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Exploring Emotional Impact on User Experience with Mobile Touchscreen Gestures through User Evaluation

University of Lapland
Faculty of Art & Design
Master's Degree
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2026

Title: Exploring Emotional Impact on User Experience with Mobile Touchscreen Gestures through User Evaluation

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Degree Program: Design

Type: Pro Gradu

Pages: 80

Date: 11.6.2026

Supervisor: Ashley Colley

Abstract

The touchscreen gestures swipe, drag and tap are used among mobile applications providing efficient and engaging usage, ensuring everyday interaction. Their effectiveness is discovered by previous research, however it has not been widely explored whether a gesture itself possesses a certain emotional impact to the user. The aim of this study is to discover the emotional qualities of these commonly used gestures by comparing them with each other using user evaluation. These factors were tested with 12 simplified interactive mobile UI prototypes with 18 participants using SAM-scale, likert scale and structured interview as data collection methods. The data was analysed using repeated measures Anova and thematic analysis. The study results showed that these gestures possess little emotional impact by themselves and participants preferred gestures which provide efficient usability. Swipe and tap are perceived as fast and natural, whereas the slowness of drag was seen as the least engaging. Swipe enhances engagement with fast decisive interfaces, tap with precision requiring tasks, and drag as an element of friction. The findings suggest that different gestures do change the UX and can assist in emotional impact if users connect the UI to different subjective contexts from their past experiences. With a visual example design, I propose that this emotional UX can be obtained by designing embodied metaphors, which combine gestural features with real-world affordances activating reflective level user engagement. These suggestions can be applied to mobile UI designs when selecting gestures to enhance the UX.

Keywords: Mobile Touchscreen Gestures, Interaction Design, Embodied Metaphor, Emotional Design, Human-Computer Interaction, User Experience, User Interface

Tiivistelmä

Mobiililaitteiden kosketuseleet swaippaus, vetäminen ja napauttaminen (swipe, drag, tap) mahdollistavat tehokkaan ja mukaansatempaavan päivittäisen käytön. Aiempaan tutkimukseen perustuen näiden eleiden tehokkuutta on tarkasteltu, mutta yksittäisen eleen vaikutusta emotionaaliseen kokemukseen ei ole tutkittu laajasti. Tämän tutkimuksen tavoitteena on selvittää edellä mainittujen yleisten eleiden emotionaalisia ominaisuuksia vertaamalla niitä käyttäjätestauksen avulla. Kyseisiä tekijöitä tutkittiin 12 yksinkertaistetulla interaktiivisella mobiili-käyttöliittymällä 18 osallistujan avulla. Aineistonkeruumenetelminä toimi SAM-asteikko, Likert-asteikko sekä strukturoitu haastattelu. Aineisto analysoitiin ANOVA-analyysin ja temaattisen analyysin avulla. Tulokset osoittivat, että eleillä itsessään on vähäinen emotionaalinen vaikutus, ja osallistujat suosivat eleitä, jotka omaavat tehokkaan käytettävyyden. Swaippausta ja napautusta kuvailtiin sanoilla nopea ja luonnollinen, kun taas vetämis-eleen hitaus koettiin vähiten mukaansatempaavana. Swaippaus sopii nopeaa päätöksentekoa hyödyntäviin käyttöliittymiin, napautus tarkkuutta vaativissa tehtävissä ja vetämis-elementti hidastamaan tarkoituksenmukaisesti käyttöä. Havainnot esittävät, että erilaisilla eleillä on vaikutusta käyttäjäkokemukseen ja ne voivat tukea emotioon vetoamista, mikäli käyttäjät yhdistävät käyttöliittymän aiemmin koettuihin subjektiivisiin kokemuksiin. Esitän visuaalisen muotoiluesimerkin avulla, että emotionaalinen kokemus on mahdollista saavuttaa suunnittelemalla kehollisia metaforia, jotka yhdistävät eleen ominaisuudet reaalimaailman affordanssien kanssa aktivoiden reflektiivisen tason käyttäjäkokemusta. Näitä havaintoja voidaan hyödyntää valitessa eleitä mobiilikäyttöliittymiin käyttäjäkokemuksen parantamiseksi.

Avainsanat: Mobiili Kosketusnäyttö-eleet, Vuorovaikutussuunnittelu, Kehollinen metafora, Emotionaalinen muotoilu, Ihmisen ja tietokoneen vuorovaikutus, Käyttäjäkokemus, Käyttöliittymä

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1 Introduction

This section includes the introduction to the thesis, providing background information and motivation to pursue this topic. In addition, the research context and objectives are introduced. The study structure is presented as a visualised graphic and the chapters are introduced with a brief description.

1.1 Background

A smartphone is a mobile phone that runs on a mobile operating system with multiple functions from calling and texting to mobile applications (apps) which allow easy access to a wide range of services (Logan, 2016). The use of mobile devices has become part of our daily lives ever since the first iPhone was introduced in 2007 (Hoffman et al., n.d.). Within the change from physical interface to a touch screen, the amount of different touchscreen gestures has increased. Usability of them is important, but a mobile device also has to impact the user on an emotional level to ensure engaging user experience. This has been achieved with customised phone functions, a variety of downloadable apps and visually attractive mobile User Interfaces as seen in Figure 1. These apps touch different fields of design, functioning either as an assistive part for the experience or are completely required for the full usage. For instance, banking services have their own applications, house lighting can be controlled via app, and even games have been implemented into our mobile devices. Since the usage of these apps touches our everyday life, it is challenging yet crucial, for designers to balance the design in a way it remains usable, yet engaging. One solution to this is to design gestures which ensure engaging, intuitive and fast performance while being suitable for the intended usage.

Figure 1: Examples of Mobile Apps; TikTok (Unblast, n.d.) - vertical scrolling, Pokémon Go - swipe to throw, MobilePay - drag to pay, Tinder - swipe or tap to match (Tinder, n.d.)

1.2 Motivation

Usability related issues, like the placement of the button, speed and accuracy with gestures have been studied previously. Additionally the addictive aspects of mobile usage and apps have been explored, but the emotional impact of the gestures themselves has been less researched. Many well known apps use different gestures to enchant the User Interface with metaphors and affordances, e.g. swiping for scrolling through content as the most frequently used among them (Lee, 2021). The question is, can a specific gesture provide emotional reactions to the user? And if so, in what kind of platforms can they be applied to without distracting from the context of the interface.

For example, in dating app Tinder, once the user realizes the simplicity of swiping, they may increase the speed of the gesture to the point where it causes them to accidentally swipe in the wrong direction (David & Cambre, 2016). Apps like Tiktok and Instagram also keep the user entertained with the never-ending scrolling for more content. In this case, the gesture itself has become more engaging than the actual content. Since many apps use these gestural functions and provide emotionally meaningful user experience, it is also relevant to study whether the emotion is related to performing the gesture or only towards the context.

The Short-form content used in TikTok and Instagram must draw attention in a matter of seconds for the user to keep watching. The content is often shallow and does not engage the

user to process the information, only basic emotions occur, such as surprise, anger or humor. Studies show the short-form content encourages to spend too much time on the platform which has a downside with decreasing attention span. (Mark, as cited in Onque, 2025) Since these platforms use quick gestures, it can be explored whether the gestures have any relation with guiding the experience towards this addictive behaviour. Additionally, it is worth discovering whether they can be used to shape the mobile experience into an emotionally deeper connection while avoiding the addictive features.

In this thesis, I will research which commonly used one-hand thumb gestures provide certain emotions. Because these gestures should provide fast and engaging usage, the results will provide guidance in which user interfaces certain gestures are suitable to apply and how to keep the engagement and usability in balance. It is important to compare multiple design elements with each other, because providing multiple options to users, it gives them a space to declare their preferences and express their criticism stronger, which helps designers to choose the right design (Tohidi et al., 2006). This study primarily focuses on exploring gestures to obtain insight of their emotional impact. In addition, the metaphorical aspect of the gestures is discussed and visualised by giving an example of a visual embodied metaphor.

1.3 Research Context

Research refers to developing something with a new perspective, aiming towards innovation, introduction, and improvement of products and processes (Frayling, 1993). The research approach for this thesis is Research Through Design (R-t-D) where interaction designers create objects to study their preferable features and undiscovered problems, transforming it from the current state to a preferred one (Zimmerman et al., 2007). This thesis uses R-t-D to discover the unidentified qualities of mobile touchscreen interactions for their emotional impact.

Since my thesis explores the emotional impact of mobile gestures, the framework of this research is User Experience (UX), Interaction Design (IxD) and Human Computer Interaction (HCI). This research is made as Master's Thesis in the field of design. **Design** is a multi-dimensional concept, which is difficult to explain shortly as it crosses from graphic design to engineering, forming diverse explanations (Auernhammer & Ford, 2022). One way to describe design from a designers perspective is a "A concept of giving a form to something

in a way that makes sense" (Persson, 2024). In the context of this thesis, design can refer to multiple factors, such as designing the user experience, or designing the graphic interface. It explains how the idea was thought of, planned and conducted to reach the wanted outcome.

According to Benyon (2019, p.1980), "User Experience (**UX**) encompasses all the feelings, thoughts, sensations and actions of engaging in some activity." The interactive system should be accessible, usable and engaging to enhance the User Experience and involve seven UX factors presented in Figure 2. UX is an essential framework for creating emotionally impactful mobile design to study the effect and evoked feelings of the gestures. Human Computer Interaction (**HCI**) discovers e.g. the use of mobile systems and smartphone apps in a human-centered way for the system to remain accessible, usable and acceptable (Benyon, 2019). Interaction Design (**IxD**) refers to the interaction between users and products (Yu Siang, 2015). The mobile interface is the main interactive system which is explored in this thesis, discovering how it functions as a system made for humans.

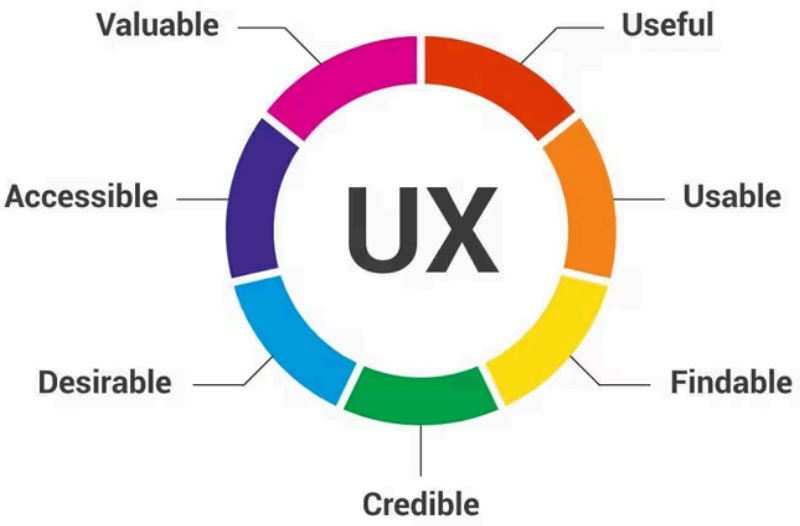


Figure 2: UX honeycomb diagram, Morville (n.d.),

Since the study has a strong emphasis on emotions and intends to seek emotional responses in gestures, the framework focuses on **Emotional Design**. Don Norman (2004) states that Emotional Design as a concept creates designs which evoke emotions to reach a positive UX. He claims that in UX, emotion has 3 different levels of processing: Visceral, Behavioral and Reflective. The visceral level is related to appearance, behavioural to the effective and pleasant usage, and the reflective to self-image, subjective views and memories (see Figure 3). These levels will be exploited to understand the emotional responses of the gestures.

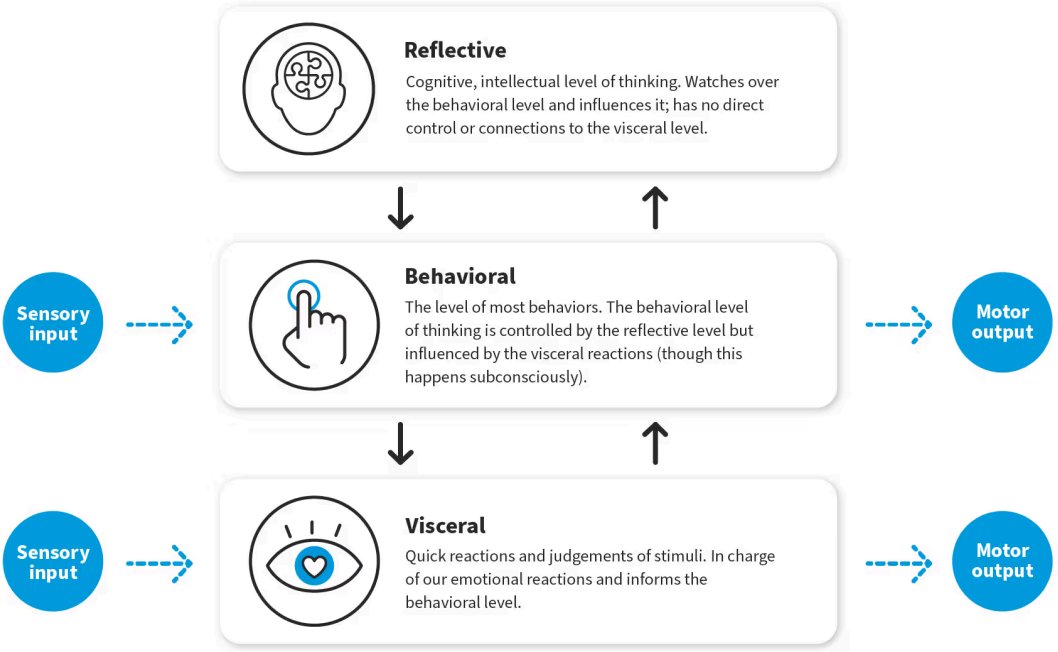


Figure 3: Three levels of Design, Norman (2016)

From the view of product design, Hekkert (2006) separates the product experience into three groups: aesthetic pleasure, attribution of meaning, and emotional response. These answer to questions such as what senses were used, what does the usage mean to the user, and how it made them feel during the interaction. This framework provides a foundation for understanding the full picture of the product UX (See Figure 4). Besides the emotion studies, Desmet & Hekkert (2007) state that **usability** affects all three levels of product experience. It focuses on the relationship between the product and how the user is using it with their set of skills, and discovers how the user can achieve a certain goal with the product. Among devices with multimode functionalities, like mobilephones, the usability of these functions is relevant

to understand to avoid the usage being too difficult to operate. Therefore usability is an essential part of the product UX and necessary to consider when designing mobile interactions.

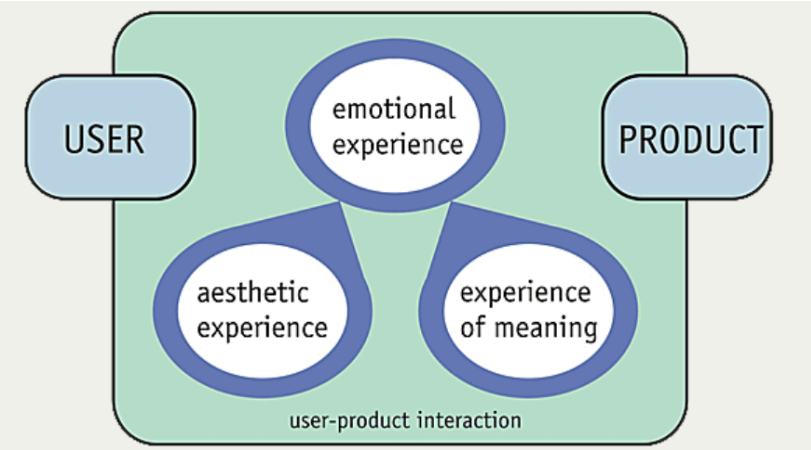


Figure 4: Framework of Product Experience, Hekkert (2006)

These frameworks by Norman, Desmet and Hekkert provide structure for studying the emotional responses. They indicate that it is relevant to study interaction design from the emotional aspect to understand what kind of factors create an emotional UX among mobile gestures.

