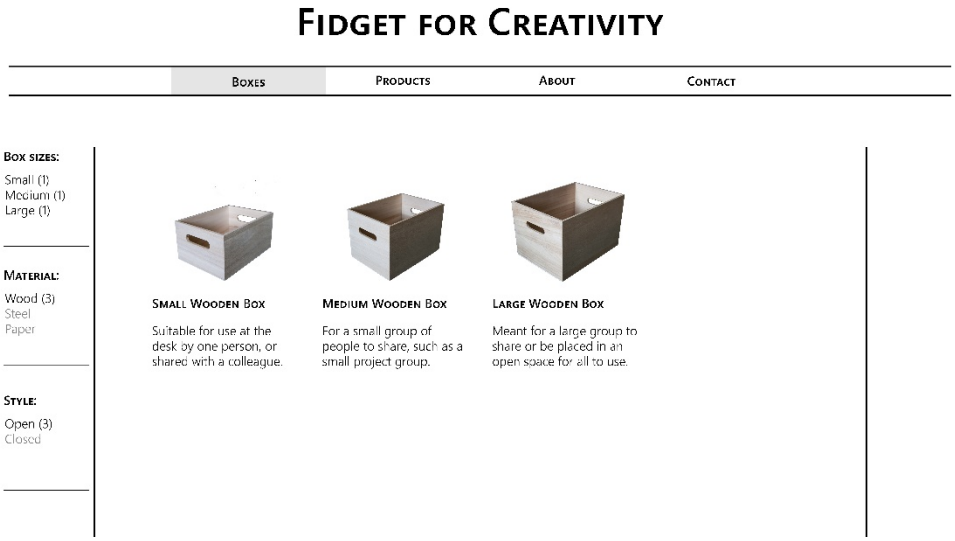

Figure 9.1 Fidget for Creativity mockup showing different sized boxes

Since there was a discussion about fidgeting discreetly and that some feel like they have a need of concealing their behavior, options for closed boxes that blend in to the office could be available.

Closed boxes also functions if you don’t want to share specific objects. As seen in the documentary study people can become rather attached to some objects and prefer not to share them. In this scenario, one closed and one open box might work.

Open boxes promote sharing, which is also an attribute often associated with creativity, and could improve the creative climate at work. Larger boxes could therefore be placed in break rooms or other places where they could be openly shared.

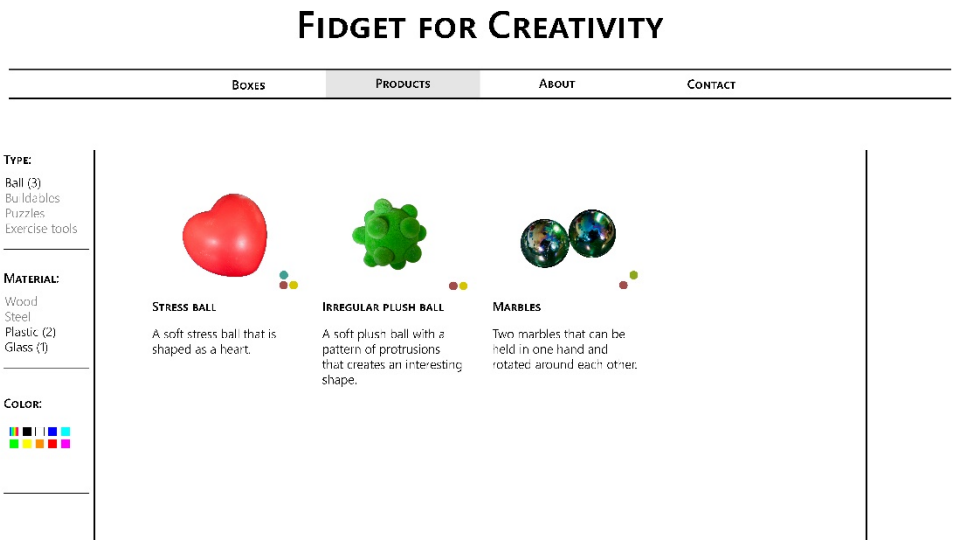

Figure 9.2 Fidget for Creativity mockup showing different objects

One possible way of sorting objects on the web page could be the four reasons for fidgeting, see Figure 9.2. For the above example the suggested fidgeting reasons for each object are visualized as dots in the corner of the images. By providing an explanation of different reasons for fidgeting it could also help with finding objects that matches one's fidgeting habits.

Figure 9.3 shows an example of how a box with several selected objects with varying functions could look like.

Figure 9.3 Example of how a Fidget for Creativity box could look like

10 Discussion

Short recap and some final words on the project. General implications and ideas for future work.

In this project four main reasons for fidgeting have been identified. Exploring thoughts and opening the mind, focusing mental effort towards work, relaxing and letting go of stress, and activation when bored or understimulated.

For all of the four fidgeting reasons, links to how they benefit creativity could be found. These findings are based on the large amount of literature that has been reviewed, and the studies that has been conducted.

Since the research methods were chosen after relevant information from the literature studies had been gained, the appropriateness of different approaches could better be evaluated. Hence, the choice to focus more on the behavior and reasons for fidgeting made sense due to the fact that there was a much larger gap in the knowledge of how fidgeting in an office environment would be received.

While the related work that was found had focused on making a digital product, I found that there seemed to exist a wish for screen free time and various finger movements, textures, materials and shapes. Therefore, digital products and touchscreens were not considered.

It's understandable that fidgeting during a conversation can be seen as disrespectful, even if you believe you're paying *enough* attention. At the same time, it's sad that those who experience the positive effects might be reluctant to fidget because of how it might come across.

While it might be debatable if the large array of benefits from fidgeting is applicable to everyone, I think it's clear that they exist. Though the precise nature and to what degree individuals are affected might vary.

In a similar manner to this project, one study promotes "mindless work", e.g. cleaning one's desk, as a way to increase creativity amongst typical "white collar" workers [45]. This in itself is essentially similar to promoting creativity by fidgeting or mind wandering.

Could this all just be symptoms of a larger problem when we are so deprived of physical labor and rest in our work environment that our brains are constantly overworked with mentally demanding tasks? That we simply have too much thinking and not enough *doing* in our work and not enough breaks during the day.

A recent study done by Staples [46], with over 200 employees says that over 25% don't take any break other than lunch, and the number one reason given for it was guilt. Yet 86% acknowledge that they would be more productive if they took more breaks.

If it was more acceptable to take more breaks, it might be more acceptable to mindlessly gaze out of the window, fidget with a notebook or just get lost in thought from time to time. Without worrying about potential backlash from coworkers or employers.

This is also a problem of status in organizations, where one might feel that one's self-worth is measured by how high workload one can handle. A mindset and work ethics like that can never produce a healthy environment for creativity and innovation. As mentioned before, fidgeting in such a competitive environment is bound to produce negative comments. And the negative comments and the anxiety they come with might further hinder creativity.

Therefore, I think that further studies of the intersection between creativity and fidgeting can contribute to a healthier and more creative work climate. Also it would be interesting to find other applications and areas for the insights gained in this thesis. I hope that reading this report has made you consider trying to fidget for creativity.