Gesture is expressive behaviour and fundamentally communicative to another person, however in HCI, it refers to being meaningful to the computer when giving commands (Kurtenbach & Hulteen, 1990). The gestures mentioned throughout the study refer to mobile-only gestures which are used with smartphones. Nowadays these devices use mostly touch screens, meaning a finger activates the interaction when touching the screen (See Figure 5). Since mobile devices do not necessarily require visible buttons on screen to guide the user, the space for content increases making the usage intuitive, engaging and fun (Babich, 2016). Therefore studying only mobile touchscreen gestures has been selected as the objective.

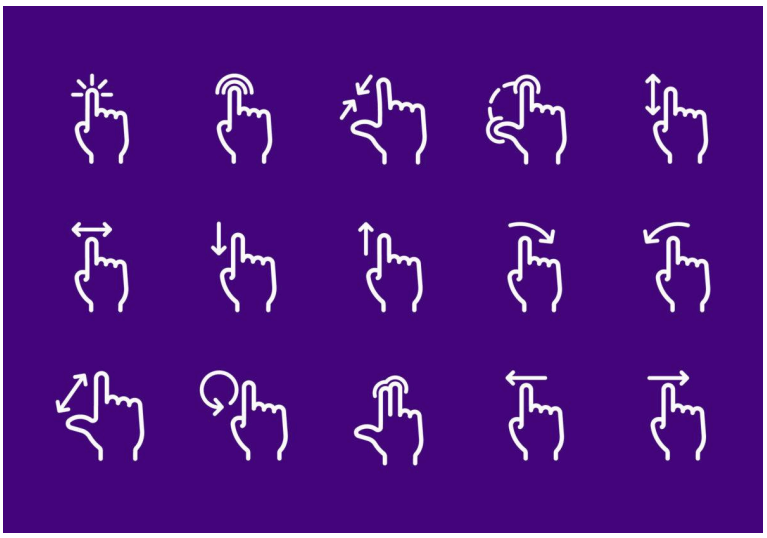


Figure 5: Examples of Touchscreen Gestures used on Mobiles, Boldist (2021)

The concept of **metaphor** in this study refers to using preknown factors (source domain) to understand the performed action (target domain) as presented in Figure 6, meaning the users connect their knowledge and experiences when using the application (Nielsen, 2025). For example, as the real-world uses trash cans as throwing away garbage, a trash can icon on a computer screen refers to deleting an object. Both of the actions result in an item being discarded, and therefore users are able to connect physical actions like these with digital ones.

In IxD, the metaphors can also be **embodied** with gestures. The deeply understood and recurring concepts, like the direction up/down, are fundamentally learned through experience and grounded in the body. Designers use these embodied metaphors to spare working memory and create effective systems, making the UI feel natural. (Nielsen, 2025) For example, Pokémon Go introduced throwing a ball to catch a pokémon with a swiping gesture. The gesture is combined with a smooth animation of a ball swinging further away from the screen, which creates the illusion of space with the player and the pokémon. The gesture itself is just a common swipe but the combination of the animation and understandable metaphor of throwing a ball makes the experience imitate real life ball throwing (See Figure 1).

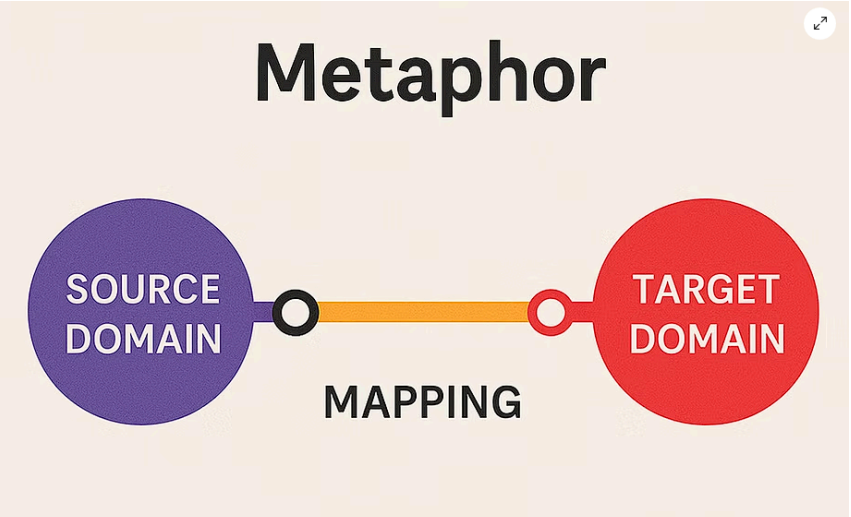


Figure 6: Metaphor, Nielsen (2015)

1.4 Research Objectives And Questions

To study emotional gestures and their influence on UX, these presented research questions will be explored:

RQ1 *Can Tap, Swipe or Drag Gestures evoke Emotional Responses in Mobile Usage?*

RQ2 *How do Tap, Swipe and Drag gestures' Qualities Compare with each other when it comes to Engagement?*

RQ3 *What is the Role of Metaphor when Designing User Interfaces with Touchscreen Gestures?*

These Research Questions RQ1 & RQ2 aid to set the framework of this study to emotional design by discovering the emotional impact of swipe, drag and tap gestures. The comparison between these gestures is meant to reveal information of their features and how they can be used when designing UX for mobile use. RQ3 explores the importance of metaphor when designing emotionally impactful UX and studies how well users are able to connect the gestures to some familiar context when performing tap, swipe and drag gestures in mobile usage.

1.5 Structure and Content

The study structure is visualised in Figure 7 and it is conducted by following guides on Design Thinking from the Interaction Design Foundation and R-t-D method. Design thinking is a non-linear process created to understand users, challenge prejudice, refine the problems and finally design solutions used for prototyping (Dam & Yu Siang, n.d.). For this thesis, I have gathered related research and benchmarked commonly used features and apps in mobile usage to create a base understanding of the topic. Based on that research, 12 abstract interactive prototypes were made in Figma. These prototypes were tested as a within-subjects counterbalanced user study (n=18) by comparing swipe, drag and tap touchscreen gestures. The results were analysed by using thematic analysis, repeated measures anova and visualised graphs. The findings are discussed through these results by giving insights of the discovered topics. Finally, to support my findings, I have presented a visual example of a mobile touchscreen UI with embodied metaphor as an infographic. The context for this visual is the Sustainable Development Goal number 6 “clean water and sanitation”. This design demonstrates the idea of embodied metaphor with tap interaction in mobile usage, while being informative and gamified. This example can guide designers when creating emotionally meaningful UI’s with common and simple gestures (See Figure 8). This structure follows the Research through Design method with building prototypes and testing them to gain insight into how people experience the design (Koskinen et al., 2013).

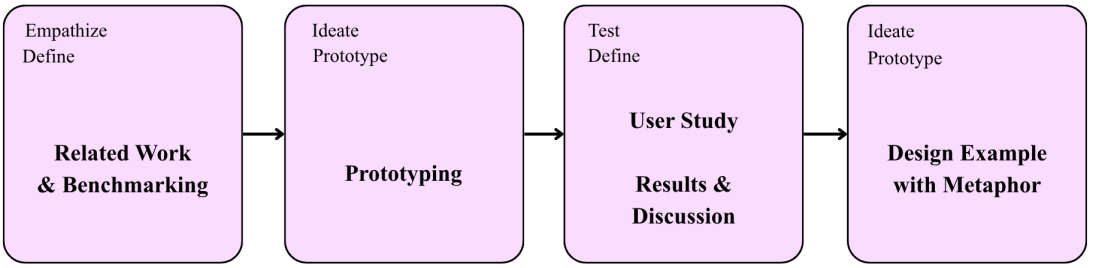


Figure 7: Visualization of the Study Structure

Figure 8: The Design Example

The Chapters:

Chapter 1: Introduction. This chapter introduces the topic, motivation behind it, and the research aims. In addition, the structure for the full study is explained.

Chapter 2: Related Work. This chapter discovers the previous research on the topic, and presents the findings of related work and benchmarking.

Chapter 3: Study Method. This chapter introduces the Measurement Instruments and Methods for the user evaluation, including prototype settings and their appearance, besides the data collection methods.

Chapter 4: Evaluation in a User Study. This chapter includes the full study procedure, participants, results and findings by comparing previous work related to the topic.

Chapter 5: Concept Design. This chapter gives an example of the embodied metaphor, including the context for it, and the visual design based on the findings from the user study.

Chapter 6-7: Discussion and Conclusion. The last chapters answers the research questions, presents limitations for the study and future work opportunities for this topic, and summarises the key findings from his study.

2 Related Work

To create a deeper understanding of the topic, the method for searching information on the subject is a mixed method approach which combines a searching for related work and benchmarking. Those categories are under “Library” in *Development Oriented Triangulation* made by van Turnhout et al. (2014) (See Figure 9). According to their research, the aim of these approaches is to get an overall review of the available data related to the research. Therefore the aim of this section is to collect data which creates the framework for executing the user studies with the prototypes.

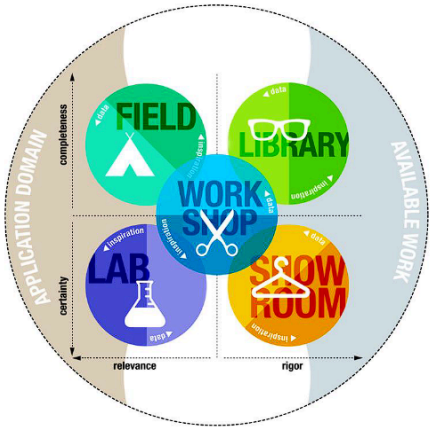


Figure 9: Development Oriented Triangulation, Turnhout et al. (2014)

2.1 Search Terms

To find previous research, I have used search words related to frameworks around *Mobile Touchscreen Gestures, Interaction Design, Embodied Metaphor, Emotional Design, Human-Computer Interaction, User Experience* and *User Interface.* This framing ensures the search results are relevant to the topic and help to choose gestures which are emotionally meaningful, commonly used with mobile interactions and proven to be efficient. The search is conducted using Google Scholar.

2.1.2 Mobile Gestures in Interaction Design

When searching with keywords “thumb-only touchscreen gestures” and “one-handed gestures”, there are many studies researching the accuracy and location of tap interactions

with touch screens, e.g. (Parhi, et al. 2006) and (Perry & Hourcade, 2008). For common web browsing tasks, e.g. saving a bookmark, swipe and drag gestures have been defined in a study by Billinghurst & Vu (2015). These studies provide insight on what kind of gestures are effective and suitable to select for this study.

2.1.3 Direction of the Gesture

The direction of the gesture is a widely researched topic. Using search words like “scrolling mobile gesture” and “direction of touchscreen mobile gesture”, articles of usability and emotional dimension are found. E.g. the usability of performing the gesture to different directions, and whether the direction causes any positive or negative thoughts on users (Lai & Zhang, 2014; Santana & de Vega, 2011). Since the directions have both symbolic and kinesthetic value, they are important to be tested for emotional responses among mobile gestures.

2.1.4 Emotional Design

Most literature on emotional design in this study refers to Norman's (2004) research, which creates a framework for studying the emotional features. Besides this, the framework by Desmet & Hekkert (2007) highlights key aspects for product experience. Additionally, when searching with more keywords, such as “emotional interaction design” and “emotion in mobile user interface”, the results provide studies on how emotion in UX is manipulated with color (Liang et al., 2025) and how Norman’s three levels of reflection has been used as a data-collection method (Lim et al., 2008). This literature provides information on how to design emotional interactive UI’s. Since the prototypes intend to evoke emotion, the previous studies will give a framework for the most suitable features for this usage.

2.1.5 Common UI designs

When searching for commonly used apps and mobile UI’s, Tinder, Tiktok and Apple occur often in previous research with specified keywords “Apple User Experience”, “Tinder Dating App User Experience” and “TikTok Scrolling User Experience”. These search terms provided studies related to: UX of Apple's best practices (Richardson, 2020), the affordances and UX of TikTok (Schellewald, 2023) and exploring Tinder’s swiping logic (David & Cambre, 2016). These studies investigate the UX and qualities of these commonly used apps, which is relevant when building the features for the prototypes.

2.1.6 Metaphor

When searching for literature on metaphors with keywords “Metaphor Interaction Design”, “Embodied Metaphor” and “Metaphor and Emotion”, the searches provided studies about the usage of metaphors on interaction and UX design (Djordjevic, 2008; Nielsen, 2025) and their impact and Interface suggestions for designers (Landay, 2022). This knowledge on metaphors will be discussed after the user studies to reflect whether metaphor has a crucial impact on emotional UX.

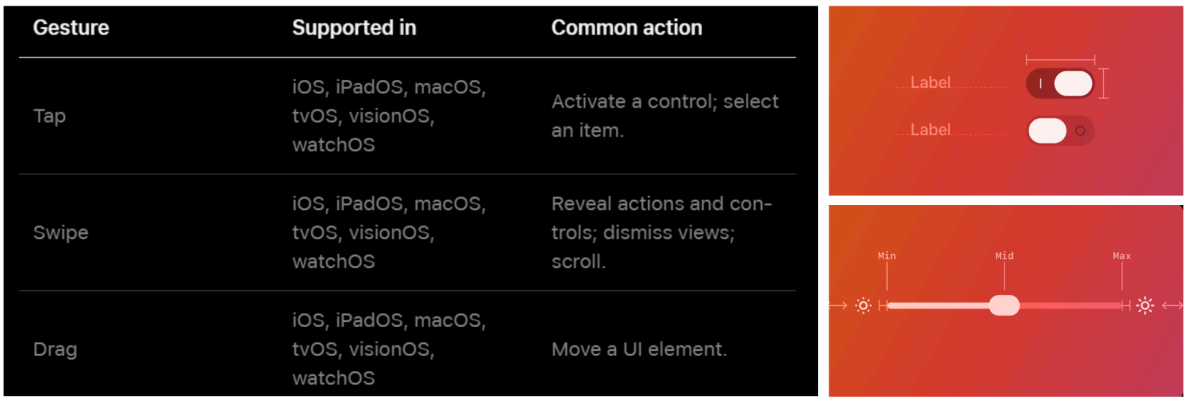
2.2 Benchmarking

In the design field, benchmarking refers to searching for best practices in a field of e.g. product design, where the design function, performance and manufacture is analyzed (Fridley, et al. 1997). Based on the search results from finding related work, I am framing the benchmarking with these criteria; The gesture can be performed with a thumb and it is engaging to perform. The UI has common and known design patterns. The design patterns refer to specific guidelines used to design interface patterns, like toggle switches and navigation tabs (Tankala & Kendrick, 2024). I am focusing on benchmarking the apps which occurred during the search, as well as design pattern guidelines on Apple’s Developer Websites.

Tinder, the dating mobile app using swipe gestures as evaluating possible partner matches, provided many previous studies about user experience and engagement. Swiping a profile right means the user wants a match with the person, and swiping to the left means to “skip” the profile. This selective UI pattern has also worked as an inspiration to many prominent shopping apps which have adapted the swiping interface (Choi et al, 2016). With 100 million downloads on Google Play (Google Play Store, 2026), Tinder’s swipe logic is relevant to explore with prototyping.

The social media app TikTok grew popular with 1 billion downloads on Google Play (TikTok Pte. Ltd., n.d.) and stood out with its innovative approach to engaging users with scrolling through short-form videos (Zhao & Wagner, 2023). The scrolling motion was later implemented into many other apps, e.g. Instagram and Twitter (Schellewald, 2023). Since the scrolling is considered both innovative, yet addicting, the qualities of this UI is valuable to explore.

Based on previous studies, in the technology industry, Apple has been recognised as the key brand of user experience (Richardson, 2020). Therefore, I've selected to benchmark design patterns which occur in the Apple's Developer Websites - Human Interface Guidelines, presented in Figure 10. Apple mentions Tap, Swipe and Drag as the standard gestures which function in many devices. Tap as an activate/select command, swipe as reveal/dismiss/scroll command and drag as move item command. (Apple Inc, n.d.)



Gesture	Supported in	Common action
Tap	iOS, iPadOS, macOS, tvOS, visionOS, watchOS	Activate a control; select an item.
Swipe	iOS, iPadOS, macOS, tvOS, visionOS, watchOS	Reveal actions and controls; dismiss views; scroll.
Drag	iOS, iPadOS, macOS, tvOS, visionOS, watchOS	Move a UI element.

Figure 10: Gestures, Toggles and Sliders, Apple's Developer Websites - Human Interface Guidelines, Apple Inc, (n.d.)

For the input controls, Apple lists sliders as horizontal track (called thumb) to adjust between minimum and maximum values. A similar design with opposite states to choose form, called toggle, changes the appearance depending on the state. (Apple Inc, n.d.) These mentioned UI elements are common design patterns listed in the Nielsen Norman Group website (Tankala & Kendrick, 2024), and can be used as e.g. a dark-light mode adjustment scale or a sound scale (see Figures 10 & 11). Therefore these patterns are meaningful to apply into the prototype designs.

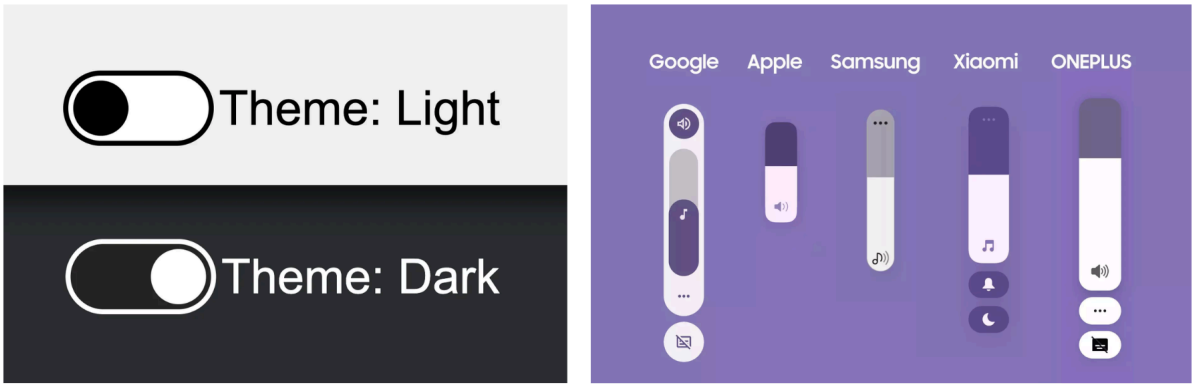


Figure 11: Dark-Light mode Toggle and Adjustment Sliders, Images adapted from Reddit (2024) and OnePlus Community (2024)

2.3 Conclusion on Related Work

Benchmarking and search for related research provide a foundation for the following user studies and ensure the prototypes are based on relevant knowledge on IxD and HCI. Selected design patterns are commonly used in previously mentioned UI's, including scrolling, toggle, slider and selective (Tinder) UI. These features are proven to be engaging, and can be tailored to multiple mobile systems. The gestures chosen are directly from Apple's Developer website; Swipe, Drag and Tap. Due these gestures are described as standard and also appear in previous research, it suggests these gestures can be implemented to different platforms with ease. Therefore these selected features and gestures will be applied to prototypes to test their emotional impact on users.

3 Study Method

This section explains how the prototypes have been developed for the user study. In addition, the methods which are used when collecting data from the participants, are introduced. This protocol follows the design thinking process and R-t-D method as seen in Figure 7 where the aim is to ideate and prototype the ideas into solutions based on the knowledge gained by related work.

3.1 Measurement Instruments and Methods

Prototyping is an experimental phase of design thinking (Design Council, n.d.). It is a fundamental practice in HCI where early staged designs are tested to explore ideas and test usability in a digital product (GeeksforGeeks, 2024). In this section, I will explain how the prototypes have been made, which qualities they have and what is the reason behind these design selections.

3.1.2 Prototype Settings: Gestures

Based on the previous benchmarking, I have used the Human Interface Guidelines on Apple's Developer Website for prototyping the gestures swipe, tap and drag (See Figure 12). For interactive digital prototyping, I have used Figma, which is a web-based design platform for visualising UX with creating interactive UI's and testing them before the implementation stage. Figma is selected due relevant qualities with a user-centered approach, where the results can be adapted to the application users (Alda, 2026).

The prototypes were made in a digital form instead of paper, because visual fidelity alone will not complete the interactive prototype and ensure the wanted purpose (Hare et al., 2013). The prototypes are a mix of low-and high-fidelity. Meaning they use simple visuals, but have fully functional interactions. By creating prototypes with mixed fidelity, low level visual enchantment and high level of interactivity, the design and data is easier to apply to specific areas of interest among designers (McCurdy et al., 2006). In this study, it refers to comparing the prototypes with different gestures without the high-fidelity visuals.

The prototypes were designed to be performed with the dominant hand, either left or right, since participants prefer to use their dominant to achieve comfortability and results are more reliable (Perry & Hourcade, 2008). Since thumb touch screen gestures were widely

researched in many previous studies, this study is also performed by dominant hand thumb while holding the phone. All gestures are under 1.0 second to ensure the user's flow of thought stays uninterrupted during the interaction (Nielsen, 1993).

Figure 12: The gestures Swipe, Drag and Tap, Apple Inc., (2025)

The selected gestures swipe, tap and drag are adjusted to fit Figma's settings. According to Apple Developer Documentation, the swipe gesture is used for flicks and quick panning gestures if the following action is clear to the user (Apple Inc, 2025). Since Figma does not have a separate swipe command, the gesture has been made with an “on drag” trigger which also supports performing the swipe gesture. For the animation, the interaction is set to *gentle smart animation* with 800ms as speed to ensure smooth flick animation.

When using the drag gesture, the user is able to drag objects around the interface to the selected location or change the appearance of an element (Apple Inc, 2025). Drag also makes the gesture slower, since the user has to end the gesture to the correct location in order for the interaction to be successfully completed. In Figma, the trigger for the interaction is the same as swipe - “on drag”, but the *smart animation* has been set on *slow* with 600ms to ensure the user is able to see the object being dragged.

Tap gesture is activated by touching the screen briefly with one or more fingers (Apple Inc, 2025). In Figma, the Tap gesture has been made with an “on tap” trigger and with *slow smart animation* set to 600ms as duration to ensure balanced animation and speed relation.

The direction of the gesture is essential since the apps I have chosen base their function on making a decision based on the direction e.g. Tinder yes-no swiping. The gesture’s direction carries metaphorical meaning, e.g. upward/downward movements are linked to physical expressions connected with emotions (Santana & de Vega, 2011). Their study shows that the action component is more important than a bare visual component, meaning that the motion in the body movement increases the meaning and understanding of the metaphor. Therefore my study investigates whether the gesture itself carries any metaphorical meaning without the visual component. Horizontal and vertical movements work well on mobile interfaces; patterns like scroll view allow users to move the content vertically or horizontally (Apple Inc, n.d.). Therefore it is necessary to test both vertical and horizontal directions and their emotional impact in mobile usage.

Many applications are providing the usage of these gestures simultaneously in the same component, for example, sound sliders can often be dragged or tapped to the preferred volume, or a video can be swiped or dragged to show the next one. This customization ensures the user is able to adapt the layout functions to their needs (Schade, 2016). Since my study compares these gestures to each other, they have to be tested separately.

3.1.3 Prototype Visuals:

Visual design of the user interface can create strong emotional responses to the user, e.g. by colors and shapes (Majd et al., 2025). Since the aim of the study is focused on gestures, the visuals should remain simplified to avoid participants from focusing on them too much. Besides this, some icons, like a trash can, hold universal familiar meaning to users (Nielsen, 2025) and must therefore be left out of this study. Therefore the UI visuals are inspired by commonly used Apps, without attracting too much focus on the layout solutions.

Since the prototypes are tested with one thumb while holding the phone, the location of the interactive area is important to place in a comfortable position. The placement of the interactive area is best to locate at the edges of the screen when accuracy is wanted, and in the middle when the purpose is a faster and comfortable usage (Perry & Hourcade, 2008).

Therefore the location of the area is either on the center of the UI or on the lower edges. User interaction points, e.g. buttons, are effective to highlight the key action (Majd et al., 2025). In my prototypes, the size of the interactive area varies from buttons to full frame interaction; the smallest one for button-elements used with the thumb is 9.6mm to ensure efficient usage (Parhi et al., 2006). In my prototypes, the small button is made with a slightly blurred circle to mimic toggle and slider buttons. The soft, rounded forms enchant the usability and deepens the emotional engagement (Majd et al., 2025). Benchmarked apps, like TikTok, use a full-frame as the interactive area. To mimic this pattern, one of the prototypes has a full screen interaction. Since this prototype UI has to be also tested with the tap gesture, the interactive area has been replaced as an arrow with a 9.6mm interactive area as the interactive field to guide the usage. To mimic the Tinder card UI, the cards are replaced as rectangles with blurred lines (see Figure 14). The difference between the size of the interactive element is studied with these prototypes to find out whether buttons or larger frames have different impact on the feeling of control.

Color design shapes UX affecting emotions, attention and user behaviour, and the resulting reactions are tied with different subjective contexts, e.g. situations, cultures and past experiences (Liang et al., 2025; Lim et al., 2008). However, due their cultural and subjective connections, they have to be used cautiously in the prototypes to avoid participants focusing only on the color when performing the gesture.

Primary intention with colors is to give contrast to interactive elements which assists users to notice them. Therefore the colors are complementary with each other using white and gray shades building a strong contrast to the background to help the interactivity stand out (Majd et al., 2025). The background colors are neutral tones of gray and white, which often function as the background elements creating space for the main interaction (Majd et al., 2025). This matches with Apple's Human Interface Guidelines, which has a selection of background colors; Gray #F2C2C2E is used for the background of the dark mode and White #F2F2F7 as the light mode background color (Apple Inc, n.d.). Therefore, these colors are used in the prototypes to create contrast.

Besides this, the elemental color changes will highlight the interaction to function like dark/light mode toggles. In practice this means the colors will flip to the contrary (light elements turn dark and other way around) when interacting with them. One exception to the

background color being toned down, is the prototype modelled after scrolling UI. Because this design uses the full-view-content as the interactive element to create an element of surprise when watching the view change, I have added different vibrant colors to the full frame view, which change when interacting with them. These monochromic tones create emotional resonance and captivate the user (Majd et al., 2025). The color change tests the emotional difference with light/dark mode and investigates whether users link the change into different metaphors.

The final prototypes are named with numbers 1-4, and their gestures with letters S=Swipe, D=Drag, and T=Tap. For all prototypes and their interactions, see Figures 13-18. The prototype based on the Tinder-card sorting function with the possibility to swipe left or right is named number 1. For example, when using this UI with swipe gesture, it is mentioned as S1. Prototype number 2 mimics a horizontal toggle/slider button with changing background color. Prototype number 3 functions as a vertical slider mimicking a sound adjusting bar with a similar background change. Prototype number 4 has a scrolling UI with changing colors. One prototype is made as an example to demonstrate the usage for participants before testing the prototypes themselves.

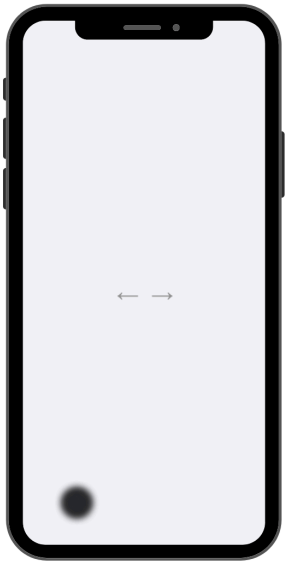


Figure 13: The Example Prototype

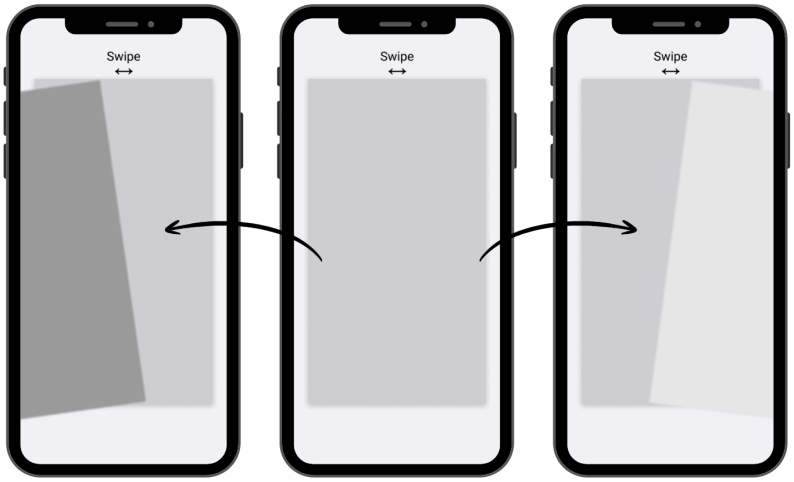


Figure 14: Prototype 1 interaction to left or right

Figure 15:, Prototype 2 interaction to left or right

Figure 16: Prototype 3 interaction to down or up

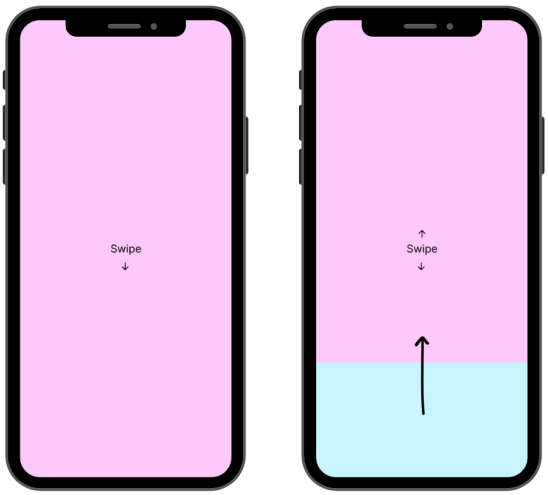


Figure 17: Prototype 4 interaction to down or up

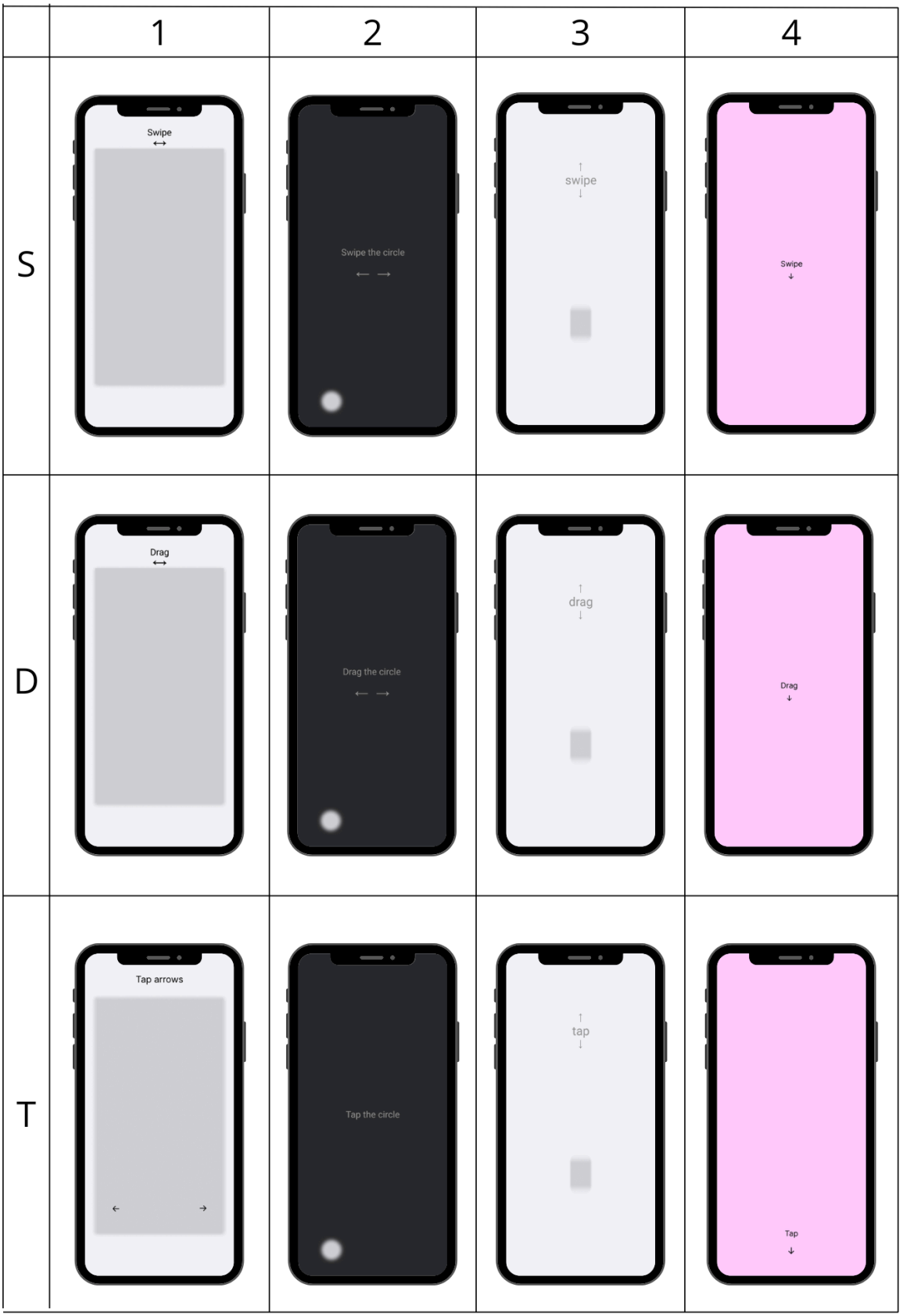


Figure 18: The Prototypes

3.2 Data Collection Methods

To collect data from testing the prototypes and to answer the asked research questions, I will conduct a user study. In a user study, participants provide qualitative and quantitative data with asking preferences, ratings, questionnaires, interviews and observing the users (Tory, et al. 2010). The study design was made as a within-subjects design as a counterbalanced study. In a within-subject design study the participant is experiencing more than one task, e.g. answering multiple questions (Charness et al., 2012). The counterbalanced study aims for an unbiased estimate, canceling carryover effects with randomizing the order of tasks for participants (Ho & Min, 2025). In my study, this means all participants will test all prototypes and answer data-collecting tasks, just in a different order.

For collecting participants' consent and data, the consent form explains the insights for the study; how the information is being collected, and for what usage. The background questionnaire involves questions to map the participants' background information, such as age, gender, occupation and handedness. It also asks how often the participant uses mobile devices with additional questions to describe this usage, and makes sure the participant is able to perform the upcoming mobile usage with their thumb. For these documents, see Figures 40 and 41 on Appendix.

The measurement method for scaling the user experience and emotion is *The Self-Assessment Manikin* (SAM), which is a quick, non-verbal method measuring the user's pleasure, arousal, and dominance to different actions (Bradley and Lang, 1994; Bruun et al., 2021) (See Figure 19). The SAM scale is used within HCI, often with comparing emotionally meaningful designs, e.g. in a study on how different robot interaction styles were perceived by humans (Cucciniello et. al, 2021) and a study of comparing two popular mobile games Temple run and Subway Surfers (Khan et al., 2024).

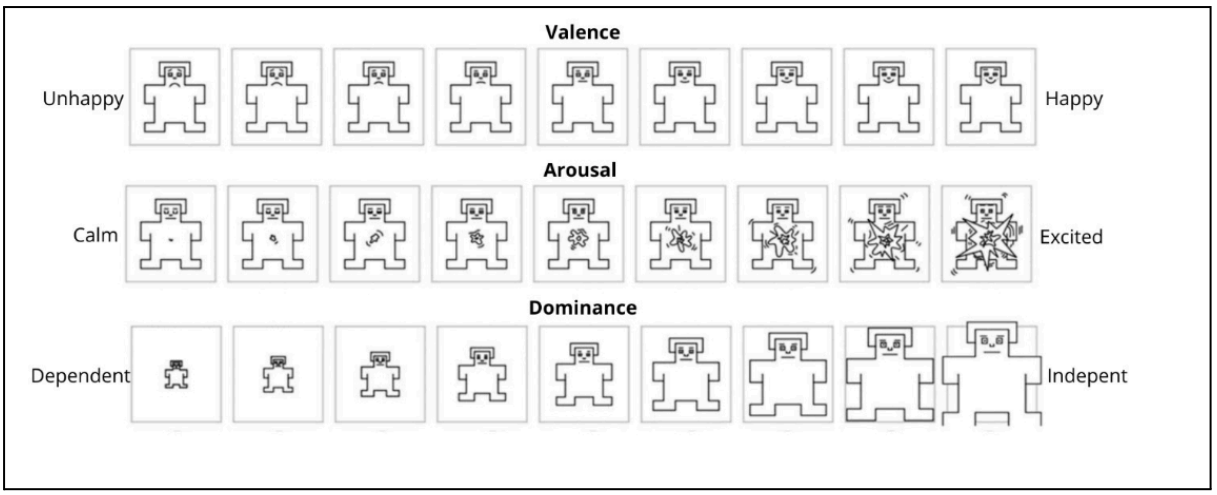


Figure 19: The Self-Assessment Manikin (SAM), Bruun et al. (2021)

The word "engagement" was selected to form the user study questions since it can be worked into design artefacts and creates freedom for the designer due being concrete and wider than asking e.g. only happiness or joy (Zagalo, 2020). A likert scale is chosen as a method to study engagement, animation flow and the gesture direction questions (See Figure 20).

This scaling method uses a systematic agree-disagree scale, where the participant responds to asked questions with a number. These numbers are often used as a scale from 1-5, one as strongly disagree and five as strongly agree to create contrary answers. (Likert scale, n.d.) When exploring the direction, the scale has been modified by replacing the agree-disagree with left-right or up-down felt engaging as the contrary values.

3. The gesture felt engaging to repeat multiple times

strongly disagree	1	2	3	4	5	strongly agree

4. The animation flow felt engaging to me

strongly disagree	1	2	3	4	5	strongly agree

5. In which **direction** it felt more engaging to perform the gesture:

left felt engaging	1	2	3	4	5	right felt engaging

5. In which **direction** it felt more engaging to perform the gesture:

down felt engaging	1	2	3	4	5	up felt engaging

Figure 20: Likert Scale Questions

Open-form questions ensure the possibility for participants to give free-form answers, which can lead to obtaining a range for the occurring themes (Leung, 2001). In this study participants are given a chance to describe the occurring emotions, how the overall UX feels to them and whether they connect the UI to something familiar. The study ends on a verbal end-interview. Those questions are about the participants' thoughts on the gestures and their features. The answers are written down by the moderator instantly (See Figures 21 & 22).

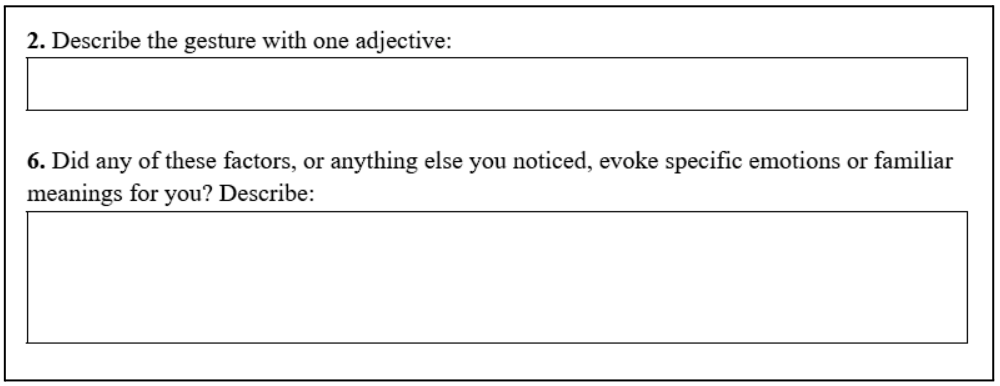


Figure 21: Open-form questions

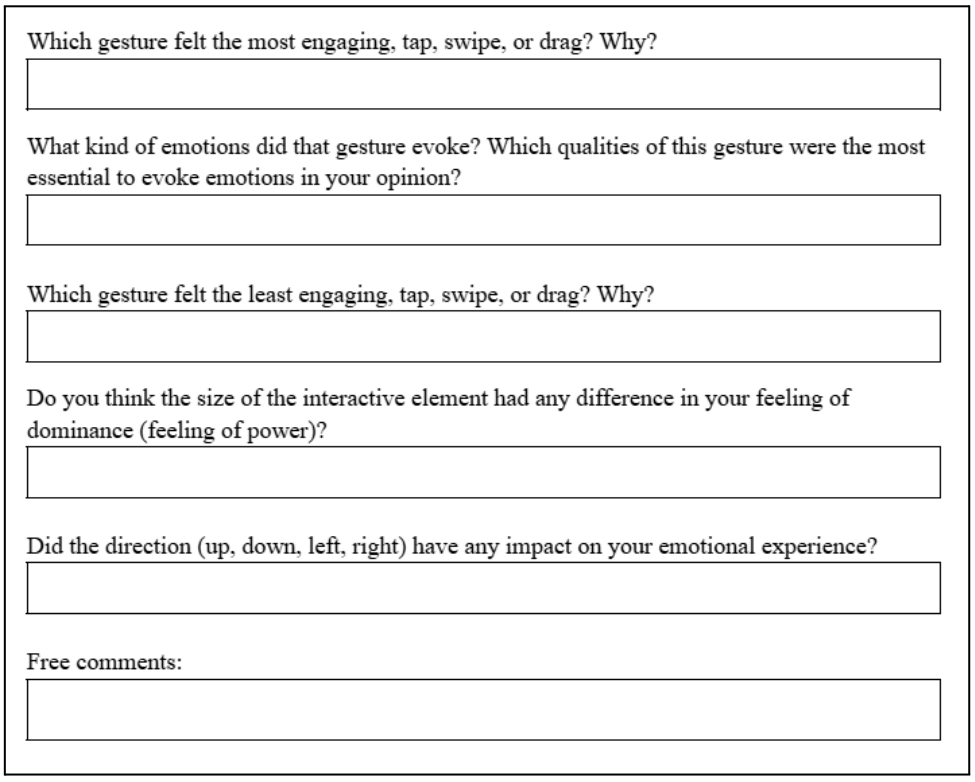


Figure 22: End-Interview Questions

4 Evaluation in a User Study

Exploring Emotional Impact to UX when comparing Swipe, Drag and Tap Gestures

This section covers the study setup and procedure, as well as the participants, the results and findings based on them. It provides visualised graphs of the results, whereas the findings focus on comparing gestures swipe, drag and tap with their emotional and engaging qualities. These gestures were tested with the 12 Prototypes made in Figma. The design features of these prototypes include the size of the interactive element, direction of the movement, animation flow and repetitiveness of the gesture. These features are reviewed to see how they affect the UX and how they behave with the selected gestures. Since all participants were right-handed, this study provides results based on only right-handed people, between ages 19 and 36 years old.

4.1 Participants

This study included 18 participants recruited from the University Campus. 9/18 of the participants (50 %) were 19-25 years old and the other half were 26-35 years old (50 %). 17/18 (94 %) participants described using mobile devices daily on different tasks, e.g. messaging, gaming, work and social media. One participant described similar usage but only occasionally. 8/18 participants (44 %) were men, 7/18 (39 %) women, 2/18 (11 %) preferred to not disclose and 1/18 (6 %) were non-binary. Every participant (100 %) was right-handed, and only one described as a possible physical limitation to a previously injured thumb, but this did not affect them performing the study tasks. 13/18 (72 %) participants described using mainly a thumb with mobile devices, 3/18 (17 %) index finger and 2/18 (11 %) mix of index finger and thumb.

4.2 Study Procedure

During the study, the participant was seated next to the moderator (see Figure 23). They were assisted to read and sign the consent form and answer the background questionnaire. After this, the whole study process and tasks were explained to the participant. The upcoming mobile prototypes were shown to the participant with an example mobile UI to demonstrate how to perform swipe, drag and a tap, and what different directions mean (see Figure 13). The participant was instructed to use only their thumb with dominant hand and test four

different designs with three different gestures (total 12 prototype designs). After each prototype, they completed a survey containing self-assessment manikin, 1-5 likert scale questions and one open form question. There was no time limit for testing the prototypes and the participant was able to test them while answering the questionnaire. After the prototypes, a verbal structured End-Interview was conducted to finish the study. The study took around 30 minutes. A pilot study was held before the actual studies to ensure the success for the forthcoming evaluation and to provide crucial feedback (Kunselman, 2024). The study was conducted using One Plus Nord CE 3 Lite 5G Smartphone. See Figure 24 for visualization of the study procedure.

Figure 23: Study Setup

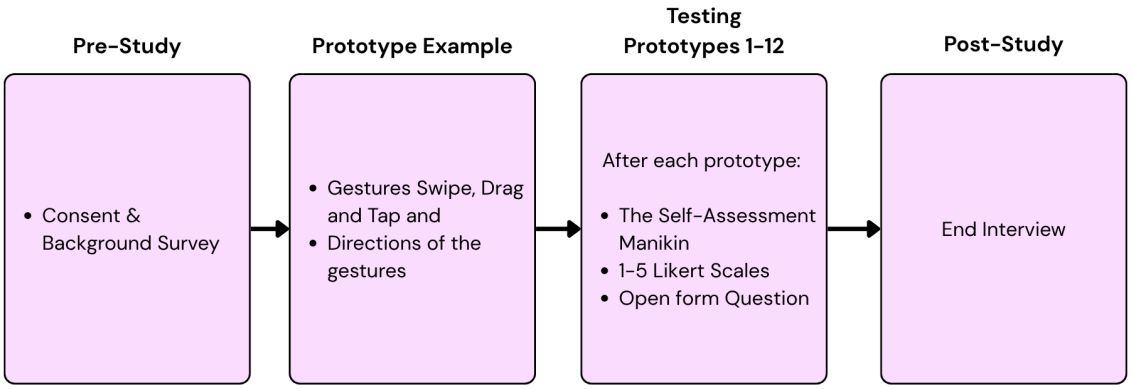


Figure 24: Study Procedure

4.3 Results

This section will provide the results from the user study. The SAM scale is analysed using Repeated Measures ANOVA and visualised as boxplots. The likert scale responses are presented as graphs. Quantitative data is analysed by calculating the average values of all prototypes of each gesture. Besides this, individual prototype SAM scale responses are shown as boxplots to demonstrate the difference between responses. The qualitative data is analysed by thematic analysis and presented as mindmaps.

4.3.1 Quantitative Data

The data from the SAM scale is analysed by using the Repeated Measures ANOVA, which evaluates different conditions (Swipe, Drag, Tap) tested by all participants. The aim is to compare the mean scores. (Statistics Solutions, n.d.). The results are presented as boxplot scales form 1-9 of how many times each value has been mentioned by participants. The colored rectangle covers 50% of the responses, the X equals the average value and the vertical lines show all answered values. The boxplots were visualized using Excel and each feature, valence, arousal and dominance are shown in order.

Valence measures a positive-negative emotion scale with 1=unhappy and 9=happy. A one-way repeated-measures ANOVA was conducted to compare SAM valence ratings across Swipe, Drag, and Tap interactions. The analysis revealed no statistically significant effect of interaction type on valence, $F(2, 140) = 2.73$, $p = .069$ (see Figure 25).

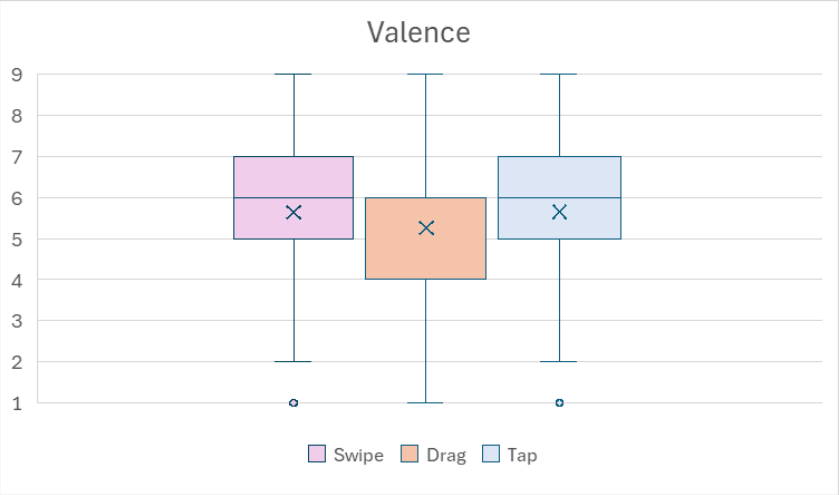


Figure 25: Valence

Arousal measures an excited-calm emotion scale with 1=calm and 9=excited. The analysis revealed no significant effect of interaction type on arousal, $F(2, 146) = 2.05$, $p = .13$ (see Figure 26).

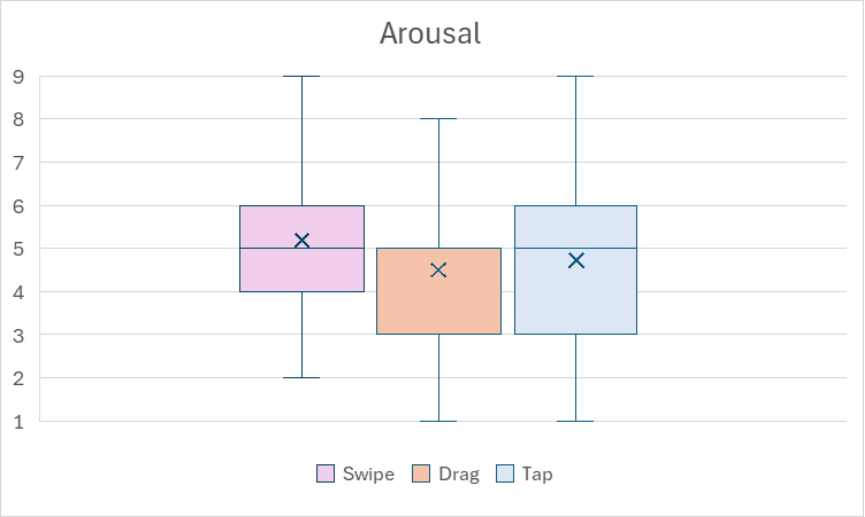


Figure 26: Arousal

Dominance measures feeling of independence on an emotion scale with 1=dependent and 9=independent. The analysis revealed no statistically significant effect of interaction type on dominance, $F(2, 72) = 0.12$, $p = .89$ (see Figure 27).

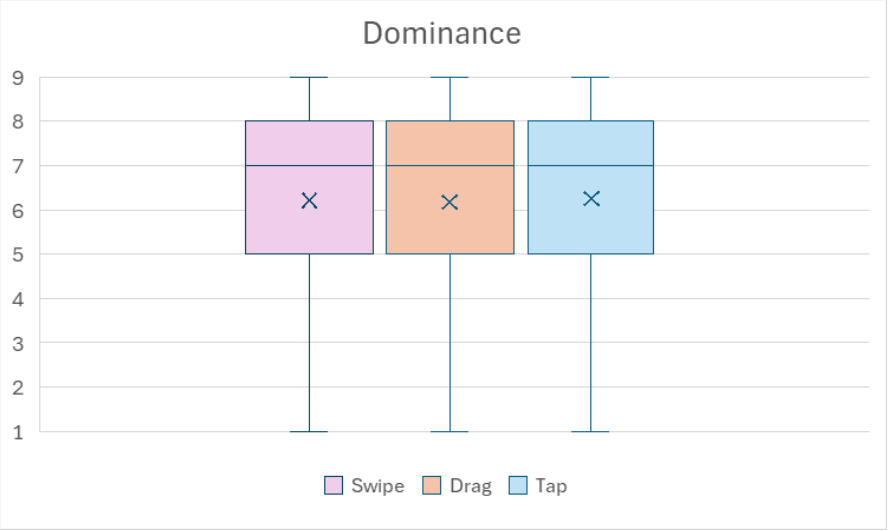


Figure 27: Dominance

Likert scale responses

The questions answered with the 1-5 likert scale, *The gesture felt engaging to repeat multiple times* and *The animation flow felt engaging to me,* are visualised with a scale showing the amount of responses. For clarity, the numbers have been replaced with texts; 1=strongly disagree, 2= disagree, 3=neutral, 4= agree, and 5= strongly disagree. For the direction question, *in which direction it felt more engaging to perform the gesture,* the horizontal direction is presented as 1=left, 2=somewhat left, 3= neutral, 4=somewhat right, 5=right. The vertical direction is presented as 1= down, 2=somewhat down, 3=neutral, 4=somewhat up, 5=up. The results are formed as the average of participants' response to each prototype, presented as percentages.

Repeating the gesture multiple times

Overall the participants agree that the swiping gesture is engaging to repeat multiple times, with the least amount of strongly disagree responses. Drag has similar responses, yet more "strongly disagree" scores. Tap has the most division between the scores, with the most disagreeing responses. (See Figure 28)

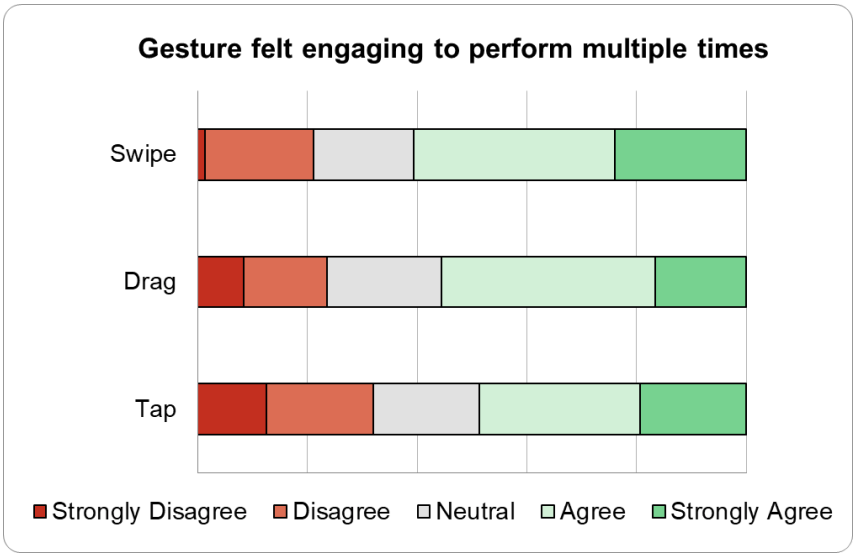


Figure 28: Repetition Engagement

Engaging Animation Flow

Swiping provides only a few "disagree" responses, and mostly "agree" responses, indicating the animation flow is overall seen as engaging with swiping. Drag has more negative

responses than swipe, though an almost identical set of positive scores. Tap has more division in the scores, yet with similar positive responses as swipe and drag. Overall the animation flow is seen as engaging, especially with swiping with least negative responses. (See Figure 29)

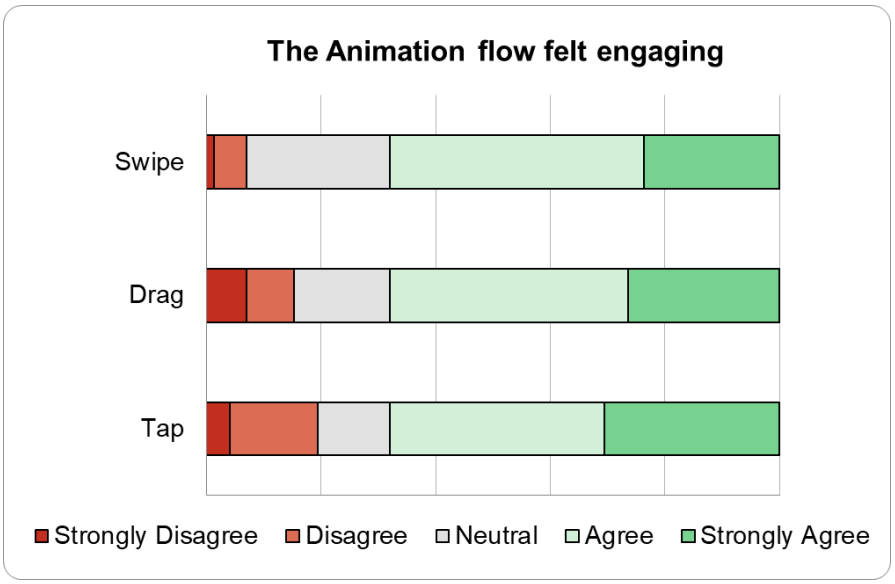


Figure 29: Animation Flow Engagement

Direction of the Gesture

Vertical movement has mostly neutral responses with tap. With swipe and drag, there is a slight lean towards upward movements. With a horizontally moving direction, the scores point towards the "right" direction in all gestures. (See Figure 30)

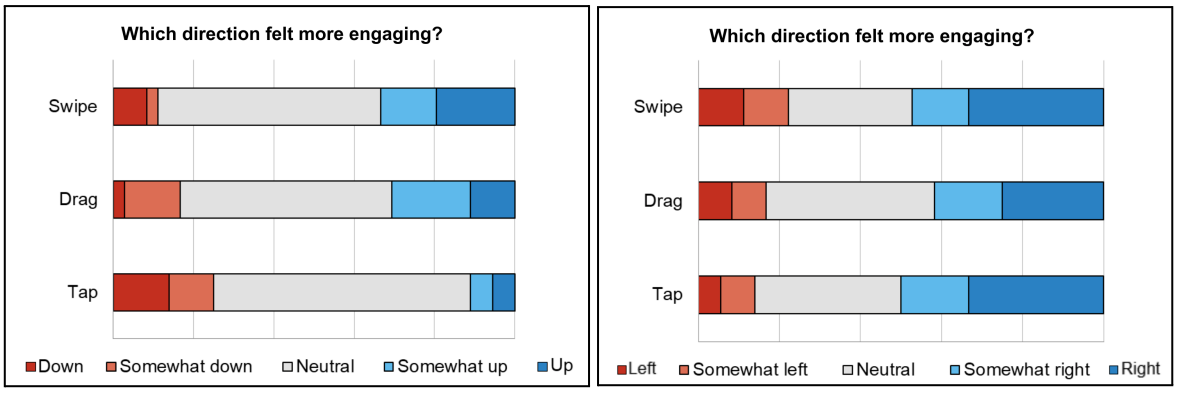
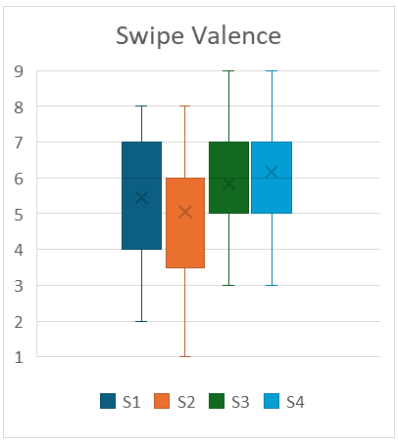
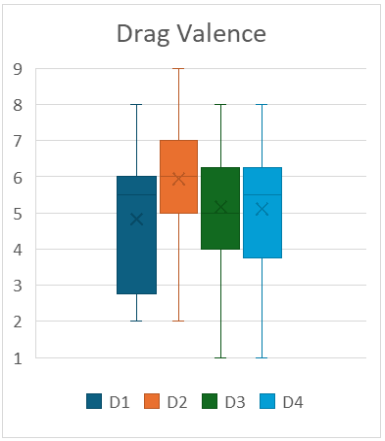
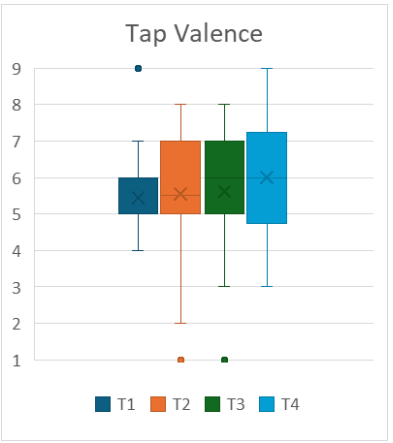


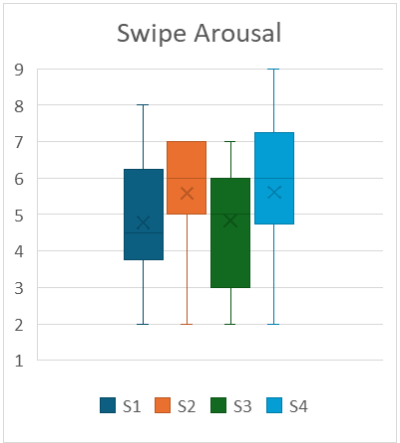
Figure 30: on left: the vertical direction, on right: the horizontal direction

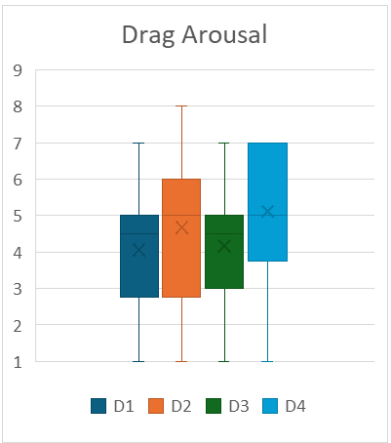
To compare the prototypes individually, they are presented as boxplots with different colors: prototype 1=dark blue, prototype 2=orange, prototype 3= green, and prototype 4=light blue. The gesture used with the prototypes is shown in the title as seen in Figure 31. Based on the SAM scale individual results, the gestures represented with abstract designs do not overall evoke strong emotions. However, the individual prototype results suggest that the gesture choice does affect the UX. The same prototype can provide a different response when it comes to valence, arousal and dominance. Swipe responses vary between prototypes, S4 (scrolling) proving slightly higher values among the swipe prototypes. Drag provides slightly calmer UX on all prototypes. With D2 (toggle button), it has the highest value of dominance out of all prototypes. Tap has the most balanced results with Valence and Dominance in all tap prototypes. The results show that the UX of the gestures is very subjective and has strong variance between the responses.

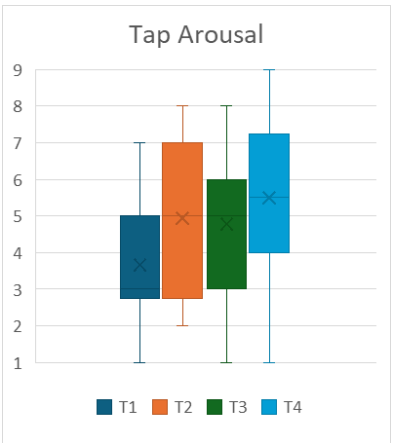












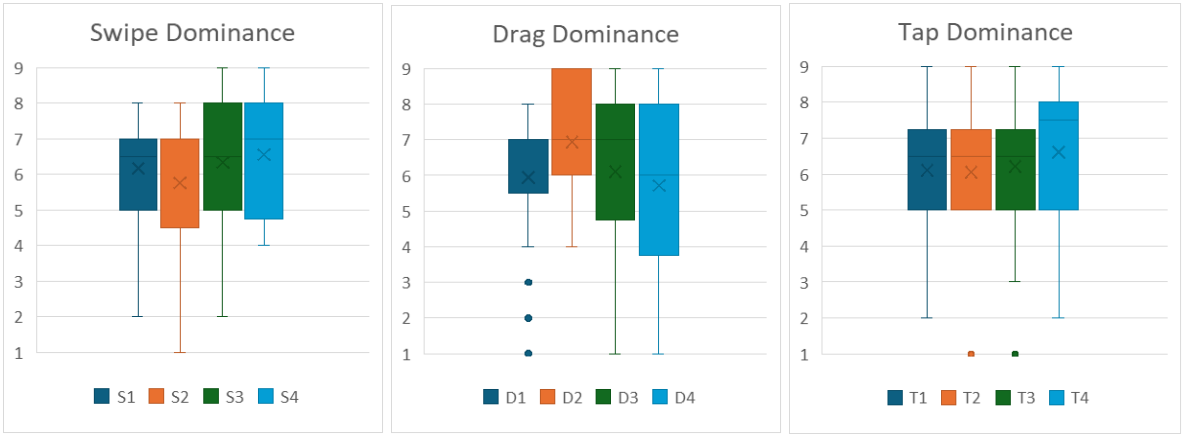


Figure 31: Individual Prototypes

4.3.2 Thematic Analysis

The Thematic Analysis was made by using the Affinity diagramming, which is made for organizing and understanding diverse and somewhat unconnected qualitative data. With this method, the data is separated and labeled with describing titles, and finally sorted into themes. (Lucero, 2015) For this study, this method was used in the open-form question with the 12 prototypes, as well as with the end-interview. For the open-form questions *"Did any of these factors, or anything else you noticed, evoke specific emotions or familiar meanings for you?",* the data is collected by each prototype. With the End-Interview, the participants' comments were written to Google Forms, which automatically makes an excel sheet of the answers. Then the thematic analysis was made by going through all the answers and labeling them.

The adjectives, which participants were asked to write on the open form questions on each gesture, are strongly divided and thus subjective. Adjectives, which occurred the most, were related to usability, e.g. natural and easy. Therefore the analysis is focused on what kind of scenarios (metaphors) participants connected the prototypes to. Overall the same design creates various different relations to the participants depending on the gestural changes. Prototype 1 is connected to a dating app (n=12), browsing for something (n=5), and a page turn (n=4). Prototype 2 is connected to an adjustment scale (n=7). Prototype 3 is connected to a switch (n=5). Prototype 4 is connected to social media (n=10) and scrolling (n=10). See Figures 32-35, where n= the amount of each metaphor, sorted by frequency.

Prototype 1

Decisive UI

S1 - Swipe	n
dating app	4
browsing something	3
page turn	2
game	2
social media	1

D1 - Drag	n
dating app	5
browsing something	1
page turn	1
app	1
knitting	1
decision making	1
dragging files	1

T1 - Tap	n
dating app	3
browsing something	1
page turn	1
filling out forms	1

Figure 32: Prototype 1 Metaphors

Prototype 2

Toggle-button UI

S2 - Swipe	n
adjustment scale	2
on/off	1
answer call	1
light switch	1
comparing something	1

D2 - Drag	n
adjustment scale	4
game	4
sound bar	1
time of day	1

T2 - Tap	n
game	2
chasing something	2
settings	2
adjustment scale	1
baking bread	1
emotion change	1
light switch	1

Figure 33: Prototype 2 Metaphors

Prototype 3

slider UI

S3 - Swipe	n
social media	4
scrolling	4
switch	2
on/off	1
settings	1
magazine	1

D3 - Drag	n
switch	2
social media	1
scrolling	1
settings	1
adjustment scale	1
putting on socks	1
game	1
wellness app	1
file dragging	1

T3 - Tap	n
game	2
chasing something	2
switch	1
fidget toy	1
selecting between values	1

Figure 34: Prototype 3 Metaphors

Prototype 4

scrolling UI

S4 - Swipe	n
social media	5
scrolling	5
searching	2
discovery	2
news	1
shopping list	1

D4 - Drag	n
social media	4
scrolling	3

T4 - Tap	n
scrolling	2
social media	1
searching	1
game	1

Figure 35: Prototype 4 Metaphors

The End-Interview provided 98 different comments from participants. The themes which arose from thematic analysis were: *The Most Engaging Gesture, The Least Engaging Gesture, Perceived Interaction Control, Direction of the Gesture,* and *Usability.* For End-Interview, see Figure 36.

7/18 participants preferred **swipe** gestures due natural feel and easy usage, e.g. "*Swipe, feels natural, I don't accidentally do it"* (P3) and *"It's easy to just swipe away"*(P15). Only 1 participant saw swipe as their least favourite: "*Swipe is commercialised and technically worse."* (P10).

Tap gesture was equally preferred as swipe. 7/18 participants described tap with similar qualities, such as natural feel and easy performance, and also brief press contact to the screen. *"Tap is simple, less touching the screen"* (P9) and "*Tap, it feels that im pressing a button, like choosing something, feels natural, things go on and off"* (P1). 5/18 participants argued tap being the least favourite due having to lift the finger up from the screen to switch buttons and repetitive movement. *"Tap is boring and repetitive, I need to lift up my finger"* (6) and *"During Tap, the thumb gets tired, uncomfortable feeling, the motion is weird when repeating many times in a row"* (P14).

Two out of 18 participants described **drag** as the best one due to the strong control level, e.g. *"I felt I can perform fast or slow, I can control what I'm doing."* (P14). 10/18 participants described the drag-gesture as the "worst" one, due slow performing time and having to keep their finger too long on the screen. E.g. *"I had to keep the finger on the screen for the longest time."* (P9) and *"It felt heavy in my finger when I had to hold it for so long on the screen."* (P13) Drag was described with adjectives heavy and slow, e.g. "*Drag felt heavy, I need to make an effort so that I can drag it to the other side."* (P1) and "*The drag the function felt heavier"* (P7).

Two participants could not choose the most or least engaging gesture arguing the gesture selections vary too much depending on the context. However, both of them agreed that swipe fits the best with card-like functions (S1): "*Depends on context, if cards then swipe"* (P8) and "*Swipe was best in the first example (S1)*" (P7).

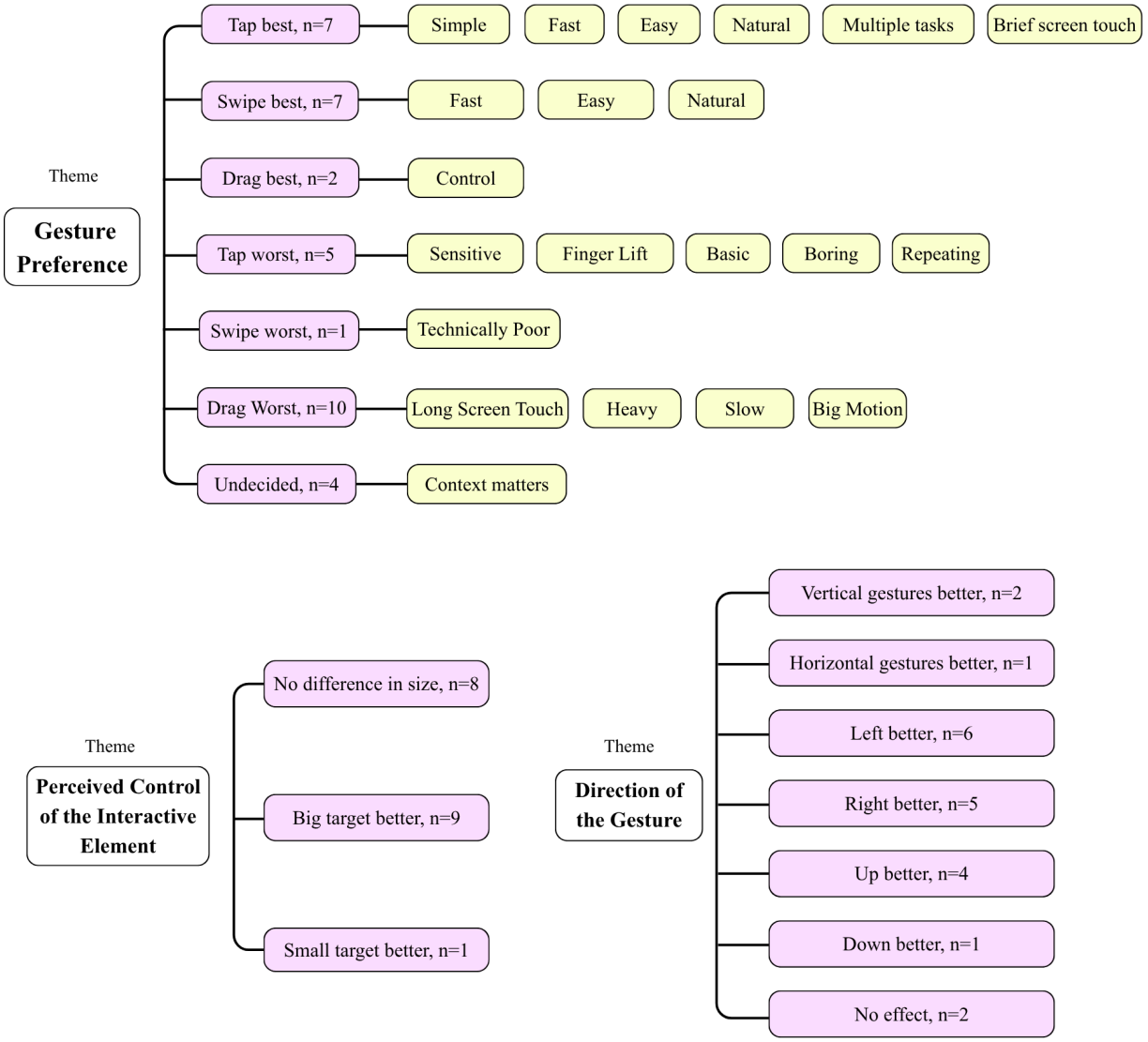


Figure 36: Thematic Analysis of the End-Interview

When asking about how the participants **perceived the control of interaction** when comparing smaller buttons and larger interactive elements, nine participants mentioned that the bigger interactive element provides a better feeling of control due user being able to place their finger anywhere in the screen, e.g. "*I liked the whole frame view, because less focusing on targeting the tiny interactive button.*" (P2) and "*When the whole frame moved, it felt more controlled.*" (P17). Eight participants mentioned that the size of the element does not matter to the feeling of control, e.g. "*I didn't pay attention to the size difference.*" *(P4)*. One participant mentioned the small element being better; *"The small button is easier to target, it guides better."* (P1).

The **Direction of the Gesture** does not have a strong difference. Horizontal gestures were preferred only one time over the vertical ones, and vertical two times over the horizontal ones. When comparing right and left, the gestures going left are preferred six times, e.g. *"It was harder to reach left, so swiping to right felt more difficult."* (P3) and *"Sometimes it felt more difficult to perform to right, left is like a sweep.* (P17). Right direction is preferred by five participants, e.g. *"Swiping right is nicer when thinking about usability."* (P14) and *"Swiping right felt pulling, right felt more natural."* (P9). With vertical movements, gesturing up is preferred by four participants and down by one participant, e.g. "*From bottom to top (up), I get the dopamine thing because I'm so used to it, it comes automatically.* Three participants mentioned that the direction does not affect their UX.

Usability related comments occurred within all asked questions. Out of 98 given answers, the usability repeated 43 times. The most or least engaging gesture qualities are mostly related to usability, like a fast or slow usage, including a total 25 responses. The usability theme also occurred ten times when asking the impact of the gesture direction.

The participant **age** did not divide the responses: three out of 26-35 year olds prefer tap, and four out of 19-35 year olds prefer tap. Five out of 26-35 year olds prefer swipe, and two out of 19-35 year olds prefer swipe. Three out of 26-35 year olds see tap as the worst and five see drag as the worst. Two out of 19-25 year olds see tap as the worst, and five see drag as worst. Participants who prefer swipe, rate tap as the worst three times, and drag three times. All participants who prefer tap, rate drag as the worst. Therefore a certain age group did not prefer a specific gesture.

4.4 Findings

The findings of this study discuss the results by providing possible explanations to occurred themes with previous research. The difference between swipe and tap is discussed, as well as the features of slow drag gesture. The emotional aspect of the gestures, impact of the prototypes and the effect of the metaphors are also investigated here.

4.4.1. Comparing Swipe and Tap

The difference to emotional UX between performing Swipe and Tap gestures is not relatively big. The SAM-scale and likert scale questions provided mostly neutral responses in both gestures, which varied depending on the prototypes. According to thematic analysis, Tap and Swipe are equally preferred due fast and easy usage. If the emotional response of these gestures is not that different, how can designers choose which of these gestures to select for a design?

The key features for usability are effectiveness, efficiency and ease of use. The goal of the interaction can be satisfied effectively, it is efficient to perform by duration and easy to do (Desmet & Hekkert, 2007). Swipe and tap gestures match to this framing which explains the positive response with usability. In previous work when testing touchscreen gestures on mobile, participants valued especially the speed of the interaction (Colley & Häkkilä, 2014). This emphasis on speed with mobile touchscreen interactions is especially occurring with swiping gestures. As Apple describes the swipe as flick or quick panning (Apple Inc, 2025), previous studies also argue the speed of swiping is encouraged on purpose by the design (David & Cambre, 2016), which lines up with the findings of this study. However, due swipe being fast, the possibility for mistakes can be higher when accidentally swiping on repeat (David & Cambre, 2016). Swiping provided the most positive results with repeating the gesture multiple times, suggesting that this gesture is engaging to perform multiple times in a row, despite it might cause accidental swipes. Exception to this is the Prototype 2 (toggle-button), which evoked more negative responses with swipe arousal levels when compared to other swipe prototypes. This suggests that despite swipe being fast, the pinpoint accuracy may reduce with the smallest button elements, causing it to feel less engaging.

Tap is also described as fast due the user touching the screen briefly (Apple Inc, 2025). Previous studies test tap functions and their target accuracy (Perry & Hourcade, 2008); (Parhi

et al., 2006) suggesting that tap is fundamentally easy to perform, but requires precision when interacting with. This is shown in prototype 2 (toggle-button) where the dominance level was perceived as higher than swipe's. Compared to swipe, tap was not seen as engaging to perform multiple times continuously, shown by the divided likert scale responses. It was criticised for participants having to lift a finger up from the screen when switching the target, which was not perceived as natural as swiping.

One appealing design opportunity for swipe is to set different values to different directions. Swipe is described as a firm **decisive** micro-action (David & Cambre, 2016). This ability of swipe gives users an opportunity to make a choice with the gesture. This forms a psychologically persuasive pattern, used e.g. with Tinder, which sets polar values to directions creating a game-like design and partially addicting to the usage (Bosker, 2015). This persuasive framing may explain why swiping was seen as more engaging compared to tap. Users of Tinder have also described the motion as flicking the person's photo aside as dismissing them with a wave of a hand (Bosker, 2015). Therefore, the animation flow of swipe might feel more engaging to users, since participants connected the prototype 1 to e.g. dating app, page turn or choosing something - something they have previously experienced. The animation moving to the same direction as the swipe may explain why swipe provided slightly more positive responses with animation engagement.

Gesture classification in HCI by Cadoz & Wanderley (2000) explain that gestures can be classified into three groups: Ergotic, where users' movement creates a concrete change in the energy transfer; Epistemic, where the gesture is used for learning or revealing something; and finally, Semiotic, which communicates the meaning of the gesture, either symbolic or conceptual. If following this framework, swipe can be considered as both ergotic and semiotic: It has a directional physical movement causing the interaction, and if those directions are set with values, it also functions as a meaningful choice for the user.

Tap, on the other hand, does not provide this ergotic movement. In some HCI gesture definitions, pressing a key on a keyboard is not considered as a gesture, since the motion of the finger movement is not crucial to the device, it only matters which button was pressed (Kurtenbach & Hulteen, 1990). However, despite tap not possessing the movement within the gesture, the results of the horizontal animation flow are almost equal to swipe. This suggests

the animation is still perceived as engaging despite the directional flow linked to the gesture is missing.

Swipe and tap do not provide strong emotional responses as themselves, but vary depending on the UI design when it comes to engagement. The main difference with swipe and tap is that swipe has always a direction, which can be used as a design element when adding values for different directions, which is engaging and may evoke the emotional responses with positive and negative values. Tap has a clear target, and it is best to use it with button designs when target accuracy is required. Due to swipe being engaging to repeat continuously and fast, it might reduce target accuracy and cause mistakes, suggesting tiny buttons might not be suitable for it. Swipe is suitable for continuous UI's like scrolling and making fast decisions.

4.4.2 Drag can provide efficient UX

The drag gesture was the worst in participant opinion, the responses gave clear guidance on what kind of qualities it holds: it requires stronger focus, it is slow and heavy, and the user has to keep finger on screen for a longer time. This gesture provides negative emotions when it comes to efficient usage. However it can be argued whether this negative UX can still be used beneficially.

Even if the users do not like the functions, the data can still be used beneficially. In a design thinking process, solutions to challenges can be found with alternative approaches by re-framing the problem in human-centric ways (Dam & Siang, n.d.). In the case of this study, the qualities of the least engaging gesture can be used to find a specific use scenario which benefits from these qualities.

Slow usability features like these can be used to create a design which guides users, called frictions. Frictions mean bodily and technical hesitancies created to stop or slow the user e.g. when buying a product and can help users to complete tasks, if designed carefully (Ash et al., 2018). Slow drag gesture is seen as the least engaging gesture in this context, but can remain useful in an UI where the user has to be slowed down on purpose. For example, apps like MobilePay use this design when confirming a payment, where the user has to drag the button to the other side in order for the payment to go through. Ash et al. (2018, p.1148) explain the usage of sliders similarly: "Giving the users something to grab and move around provided both the space and time to resolve competing tendencies." This also gives insight why drag

provides valence ratings towards the calmer UX than swipe. Using drag function without context provides negative responses, but combined with correct usage, the visual context can support the gesture so well that it can change the whole UX.

Therefore, the drag gesture is not necessarily a “bad” gesture, it merely needs to be connected to a proper context where the user is meant to slow down and focus on purpose. This suggests that the context matters when choosing the gestures for a design. Besides, drag responses with the repetition and animation flow did not differ strongly with swipe and tap, suggesting that the difference in engagement and emotion is not that significant, participants merely placed them in this order rating the perceived usability.

4.4.3 Emotion Evoking Gestures

During the studies, the participants primarily notice the usability of the gesture and do not necessarily pay any attention to their emotional state, which explains half of the thematic analysis comments being about the efficient usage. To understand the relation between usability and emotion, it is discussed here with related studies about emotion in interaction design.

As stated previously by Desmet & Hekkert (2007), usability touches all dimensions of the product experience, and therefore is linked to emotional experience. It is explained that usability, as experiences, are relational, not a direct feature of either the user or the product. This suggests why swipe and tap evoked similar feelings, yet divided the participant responses when choosing the most engaging gesture.

Gestures Swipe, Drag and Tap by themselves do not awake much emotional responses within users. However, it needs to be stated, what kind of emotions count as important? Fast, easy, and natural are definitely not bad emotions to achieve in UX. Usability goes hand in hand with emotions; In a positive affective state (caused by smooth usability), curiosity, creativity and learning increases and the user is more likely to overlook minor problems when the interface is fun and enjoyable to use (Norman, 2004). This also lines up with the product experience: usable products are more likely to evoke positive emotions (Desmet & Hekkert, 2007). Therefore the results of this study relying on usability is no surprise.

Previous work by Lim et al., (2008) explores emotional study of interaction design with three levels of emotional experience by Norman. It claims that usability is strongly tied to the *reflective level* of emotion. Their study explains how emotional responses are not entirely known in advance among interactive design features, however the arisen feelings are not fully random.

Therefore the tested gestures can **assist** to ensure the positive emotions, but they are not emotionally provoking by default. Since the efficiency of the usage is strongly stated by participants, the reflective level responses are activated, and prior to subjective reflection. These gestures have now been tested by their qualities, therefore it is easier to understand what kind of usability features they carry, and how they can assist towards an emotional experience in mobile usage. For example, drag is fundamentally slow and feels heavy, therefore a designer has to think what kind of emotions occur from something being slow, and what kind of objects possess the idea of slowness. Dragging the Tinder cards to the left or right was not effective, because the user would not think turning book pages is considered heavy or slow. Therefore swipe embodies the action better, guiding the UX towards more positive emotions.

When it comes to engagement, the SAM-scale results provided mostly neutral responses, thus the gestures do not provoke strong engagement with presented abstract visuals. In previous work by Bradley et al., (1994) the SAM is described as an effective method to combine with other emotional indicators. In my thesis, this scale was combined with the likert scales and thematic analysis. This supported the understanding why engagement levels were relatively low when analysing only the SAM scale, and proved that despite the quantitative data showing neutral responses, the emotion can still be found through different methods. Despite the engagement being neutral on SAM scale, the likert scale provided deeper information of the qualities of what kind of factors increased the engagement, and the thematic analysis gave a clear idea of the metaphors.

4.4.4 Impact of Prototype Features

Nine of the participants agreed that a bigger element as the interactive area feels better than a small button due to having a freedom to select the placement of the finger. Due to previous research, the interaction speed improves as target size grows from 9.6mm to 11.5mm (Parhi et al., 2006). In a study from Perry & Hourcade (2008), they found that when testing target

accuracy, only the largest 11.5mm provided a mean accuracy rate above 95 percent. In my study the results line up with previous work as the bigger interactive element provides better usability with speed and target accuracy with flexible output selection for the finger. Since the usability provides positive UX, the engagement is also more likely to increase. Based on the results of my study, the gesture which supports the bigger elements on UI is swipe due it ensures flexible placement to the finger and remains fast to use.

The direction of the gesture provided slight differences with both vertical and horizontal directions; in horizontal ones, towards right was seen as more engaging than towards left among all gestures. In vertical ones, upwards was perceived as more engaging than down with swipe and drag. However, the majority of the direction likert scale responses are neutral, and thematic analysis did not provide any significant support for these insights.

In previous research, the metaphorical meaning of upward/downward direction has been suggested to be linked with bodily expressions of the comparable emotion. Emotions, like joy, sometimes occur as upward body movements, whereas sadness is associated with downward body movement. (Santana & de Vega, 2011) This relation did follow in this study with upward direction providing slightly more engagement. Especially prototype 4 was connected with social media scrolling, where upwards direction reveals something new, which can be linked to a positive UX.

With horizontal designs, prototype 1 was recognised as Dating app UI, which might explain the preference towards right (where in e.g. Tinder, the user can possibly make a match). As mentioned previously, the decisive nature of swipe provides an opportunity to apply directional choicemaking to the design. Tinder besides other mobile UI have limited the options to opposites yes/no, where the negative leftward motion refers to turning a page, stating that the user is finished with this profile (David & Cambre, 2016). It is difficult to argue whether the gesture itself is fundamentally better to perform towards rightward or do the user only connect the relation to their previous experience. However, this suggests that users are able to recognise these gestural relations to negative and positive meanings, especially if they link the experience to something they have previously encountered.

According to previous research, UI’s which match with the user's mental state are related to engagement and satisfaction, e.g. warm tones like red or orange conduct higher arousal and

cool tones like blue provide calmer feelings (Liang et al., 2025). Even the full color change in P2 and P3 did not provide any emotional change to the participants. This might be related to using only monochromatic colors black and white when presenting opposing themes. This suggests bare monochromatic colors without context do not convey emotional responses in interactive mobile platforms. Thoughtful color schemes with well defined shapes, like animations, guide the user intuitively, and if used consistently, they provide user happiness (Majd et al., 2025). Therefore the color choices can evoke emotions, however they must be presented with context in direction based UI's to ensure the intuitive usage. When it comes to tracking the emotion in bodily expressions, emotions can remain complex (Santana & de Vega, 2011). Therefore direction, or light/dark shaded elements alone cannot evoke relations to positive or negative emotions. Like the gestures, these elements can assist the UX to a certain emotion, yet if they remain too abstract or faint, the wanted effect might not occur.

It is also important to provide the user a possibility of customization to enhance the UX. Customization refers to providing users the chance to shape the experience by adjusting layout, content or system functionality. (Schade, 2016) In mobile apps, this can be applied as being able to select the preferred gesture. For example, even in strong swipe mechanic based apps like Tinder, some users still prefer to use the buttons when deciding on profiles (David & Cambre, 2016). In addition, for mobile devices, it is also important to consider the handedness when designing mobile UI's (David & Cambre, 2016). This ensures usability for both right and left hand and assists to keep the usage engaging.

4.4.5 The Effect of Metaphors

Despite the prototypes being purposefully abstract, the users were still able to connect them to familiar contexts, e.g. a dating app, adjustment scale or a switch. The reflective level can override the visceral and behavioral level due culture, experience, education, and individual differences (Norman, 2004). These characteristics of the user are also affected by the product qualities, and the context in which the interaction takes place, shaping the overall experience (Desmet & Hekkert, 2007). Therefore it is not a surprise the participants provided multiple embodied metaphors by connecting gestures to past subjective experiences. Some researchers state that emotions are evoked by that relational meaning; that different people assign different meanings to a certain product, and therefore will most likely experience different emotions (Desmet & Hekkert, 2007). Therefore the occurred metaphors convey emotion in a subjective way to each participant.

The metaphors elicited participants to reflect. Metaphor has been described as a central principle of UI design, making it easy for users to learn unfamiliar objects (Djordjevic, 2008). The responses to the prototype designs varied depending on the gesture, suggesting that there is a mismatch with some gesture selection and UI, causing slow performance and frustration (Landay, 2022). This occurred throughout the user studies when participants compared the gestures to their own experiences, e.g. not being used to slow drag gesture with the scrolling UI. However, this mismatch can be used as an opportunity for designers to determine the target domain by comparing the target and source domain, and to decide whether the metaphor is fit to the UI (Djordjevic, 2008). This pattern was followed in this study due finding the key elements of the gestures, and even providing a context use for drag, which had the most mismatching responses.

Sometimes the metaphor requires a visual clue to function, e.g. symbol or constraint, which are called visible conceptual models, relying on cultural understandings (Norman, 1999). This explains why the prototypes of this study do not provide either knowledge or emotion based on that reflection due graphics being purposefully abstract. Visuality activates the visceral level of the reflection levels by evoking the user's attitudes, beliefs and feelings by appearance (Norman, 2004). Therefore the prototypes are missing a clear relation to emotional responses.

How can designers use the subjective nature of metaphors? The UI metaphors are intentionally used to shape the user’s mental model in design (Nielsen, 2025). If the idea of the metaphor and its effect is understood, it can shape the whole UI to a certain direction with the gesture. In order to design a comprehensive metaphor, it needs to be built on concepts the target user understands, preferably universally common ones (Nielsen, 2025). These features can be understood as affordances, which guide the user by giving clues on their behaviour, like real physical objects like knobs, sliders and buttons (Norman, 1999). Embodied metaphors on mobile interactions could add the feeling of a physical interface, e.g. swiping in Tinder as flicking through the pages of a magazine (David & Cambre, 2016) or throwing the Pokéball in Pokémon Go. Therefore it is essential to combine these metaphors with matching gestures to provide clear affordances, as the prototype 1 with swiping gesture was recognized as page turn.

These embodied metaphors are examples of tangible computing, where users control digital content with a physical object (a mobile device in this study) (Tangible Interaction, 2026). The focus is especially in bodily interactions since gestures are being explored. How can this bodily relation be applied to a mobile device where gestures are mostly limited to touchscreens? To use embodied metaphors, designers have to apply abstract frameworks in spatial features, which are fundamentally understood by the body. These include e.g. knowledge of direction, balance and force. The understanding of these can be applied into visual designs with interaction. For example, sliders provide a physical gesture to the abstract concept of adjusting a value as an intuitive way for interaction with visual feedback. (Nielsen, 2025) The toggle and slider prototypes were connected to adjustmenting value and using a switch, indicating users are able to understand this embodied interaction with low visual clues. This suggests that fundamentally understood affordances can be implemented as interactive elements to mobile devices if they behave in a recognized way.

When thinking about what kind of affordances and spatial connections humans genetically comprehend, visceral level pattern matching gives suggestions to it: For positive effects, humans tend to prefer e.g. rhythmic beats, rounded objects, and warm, comfortably lit places. And when it comes to negative effects, humans dislike e.g. darkness, sharp objects, sudden loud sounds or lights. These features are guesses since they are influenceable by human's ability to overcome biological heritage and change these settings if they wish. (Norman, 2004) These patterns can be used to guide the design to certain UX, but as seen in the study results, perception of these factors is subjective, e.g. changing between dark and light UI did not evoke any emotional change in the participants even if darkness has a fundamentally negative effect.

By using real-world affordances and visceral level pattern matching with well matched gestures, emotional UX can be provided if users connect to it in a reflective level. However, the design has to be carefully thought due multiple factors need to match with each other for the metaphor to be understood. These factors are demonstrated in Figure 37.

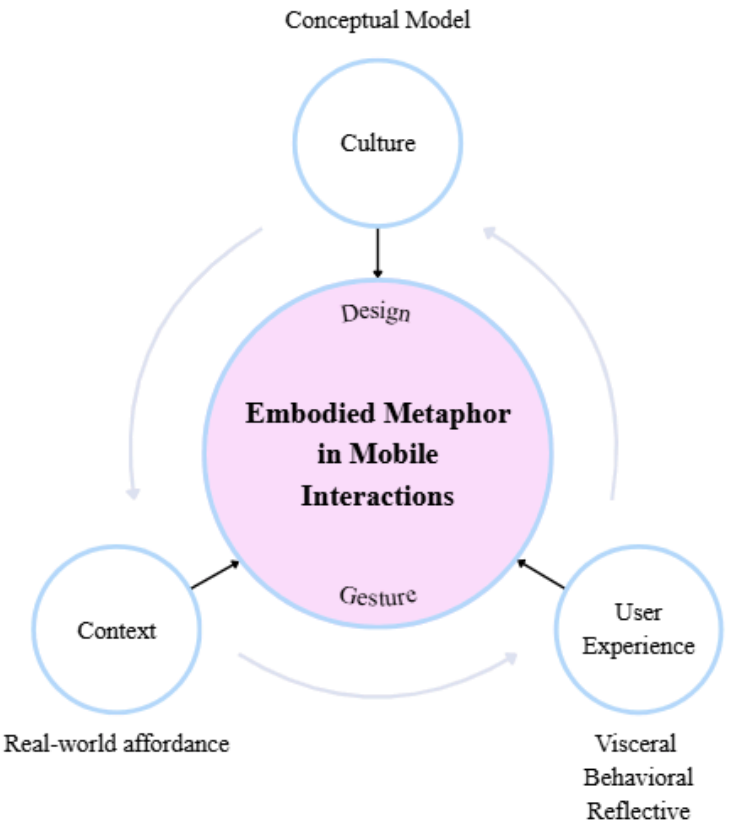


Figure 37: Embodied Metaphor, adapted from Gatsou (2015)

5 Concept Design

The gestures by themselves cannot ensure emotionally impactful UX. However, the study results suggest that it is essential to choose the most suitable gesture for different designs which can aid for certain UX. Because the participants were able to connect even simple visuals to previously encountered experiences, a visual example of an embodied metaphor in mobile use is presented to demonstrate the possibilities of the usage.

5.1 Context

Since I selected to compare very simple and common gestures, they are easy to apply into designs. This provides easy implementation and development to multiple userfaces. Because embodied metaphors have multiple dimensions which need to be taken into consideration, the design choices have to be carefully selected to support the intended context.

Many tangible designs are aimed to support learning and education (Interaction Design Foundation, 2026). Metaphors also possess similar features when it comes to learning unfamiliar objects (Djordjevic, 2008). To support this learning aspect, the design format is presented as an interactive infographic. It aims for clear information which is quick to recognize with short attention using a combination such as images, data, graphics and text in a format that is fun to read and easy to use (Siricharoen, 2024). The short attention requiring visual data fits to mobile usage, where the speed is valued within the interaction.

To ensure engaging and motivating usage, gamified elements are added to the UI, creating a fun and enjoyable experience. These include adding effective dynamics, such as feedback and storytelling which provide a sense of accomplishment and control for the user. (Oliveira et al., 2024) Storytelling or visual narrative creates a deeper emotional connection with the audience by presenting a message using visual components, like images, therefore the experience is more memorable (ChartExpo, 2026). The user themselves is the interactive participant (Riedl & Young, 2005).

The combination of storytelling and gamification has been studied e.g. in exploring non-linear storytelling when improving online education (Rasmusson & Bourne, 2017) and when evaluating UX of a storytelling mobile game (Scheible et al., 2017). These studies provide positive results for gamified learning experiences. In my design example, the

gamification and storytelling are mainly used to enchant the experience with linear narrative and gamified animation feedback, which are caused by the user interaction.

For the design context, I have selected to present one of the Sustainable Development Goals (SDG) by the United Nations as an interactive infographic with gamified elements; the SDG Goal number six “clean water and sanitation”. These goals are meant to educate, and also reach people on an emotional level to obtain empathy. Therefore the design case is relevant to present as an infographic seeking for emotional impact. The gamification of the SDG Goals have been explored by making the goals into a card game, which aims for a fun experience while pursuing an educating, yet positive message to the user (Creature & Co, 2022). Since the idea of gamifying these goals already exists, it is interesting to place them into a digital platform on mobile. This may provide an innovative way to discover new topics on an emotional level with a daily used device.

The context for the design example has been presented as an interactive infographic that uses linear storytelling and gamified elements to enchant the message about SDG Goal six. The user is learning the message by going through the narrative. As the user interacts, the gamified elements appear and the user is able to connect to the message on a reflective level.

5.2 Visual Design

The visual design for this example design has been made with Figma. It is based on the Prototype 2 with tap gesture, because participants connected it to contexts such as “game” and “chasing for something”. The visuals have been made by following the SDG Design Guidelines, where the font is Oswald Semibold and the colors as followed hexes; blue #26BDE2, white #FFFFFF and black #212529 (United Nations Sustainable Development Group, 2023). The references for the educational material of the Goal six are from the United Nations website (United Nations, n.d.).

The SDG Goal 6 is presented as an interactive infographic, starting with the user trying to reach for a glass of water by tapping the glass a few times, which each time dodges the user. After that, the graph asks a rhetorical question *“Do you know the feeling of chasing the essentials?”*. By tapping the glass again, the user knocks it down, causing the water to spill and simultaneously a response text *“2.1 billion people know that feeling”* appears on the

screen. Tapping the glass again lifts it up and discovers a text *"clean water"* accompanied by a water tap. Tapping the empty glass influences an animation of the tap filling the glass with water. Simultaneously the water tap reveals the edges of the SDG Goal six. Finally, the *"clean water"* text is completed as a phrase "*clean water should be accessible to everyone."* Final tap of the glass causes the final frame to appear as information of the SDG Goal 6. This interaction flow is presented here with individual frames, where the pink circle highlights the part where the user is interacting with the tap gesture (See Figure 38). For detailed visuals, see Figure 39.

Figure 38: The Design Example's Interaction Flow

Figure 39: The Design Example

The tap gesture supports the design, because swipe or drag would convey the idea that the user is moving the glass by themselves, here the object is “running away” to a direction which is unpredictable. Since the participants also mentioned lifting up the finger with tap interactions reduces the engagement, this gesture emphasizes on the “work load”; this object is not easily obtained.

This design supports embodied metaphor, while being informative and gamified. It bases the emotional impact on participant’s responses, where the embodied metaphor is connected to the understanding of chasing for something. When the user is reaching for the water, it moves out of reach. This creates a bodily metaphor of physically reaching for something with a hand, and a conceptual idea of not accessing something. This interactive infographic could be used, for example, in the SDG homepage in mobile version when looking for information on the SDG Goals.

6 End Discussion

This section summarises the finding of this study by going through all the research questions and answering them. Possible limitations for the study are presented and their impact is discussed. For following studies related to this topic, the future work section covers possible insights which are left untouched within this study.

6.1 Answering Research Questions

RQ1 *Can Tap, Swipe or Drag gestures evoke Emotional Responses in Mobile Usage?*

Gestures swipe, drag and tap do not directly evoke strong emotional responses. The occurring emotions are tied to perception of usability and possess an inconsistent subjective dimension. However, these gestures with their specific features can *assist* to shape the UX in an emotional way if users find the gesture's usability engaging. This can be achieved by combining them into suitable interfaces by using relevant design affordances, like embodied metaphors with strong visual clues. This ensures the efficient usability when the user is capable of intuitive usage, which can lead to an emotionally engaging experience.

RQ2 *How do Tap, Swipe and Drag gestures compare with each other when it comes to Engagement?*

Swipe provides fast usage and has potential for emotionally meaningful experience when giving polar values to opposing directions. This gesture is engaging if combined with fast-paced interfaces like scrolling, where the gesture can be repeated many times in a row. Bigger interactive elements, like full frame interactions suit for swipe due user is able to place the finger anywhere on the screen while usage remains fast. Swipe might cause accidental interactions due it being fast to perform, and it does not suit with tiny button elements which require more precision. Tap, on the other hand suits best for them, assuring precision when interacting with them, leading to more engaging UX. Tap also ensures fast usability, and can still carry engagement through well designed animation flow despite lacking the directional possibilities. Drag provides calmer emotions, yet requires caution when used due its slow nature, which can lead to frustrated UX if used with mismatched UI

elements. Therefore it suits the best when the interface is purposefully slowed down with frictions to ensure the user's attention.

RQ3 *What is the role of Metaphor when designing User Interfaces which use touchscreen gestural interactions?*

Metaphor can be essential with gestural interactions due they are efficient when guiding the user. If embodied, they replicate our bodily movements, and are therefore intuitive to use if supported well with visuals. By using real-world affordances and visceral level pattern matching with well matched gestures, emotional UX can be provided if users link the embodied gesture in a reflective level to a familiar context. These contexts vary from mobile apps to real-world connections and are prone to subjective perceptions.

6.2 Limitations

The phone used for this study is a One Plus Nord CE 3 Lite 5G Smartphone, which seemed too big for some participants, making swiping from the left side more challenging to some of them. Participants also tended to mix the directions with each other quite fast, so it must be carefully and visually demonstrated, which direction is in question. All participants were young Finnish adults under 35 years old, stating that any cultural differences might not have occurred, and e.g. accessibility considerations for elderly people using mobile devices has not been taken into consideration. Since all participants were right handed, this study provides results based on only right-handed people.

When collecting emotional data, the process is not always simple. It is common for emotions to be difficult and costly to track, which leads the focus shifting towards cognitive and subjective aspects. The produced data from surveys or questionnaires are limited due the evaluator's perception of the user's emotions, which often does not include the present state of the user during the test. (de Lera, et al., 2007) This pattern also occurs in my study, and it does not necessarily make the results less valid, however, they need to be interpreted critically due being a product of a single researcher, whose subjective views might influence the outcome. For example, with thematic analysis when sorting results into categories, which often is performed by more than one researcher (Lucero, 2015).

Figma's drag function had to be implemented to swipe as well due swiping command does not exist in Figma, which may have resulted in drag seeming too similar with the swipe, possibly causing confusion when comparing the gestures. With there being a relatively small number of participants, the quantitative results provide subjective and divided responses, making it challenging to analyze.

6.3 Future work

For future work, when studying emotional mobile gestures, the focus could shift into deeper analysis on embodied metaphors. There is little research on embodied metaphors' influence on emotional UX on mobile usage, therefore it would be interesting to explore different usage scenarios for them. For example, it would be interesting to discover whether the gesture changes the perception of the context. For instance, in the presented design example, if the water glass would be swiped to a different direction instead of tapping, it might cause a different understanding of the context. Testing the same visualised objects with different gestures might give insight of how important the gesture selection is, and whether it can affect the emotional impact.

As shown in the design example, embodied metaphors could be studied as supporting informative platforms, e.g. with language learning, interactive storytelling or infographics. Since many apps already use different gestures to enchant the UX, it would be curious to discover how far can the gamification of formal platforms be taken to without driving the focus away from the actual topic. Since apps like Tinder and Tiktok already base the engaging usage on the speed of the interaction, it would be crucial to discover this balance between engaging gesture and attention requiring context. Could this addictive-associated usage be exploited in a way that keeps the user engaged during tasks that require focus, like learning?

Different gestures, more specific and slow ones, for example, twirl, pinch or double tap could be explored. Since fast and easy usage is important to mobile users, studying these gestures and their usage context could be beneficial to discover. Would these gestures remain usable or also considered too slow to perform as drag, and could they possibly increase engagement in a suitable platform?

In addition, different data collection methods for emotional design could be explored, e.g. the Positive and Negative Affect Schedule (PANAS) scale as self-reporting UX (Landowska & Miler, 2016). The data analysis methods could be based on Norman's Three Reflective levels by sorting themes by the visceral, behavioral and reflective levels to ensure they rely completely on analyzing emotional responses (Lim et al., 2008).

7 Conclusion

This thesis explored the emotional impact of mobile touchscreen interactions Swipe, Drag and Tap by comparing them to discover their qualities for design purposes. By testing simplified visual mobile prototypes with these gestures in user studies, the research provided insights on how emotional UX is strongly tied to perceived usability with mobile touchscreen interactions.

The study results revealed no significant differences in emotional responses between the evaluated gestures. Stating that fundamentally these gestures do not possess emotional impact by themselves, and the occurring emotions are tied to usability and subjective perception. However, these findings show that the gesture selection still matters, as the same prototype design provided different responses depending on the used gesture.

Gestures swipe, tap and drag carry different affordances in their design, which can assist to a certain UX if applied effectively. Swipe provides fast interaction, supports a possibility to set polar values to directions and suits well for full frame interactions such as scrolling. Tap also supports quick interaction and suits for precision requiring button elements. Drag, by contrast, can be used to intentionally create friction to design, where the user is meant to be slowed down on purpose for them to complete a task. Therefore gesture choice should be carefully considered when designing a mobile UI design, as good usability provides better engagement and therefore a greater potentiality for emotionally impactful experience.

Despite the responses being mostly neutral for the direction of the gesture, the rightward direction is perceived as slightly more engaging to perform across all gestures. Upward movements are also seen as slightly more engaging with swipe and drag gestures. This suggests that the direction might carry metaphorical meaning for users. However, the user has to associate the idea of it to something they have previously experienced. For example, several participants connected the Prototype 1 to a dating app, suggesting that the left-right swiping interaction has become a widely recognized design pattern. This indicates that using a commonly known app design pattern can assist the user to understand how the UI functions with familiar interactions.

The user study limitations included receiving data only from right-handed participants from ages 19-35. Despite these constraints, the findings provide valuable understanding of the qualities of swipe, drag and tap gestures, and how they can be exploited when designing mobile interfaces. Because these gestures are widely used across touchscreen platforms, this thesis provides a good framework for future touchscreen gesture research. It also gives guidance on how emotion can be tailored in gesture-based mobile designs. This knowledge is relevant in HCI when designing tangible interfaces that rely heavily on gestural interactions. Beyond digital IxD, mobile touchscreen gestures are also relevant in industrial and service design, where mobile apps are often an essential part of the UX by providing additional, or even necessary, features to the product or service.

Fundamentally gestures by themselves cannot provide emotional responses without the UI's context suggesting it. The presented gestures are highly prone to subjective differences, indicating they can be used to modify the UX by assisting the visual UI features, e.g. with embodied metaphors. The presented Design Example embodies the tap gesture to the feeling of chasing for something with an emotionally meaningful message. This design is based on a simple gesture, which is easy to implement into multiple interfaces, indicating that even commonly used simple gestures can provide an emotionally impactful experience. Similar designs can be used in mobile UI designs like apps or websites, where the aim is to use short-form content in an engaging way to evoke emotions.

Users tend to use their reflective level of emotion to create the connections to their past experiences, which can lead to emotional responses. A simple movement can create a big effect with a suitable embodied metaphor. Overall, emotionally engaging mobile UX is a combination of a well matched gesture and UI visual which gives users the platform to reflect the experience to something they've previously encountered.

8 References

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Figure 4: Desmet, P. M. A., & Hekkert, P. (2007). Framework of product experience. International Journal of Design, 1(1), 57–66. https://www.ijdesign.org/index.php/IJDesign/article/view/66/15

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Figure 9: Development Oriented Triangulation, van Turnhout, K., Bennis, A., Craenmehr, S., Holwerda, R., Jacobs, M., Niels, R., Zaad, L., Hoppenbrouwers, S., Lenior, D., & Bakker, R. (2014). Design patterns for mixed-method research in HCI. Proceedings of the NordiCHI 2014: The 8th Nordic Conference on Human-Computer Interaction: Fun, Fast, Foundational, 361–370. https://doi.org/10.1145/2639189.2639220

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Figure 11: Dark–Light mode toggle and adjustment sliders

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Figure 19: The Self-Assessment Manikin (SAM), (2021) Bruun, A., Law, E. L.-C., Nielsen, T. D., & Heintz, M. (2021). Do You Feel the Same? On the Robustness of Cued-Recall Debriefing for User Experience Evaluation. ACM Transactions on Computer-Human Interaction, 28(4), 1–45. https://doi.org/10.1145/3453479

Figure 37: Embodied Metaphor, adapted from Gatsou, C. (2015). The importance of metaphors for user interaction with mobile devices. Lecture Notes in Computer Science, 9187, 520–529. https://doi.org/10.1007/978-3-319-20898-5_50

9 Appendix

This section includes materials used in the user study.

Consent Form

This study is being conducted as a part of Master's Thesis by Sofia Vierula at the University of Lapland, Faculty of Arts and Design. The responses can be used in Master's Thesis as well as other publications. The aim of the study is to perceive, which commonly used mobile gestures performed with one thumb can lead to emotionally meaningful user experience. This is studied by testing four different interactive mobile interface prototypes with drag, swipe and tap commands. The collected data is in questionnaire form. Participants have the option to withdraw from the study at any time, but once they submit their responses, the data will be anonymized, and it will be impossible to differentiate the participants. This means that the researcher will not be able to track the identity or data of the participants even if they decide to withdraw later.

For further information & Contact:

Sofia Vierula
svierula@ulapland.fi

By signing this form, I declare that I understand and accept the terms set out in this form.

Participant _____ Time and Place **Rovaniemi** ____.____.2026

Researcher _____ Time and Place **Rovaniemi** ____.____.2026

Figure 40: Consent Form

Background Form

Participant nr._____

Date:_____

1. **Age**

☐ < 18
☐ 19-25
☐ 26-35
☐ 36-45
☐ 46-55
☐ 56-65
☐ 66 >

2. **Gender:**

☐ Man
☐ Woman
☐ Non-binary
☐ I'd rather not answer

3. **Occupation or field of study:**

_____

4. **How often do you use mobile devices?**

☐ Daily,
☐ Frequently
☐ Occasionally
☐ Once or twice
☐ Never

Describe usage: _____

5. **The test requires a phone usage with the dominant hand thumb, do you have any limitations to perform the tasks using your dominant hand thumb?**

☐ No
☐ Yes, describe:_____

6. **Are you left- or right-handed?**

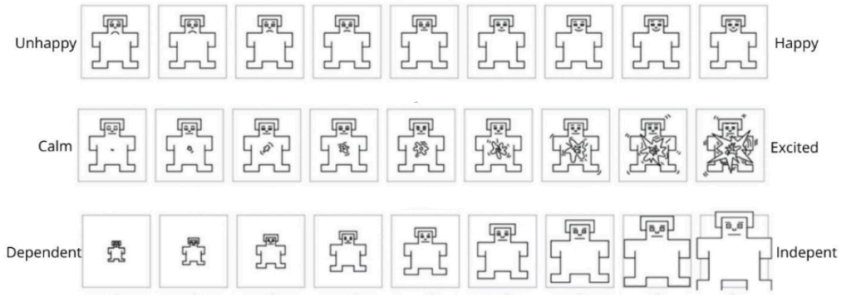
☐ Right
☐ Left
☐ Mixed

Figure 41: Background Form

Survey Questions Participant nr._____

Swipe T1

1. How did the gesture make you feel? Please, mark one in each row:



2. Describe the gesture with one adjective:

3. The gesture felt engaging to repeat multiple times

strongly disagree	1	2	3	4	5	strongly agree

4. The animation flow felt engaging to me

strongly disagree	1	2	3	4	5	strongly agree

5. In which **direction** it felt more engaging to perform the gesture:

left felt engaging	1	2	3	4	5	right felt engaging

6. Did any of these factors, or anything else you noticed, evoke specific emotions or familiar meanings for you? Describe:

Figure 42: Survey Questions

End Interview: Participant nr._____

Which gesture felt the most engaging, tap, swipe, or drag? Why?

What kind of emotions did that gesture evoke? Which qualities of this gesture were the most essential to evoke emotions in your opinion?

Which gesture felt the least engaging, tap, swipe, or drag? Why?

Do you think the size of the interactive element had any difference in your feeling of dominance (feeling of power)?

Did the direction (up, down, left, right) have any impact on your emotional experience?

Free comments:

Figure 43: End Interview