11 References

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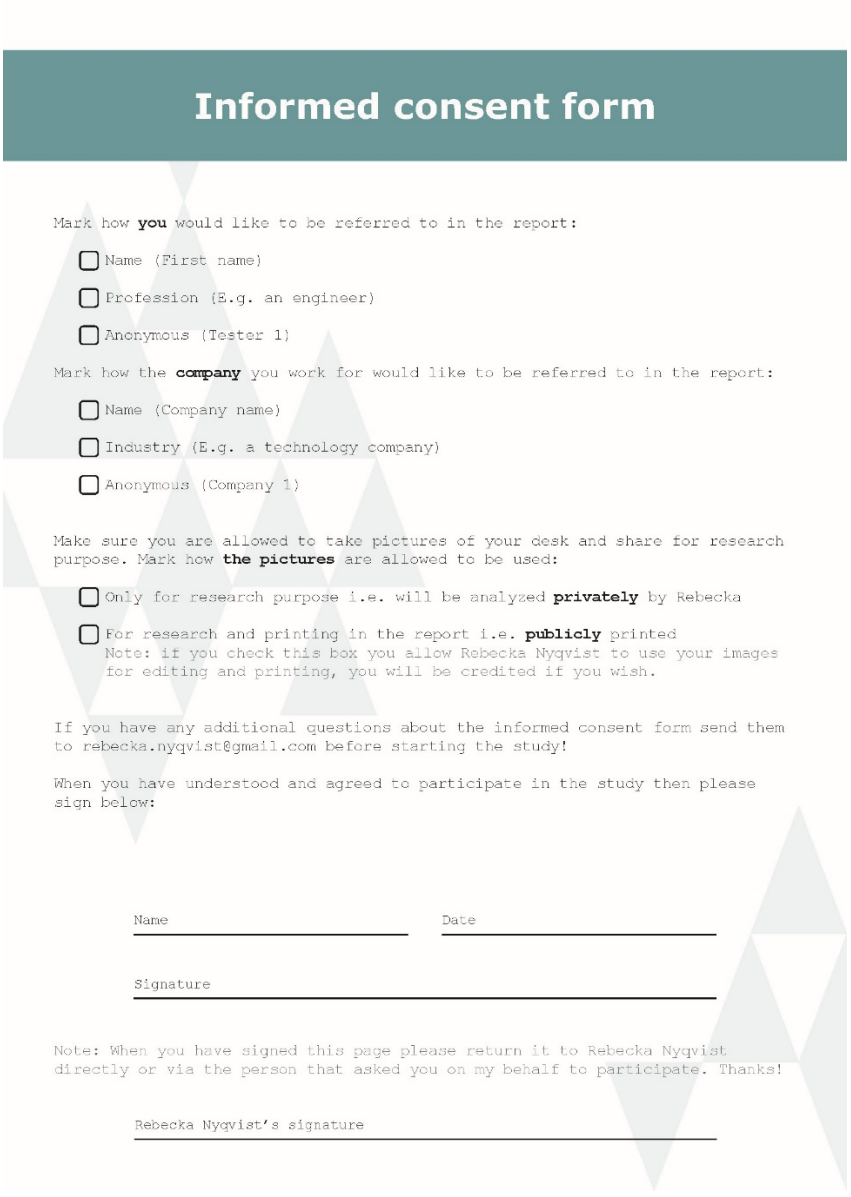
Appendix A: Probe details

A.1 Probe consent form



Informed consent form

Mark how **you** would like to be referred to in the report:

- ☐ Name (First name)
- ☐ Profession (E.g. an engineer)
- ☐ Anonymous (Tester 1)

Mark how the **company** you work for would like to be referred to in the report:

- ☐ Name (Company name)
- ☐ Industry (E.g. a technology company)
- ☐ Anonymous (Company 1)

Make sure you are allowed to take pictures of your desk and share for research purpose. Mark how **the pictures** are allowed to be used:

- ☐ Only for research purpose i.e. will be analyzed **privately** by Rebecka
- ☐ For research and printing in the report i.e. **publicly** printed
  Note: if you check this box you allow Rebecka Nyqvist to use your images for editing and printing, you will be credited if you wish.

If you have any additional questions about the informed consent form send them to rebecka.nyqvist@gmail.com before starting the study!

When you have understood and agreed to participate in the study then please sign below:

Name _____ Date _____

Signature _____

Note: When you have signed this page please return it to Rebecka Nyqvist directly or via the person that asked you on my behalf to participate. Thanks!

Rebecka Nyqvist's signature _____

A.2 Probe notebook questions

The questions in the notebooks were written in Swedish, here they will be translated into English. After each day's questions two empty pages with the headline "own notes" that could be used to write additional thoughts about the questions, object or anything they want that might be relevant.

Day 1

Question 1: What is your first impression of the object?

Question 2: Describe the object with five expressions.

Day 2

Question 3: What other objects around your desk do you have that you fidget with when you think? Please take pictures!

Question 4: Among the items in the last questions, do you have any favorites and what properties about them do you like?

Day 3

Question 5: How and in what situations do you use the objects?

Question 6: How does the object fit in your hand and what feelings does it invoke in you?

Day 4

Question 7: Write at least one thing you like and one thing you dislike about the object.

Question 8: Is there anything about the object you would like to change?

Day 5

Question 9: How have the object impact your work? And will you continue to use it?

Question 10: Look through all previous questions, have your opinion/impression about the object changed? Write the changes here: