

# Is The Grass Really Greener or is it Just a Filter?

How Social Comparison on Instagram Influences Aspects of Emerging Adults' Self-Esteem

Beenen, K.T. (s2168863)

Bachelor Thesis

Van Der Graaf, S.

University of Twente, The Netherlands

Hand-in date: 22-6-2021

## Abstract

**Introduction:** Instagram is one of the most popular social network sites for young people these days. The application offers its users numerous opportunities to socially compare their abilities and opinions with that of others. Previous research showed that online social comparisons can influence how people evaluate themselves. However, little is known about which specific aspects of young Instagram users' self-evaluation are affected the most.

**Objective:** Hence, this study examined the effects of ability- and opinion-based social comparisons on Instagram on both female and male emerging adult's social-, appearance-, and performance self-esteem. **Method:** This was done by conducting two studies. First, an online questionnaire study was conducted in which 215 emerging adults ( $M_{age} = 21.5$ ; 58.6% female) were asked about their social comparison behaviour on Instagram and their self-esteem. Second, 10 emerging adults ( $M_{age} = 21$ ; 5 females) participated in a diary study in which they were asked to report the types of social comparisons that they made on Instagram on three different days. **Results:** The results of the studies showed that emerging adults engage in ability-based social comparison more often than in opinion-based social comparison on Instagram. These ability-based social comparisons negatively affect emerging adults' social self-esteem, both directly and indirectly (via feelings of envy). Moreover, ability-based social comparisons on Instagram were negatively related to male's (not female's) performance self-esteem via feelings of envy. Lastly, females' social comparisons more often included comparing appearances. **Conclusion:** These findings show that ability-based social comparison on Instagram can be harmful to emerging adults' self-esteem. Moreover, it showed that females and males differ in the types of social comparisons that they make on Instagram and in the effects that social comparisons can have on their performance self-esteem. **Recommendations:** These insights can be used to effectively support male and female emerging adults in coping with negative consequences associated with their daily Instagram use. Moreover, this study serves as input for Instagram to design the application in ways that enhance, rather than diminish, emerging adults' self-esteem.

Keywords: social comparison, self-esteem, Instagram, emerging adulthood

## Table of Contents

1. Introduction .....	7
2. Theoretical Framework .....	10
2.1. Instagram .....	10
2.2. Self-esteem .....	10
2.3. Online Social Comparison.....	11
2.3.1. Ability-based Social Comparison .....	11
2.3.2. Opinion-based Social Comparison .....	13
2.4. Mediating Effect of Social Comparison-based Emotions .....	15
2.4.1. Feelings of Envy .....	15
2.4.2. Feelings of Inspiration .....	16
2.5. Moderating Role of Gender .....	17
3. Methods.....	20
3.1. Participant Recruitment .....	20
3.2. Online Questionnaire Study.....	21
3.2.1. Participants.....	21
3.2.2. Procedure .....	22
3.2.3. Instrument .....	23
3.2.4. Pre-tests.....	25
3.2.5. Data Preparation.....	25
3.2.6. Factor Analysis .....	26
3.2.7. Reliability Analysis.....	26
3.3. Diary Study.....	30
3.3.1. Participants.....	30
3.3.2. Procedure .....	31
3.3.3. Instrument .....	31
3.3.4. Pre-test .....	32

3.3.5. Data Preparation and Analysis .....	33
4. Results .....	34
4.1. Online Questionnaire .....	34
4.1.1. Multiple Regression Analysis .....	34
4.1.2. Mediating Analyses .....	36
4.1.3. Moderated Mediation Analyses .....	38
4.1.4. Summary of the Findings.....	42
4.2. Diary Study.....	42
4.2.1. Purpose of Instagram Use .....	42
4.2.2. Opinion-based Social Comparison .....	42
4.2.3. Ability-based Social Comparisons.....	44
4.2.4. Summary of the Findings.....	47
5. Discussion .....	48
5.1. Limitations.....	53
5.2. Practical Implications .....	54
5.3. Conclusion .....	55
References .....	56
Appendix A - Age Distribution of the Online Questionnaire Sample .....	61
Appendix B - The Online Questionnaire Items and the Scales that they are based on .....	62
Appendix C - The Online Questionnaire.....	68
Appendix D - Checking Assumptions of Multivariate Linear Regression .....	81
Appendix E - Diary Study Questionnaire .....	86
Appendix F - Codebook Diary Study.....	90

## **List of Tables**

1. Demographics of the Online Questionnaire Sample .....	21
2. Factor Loadings and Cronbach's Alphas of the Online Questionnaire Items.....	27
3. Demographics of the Diary Study Sample .....	30
4. The Open-ended Questions of the Diary Study .....	32
5. Opinions that Participants were exposed to on Instagram during the Diary Study.....	43
6. Participants' Ability-based Social Comparisons on Instagram during the Diary Study .....	46
7. Overview of the Final Items of the Online Questionnaire and their Origins .....	62
8. Codebook for the Diary Study .....	90

## **List of Figures**

1. Hypothesized Relationships between Social Comparisons and Social Self-esteem .....	18
2. Hypothesized Relationships between Social Comparisons and Performance Self-esteem..	19
3. Hypothesized Relationships between Social Comparisons and Appearance Self-esteem...	19
4. Significant Main Effect of Ability-based Social Comparison on Social Self-esteem.....	35
5. Direct and indirect effect (via Feelings of Envy) of Ability-based Social Comparison on Social Self-esteem .....	37
6. Indirect effect of Ability-based Social Comparison on Performance Self-esteem via Feelings of Envy.....	38
7. Effect of Feelings of Envy on Performance Self-esteem moderated by Gender.....	40
8. Effect of Feelings of Envy on Performance Self-esteem for Males and Females.....	41
9. Age Distribution of the Participants of the Online Questionnaire Study .....	61
10. Histogram of Appearance Self-esteem to check for Normality .....	81
11. P-P plot and Q-Q plot (respectively) of Appearance Self-esteem .....	82
12. Histogram of Performance Self-esteem to check for Normality .....	82
13. P-P plot and Q-Q plot (respectively) of Performance Self-esteem .....	82
14. Histogram of Social Self-esteem to check for Normality .....	83
15. P-P plot and Q-Q plot (respectively) of Social Self-esteem.....	83
16. Scatterplot to check Homoscedasticity and Linearity for Appearance Self-esteem .....	84
17. Scatterplot to check Homoscedasticity and Linearity for Performance Self-esteem .....	84
18. Scatterplot to check Homoscedasticity and Linearity for Social Self-esteem.....	85

## 1. Introduction

With over one billion active users per month, of which 62.8% are aged 18 to 34 (Tankovska, 2021), Instagram belongs to one of the most popular social network sites (SNSs) for emerging adults these days (Faelens et al., 2021). Emerging adulthood is a stage between adolescence and young adulthood which lasts from the age of 18 to 29 in which identity exploration and creation are crucial tasks (Arnett & Sugimura, 2014).

Instagram does not only provide these young users with the possibility to construct a digital profile of themselves, edit pictures with filters, post images, and share information about one's life, experiences, and beliefs, it also allows them to maintain and create relationships, and observe other people's lives (Vogel et al., 2014). Looking at other people's posts belongs to one of the main motives for young people to use Instagram (Huang & Su, 2018). This activity of observing others can potentially influence aspects of young people's identity development (Sebre & Miltuze, 2021). In this view, being exposed to online presentations of other people's lives seemingly presents users with the opportunity to compare themselves to others, which can possibly influence how they view themselves. As the process of identity development is a central activity for emerging adults, they might be especially vulnerable to such influences.

The process of comparing oneself to others is called 'social comparison' and serves the function of understanding and evaluating oneself (Festinger, 1954; Vogel et al., 2014). It can be seen as a common habit of humans as 12% of all people's thoughts are deemed to be of a comparative nature (Summerville & Roese, 2008). Previous research showed that online social comparison activities can have different short-term as well as long-term effects on individuals' self-evaluations and self-esteem (De Vries & Kühne, 2015; Park & Beak, 2018; Vogel et al., 2014; Ozimek & Bierhoff, 2020; Wang et al., 2017; Eyal & Te'eni-Harari, 2013; Myers & Crowther, 2009; Buunk et al., 2007; Yang et al., 2018). Most studies took into account the competitive and judgemental type of social comparison, also referred to as ability-based social comparison. This type of comparison is focussed on how well one is doing relative to others (Festinger, 1954; Yang et al., 2018) and is generally associated with negative consequences on people's overall self-perception (De Vries & Kühne, 2015; Park & Beak, 2018). However, up till now, it remains unclear how this type of comparison affects different parts of individuals' self-esteem (social-, appearance-, and performance-related self-esteem) separately. Besides ability-based social comparisons, people also engage in comparisons of thoughts, attitudes, values, and beliefs. This non-competitive type of

comparison can be referred to as opinion-based social comparison and has the goal to learn about social norms, construct or modify one's value system, and regulate behaviours (Festinger, 1954; Yang et al., 2018). Limited studies examined the effects of this type of social comparison. Hence, Yang et al. (2018) started to address this gap and found that, in contrast to ability-based social comparisons, opinion-based social comparisons do not predict lower self-esteem. Nevertheless, insights into how exactly opinion-based social comparisons can influence different parts of self-esteem (social-, appearance-, and performance-related self-esteem) remain unclear.

Further, previous research showed that feelings of envy and inspiration can mediate the relation between social comparisons and overall self-esteem and well-being (Park & Beak, 2018; Burleson et al., 2010; Appel et al., 2016; Nabi & Nekblusek, 2014; Meier & Schäfer, 2018). Moreover, various studies found that males and females' self-esteem are affected differently by different sources (Heatherton & Wyland, 2003; Myers & Crowther, 2009). Nevertheless, the mediating role of feelings of envy and inspiration and the moderating role of gender are not yet studied in the relationships between ability- and opinion-based social comparisons and the social-, appearance-, and performance-related self-esteem. To sum up, previous research has not yet addressed the effects that opinion- and ability-based social comparisons on Instagram can have on emerging adults' social-, appearance-, and performance state self-esteem, the possible mediating role of feelings of envy and inspiration in these specific effects, and whether the effects are differently experienced by males and females.

Understanding how social comparison activities on Instagram can - in various degrees - positively or negatively contribute to parts of young adults' self-esteem has some practical advantages. For instance, SNSs, like Instagram, can use the insights to design their platforms in ways that enhance their users' well-being. Moreover, parents, educational institutions, and mental health institutions can use these insights to effectively support emerging adults in their navigation of the internet in ways that ensure positive outcomes on their self-esteem and well-being. Enhancing emerging adults' self-esteem is important as it is related to their life satisfaction, happiness, feelings of being liked, ability to cope with stress, alcohol consumption, eating behaviours, and physical as well as psychological health (including eating disorders and depression) (Arsandaux et al., 2020; Park & Yang, 2017; Colmsee et al., 2021; Baumeister et al., 2003).

Against this backdrop, this study aims to answer the following research question: *How do ability- and opinion-based social comparison on Instagram affect female and male*

*emerging adults' social-, appearance-, and performance state self-esteem, taking into account the possible mediating role of feelings of envy and inspiration?.*

To answer this overall research question, two studies will be conducted. First, an online questionnaire study was conducted to examine the effects of ability- and opinion-based social comparison on emerging adults' state self-esteem, the mediating effects of social comparison-based emotions, and the moderating effects of gender. Moreover, a diary study was conducted which compliments the online questionnaire study with exploratory insights into the types of opinions and ability-based social comparisons that emerging adults make during their daily Instagram use.

Before discussing the details of these two studies, the key constructs involved will be further elaborated on in the theoretical framework and proposed hypotheses will be introduced. After that, the methods and results of the online questionnaire and diary study will be described. The discussion section summarizes the most important findings of the two studies and provides recommendations for future research. Thereafter, limitations of the two studies will be reflected upon and practical implications will be discussed. Lastly, the conclusion includes a final answer to the research question.

## 2. Theoretical Framework

For this research, the context of Instagram and the concepts of self-esteem, online social comparisons, social comparison-based emotions, and gender play a central role. Hence, in this section, these key concepts will be introduced and elaborated upon. Moreover, the proposed hypotheses of this research will be introduced.

### 2.1. Instagram

Instagram is a free social media platform where users can share photos and videos (Antonelli, 2020). The platform was launched in October 2010 (Instagram, n.d.) and was bought by Facebook two years later because of its increasing popularity (Huang & Su, 2018). The platform is especially popular among the youth, whose preferred way of communication tends to be visual communication (Huang & Su, 2018).

### 2.2. Self-esteem

Even though researchers have defined self-esteem in various ways, the concept of self-evaluation seems to recur in most of the proposed definitions. For example, self-esteem can be defined as the positivity or negativity with which individuals evaluate themselves (Campbell et al., 2002; Rosenberg, 1965) or it can be defined in terms of the value that people place on themselves (Baumeister et al., 2003). What researchers seem to disagree about is the way that self-esteem should be measured. Some researchers view self-esteem as a unidimensional construct that refers to the overall self (Heatherton & Wyland, 2003). For instance, Rosenberg (1965) and Robins et al. (2001) designed unidimensional self-esteem scales that measure someone's overall global self-esteem, which is assumed to be a static and fixed personality trait. In contrast, others have argued that self-esteem has to be regarded as a multidimensional construct. More specifically, Heatherton and Wyland (2003) see self-esteem as a context-specific state which can be momentarily affected. They argue that self-esteem can be broken down into three different components (types of state self-esteem); (1) *performance self-esteem*, which refers to people's evaluation of their general competence and performance, (2) *social self-esteem*, which refers to people's perception of their social lives which includes their evaluation of their public image and how other people perceive them, and (3) *appearance (or physical) self-esteem*, which refers to how people evaluate their own physical bodies and attractiveness.

The multi-dimensional view of state self-esteem can offer a more detailed view of how and which parts of self-esteem are momentarily affected by recent online social comparison activities. Taking the various definitions and the goal of this research into account, this study proposes to understand self-esteem as context-specific self-evaluations related to one's appearance, social life, and performances, which can be momentarily affected.

### **2.3. Online Social Comparison**

Social comparison refers to the process of comparing oneself to others (Corcoran et al., 2011; Kruglanski & Mayseless, 1990). It can be considered an essential psychological mechanism as it serves functions like fulfilling affiliation needs, making decisions, getting inspired, regulating emotions and wellbeing, and evaluating one's self and one's judgements, experiences, and behaviour (Festinger, 1954, Vogel et al., 2014; Corcoran et al., 2011). Comparing oneself to relatively similar others offers the most desirable standard for comparison (Kruglanski & Mayseless, 1990). Traditionally, social comparisons took place during real-life interactions with close others (Vogel et al., 2014). However, nowadays, a big part of emerging adults' lives, including processes of social comparison, takes place online. On Instagram users are constantly exposed to photos, captions, stories, and popularity indicators of others, which offer many opportunities for social comparison. Social comparison activities can be categorized into ability-based social comparison and opinion-based social comparison which are two distinct processes that differently affect self-esteem (Festinger, 1954; Yang et al., 2018).

#### **2.3.1. Ability-based Social Comparison**

*Ability-based social comparison* concerns comparing achievement and performance in the widest sense, it is inherently judgmental and competitive, and focuses on how well one is doing relative to others (Festinger, 1954; Yang et al., 2018). Park and Beak (2018) argue that people who tend to engage in this type of comparison see the comparison target as a 'competitor', and are, therefore, more likely to assess whether they are better or worse off than their SNS friends. According to Yang et al. (2018), previous research on social comparison has most often focused on this judgemental type of social comparison. Insights of such studies have shown that ability-based social comparison can negatively affect one's self-perception (De Vries & Kühne, 2015; Park & Beak, 2018).

Furthermore, previous research showed that this judgemental form of social comparison is, in the long term, associated with lower global self-esteem and in the short-term with lower overall- and performance self-esteem (Vogel et al, 2014; Ozimek & Bierhoff, 2020). These studies, however, did not address the effects of ability-based social comparison on all types of state self-esteem (social-, appearance-, and performance self-esteem) separately. Therefore, it remains unclear what the short-term effects of online ability-based social comparison are on all three types of state self-esteem.

This study proposes that online ability-based social comparison on Instagram has a negative short-term effect on all types of emerging adults' state self-esteem separately. The majority of social comparisons on SNS are directed upward, meaning that SNS users are likely to compare themselves to people who are doing relatively better on a certain construct (e.g., beauty, intelligence, athletic ability) (Lin & Utz, 2015; Vogel et al., 2014; Latif, 2021). This leads to people comparing their realistic offline selves to idealised images of others, which can be harmful to their self-esteem (Vogel et al., 2014; Wang et al., 2017).

Therefore, when emerging adults compare themselves with others in a competitive way on Instagram to estimate how well they are doing (ability-based social comparison), they are likely to compare their realistic selves with ideal, and possibly unrealistically positive images of others' appearances, performances, or social lives. This can lead them to feel that they are doing relatively worse on these constructs. In line with this, De Vries & Kühne (2015) found that the judgemental form of social comparison can negatively affect one's self-perceived social competence and attractiveness. Taking into account the above-mentioned insights of previous studies, three hypotheses can be formulated.

First, it is expected that comparing oneself with others in competitive and judgemental ways, also means comparing oneself to online ideal images of others' appearances, which makes emerging adults likely to rate their own appearance lower. In line with this reasoning, previous research shows that online comparisons can lead to a more negative body image and body dissatisfaction (Eyal & Te'eni-Harari, 2013; Myers & Crowther, 2009). Therefore, the following hypothesis is proposed:

*H1a: Ability-based social comparison on Instagram negatively affects emerging adults' appearance self-esteem.*

Second, it is expected that comparing oneself with others in a competitive way, also means comparing oneself to ideal online images of others' achievements and performance,

which makes emerging adults rate their own performance self-esteem relatively lower. In line with this, Ozimek and Bierhoff (2020) have found a negative relation between judgmental social comparison activities and performance self-esteem. Hence, the following hypothesis is proposed:

*H1b: Ability-based social comparison on Instagram negatively affects emerging adults' performance self-esteem.*

Lastly, it is expected that comparing oneself with others in a competitive and judgemental way, also means comparing oneself to online ideal images of others' social lives, which makes emerging adults likely to rate their own social life less favourably. In line with this reasoning, previous studies have shown that people with a tendency to compare how well they are doing relative to others, evaluate their own social life based on what they see in others (Buunk et al., 2007). If this comparison is directed upward (which is most likely the case on SNS like Instagram (Vogel et al., 2014)), people's evaluations of their own social life decreases (Buunk et al., 2007). Therefore, the following hypothesis is proposed:

*H1c: Ability-based social comparison on Instagram negatively affects emerging adults' social self-esteem.*

### **2.3.2. Opinion-based Social Comparison**

*Opinion-based social comparisons* centre around comparisons of thoughts, attitudes, values, and beliefs, is non-competitive and communicative in its nature (Yang et al., 2018). The goal of this type of comparison is to learn social norms, construct or modify one's value system, increase self-knowledge, and regulate behaviours to, for example, overcome problems, instead of distinguishing the better from the worse (Festinger, 1954; Yang et al., 2018). Moreover, Park and Beak (2018) argue that people who tend to socially compare opinions online are likely to see their comparison targets on SNSs as opinion holders from whom they can learn. Further, Yang et al. (2018) claim that previous research focusing on opinion social comparison is rather limited as most studies have focused on ability-based social comparison. They tried to address this research gap in their research and found that, in contrast to ability-based social comparison, comparison of opinions did not result in lower self-esteem.

This study proposes that opinion-based social comparison on Instagram has a positive short-term effect on both social- and performance self-esteem. First, opinion-based social comparison is often performed to assure that one's own opinion is accurate and likely leads to enriched opinions (Park & Beak, 2018). Enriching one's own belief- and attitude system is expected to have a positive impact on emerging adults' performance self-esteem due to increased feelings of general competencies and increased (self-)knowledge. Hence, the following hypothesis is proposed:

*H2a: Opinion-based social comparison on Instagram positively affects emerging adults' performance self-esteem.*

Moreover, Park and Beak (2018) suggest that opinion-based social comparison, with its communicative and non-competitive nature, can lead to better social outcomes, such as higher connectedness. They argue that people compare opinions to assure that their own opinion is socially acceptable. In line with this, Suls et al. (2000) state that comparison of opinions includes determining whether one's reactions towards a situation are appropriate given the norms of other people. Further, they suggest that opinion-based social comparison plays an important role in various social behaviours, including conformity and group decision making. As people who engage in opinion-based social comparison are likely to engage in social processes like shared meaning creation and conformity, it is expected that opinion-related social comparison orientation is positively related to social self-esteem. Therefore, the following hypothesis is proposed:

*H2b: Opinion-based social comparison on Instagram positively affects emerging adults' social self-esteem.*

Lastly, it is expected that there is no effect of opinion-based social comparison on appearance self-esteem. More specifically, even though one can compare opinions and norms which are content-wise related to body image, opinion-based social comparison is expected to influence someone's opinion, and not directly someone's self-esteem related to their appearances. For instance, if users would be exposed to the opinions or norms of others concerning certain beauty standards, it is likely to influence their norms and belief system. However, comparing oneself to the norm to see whether one is doing better or worse than the norm, would be an ability-based social comparison. Therefore, it is expected that activities of

opinion-based social comparison do not affect appearance self-esteem. Hence, the following hypothesis is proposed:

*H2c: Opinion-based social comparison on Instagram does not affect emerging adults' appearance self-esteem.*

## **2.4. Mediating Effect of Social Comparison-based Emotions**

Park and Beak (2018) found that the effects of ability- and opinion-based social comparisons on psychological well-being are mediated by social comparison-based emotions. Certain social comparison-based emotions include feelings of envy and inspiration, which have shown to determine different psychological effects (Park and Beak, 2018; Burleson et al., 2010).

### **2.4.1. Feelings of Envy**

Park and Beak (2018) have argued that the negative relationship between ability-based social comparison and well-being can be explained by negative social comparison-based emotions, like envy. *Feelings of envy* can be seen as unpleasant emotions for the self and are triggered by judgemental ability-based social comparisons (Park & Beak, 2018). Smith and Kim (2007) analysed different definitions of envy used in the literature and came to the following definition: “an unpleasant and often painful blend of feelings characterized by inferiority, hostility, and resentment caused by a comparison with a person or group of persons who possess something we desire” (p. 49). Lim and Yang (2015) explained that feelings of envy are often activated when one sees that others have desirable possessions or have accomplished superior achievement, which is likely to be the case in online ability-based social comparisons. Therefore, the following hypothesis is proposed:

*H3a: Ability-based social comparison on Instagram positively affects emerging adults' feelings of envy.*

Moreover, various researchers have argued that feelings of envy underlie the negative relationship between judgemental social comparison and well-being (Park & Beak, 2018; Appel et al., 2016; Nabi & Nekblusek, 2014). Hence, it can be expected that emerging adults who engage in comparing themselves to the ideal images of other Instagram users on different

constructs (including appearance, social life, and performance) are likely to experience feelings of envy, which, in turn, influence one's appearance-, social-, and performance self-esteem. Therefore, the following hypotheses are proposed:

*H3b: Feelings of envy will negatively affect emerging adults' appearance self-esteem.*

*H3c: Feelings of envy will negatively affect emerging adults' performance self-esteem.*

*H3d: Feelings of envy will negatively affect emerging adults' social self-esteem.*

In sum, this study proposes that negative relationships between ability-based social comparison and different types of self-esteem are mediated by feelings of envy.

#### **2.4.2. Feelings of Inspiration**

Moreover, Park and Beak (2018) found that users who tend to compare opinions online were likely to experience upward assimilative emotions, like inspiration, which, in turn, positively influenced their psychological well-being. *Feelings of inspiration* can positively influence the self as the comparison target is seen as a model for the self instead of a competitor (Park & Beak, 2018). In this research, similar findings are expected. Therefore, the following hypothesis is proposed:

*H4a: Opinion-based social comparison on Instagram positively affects emerging adults' feelings of inspiration.*

In addition, Meier and Schäfer (2018) have suggested that inspiration can be seen as an intrinsic motivation that stimulates individuals to transcend one's current self. This motivation is likely to positively influence performance self-esteem as it can convince people that they are capable of extending one's competencies. Therefore, it is expected here, that the proposed positive relationship between opinion-based social comparison and performance self-esteem is mediated by feelings of inspiration. Hence, the following hypothesis is proposed:

*H4b: Feelings of inspiration mediate the relationship between opinion-based social comparison and emerging adults' performance self-esteem.*

Furthermore, feelings of inspiration are likely to impact individuals' social self-esteem. Park and Beak (2018) argue that people who engage in opinion-based social comparison are more likely to experience positive feelings towards the comparison target by seeing them as an inspiring model instead of a competitor. Such an inspiration or 'role' model can be seen as a valuable social contact with which one engages in a social process of meaning creation. Additionally, Park and Beak (2018) argue that opinion-based social comparison is communicative and non-competitive in its nature. Hence, feelings of inspiration might be beneficial in enhancing the communicative characteristic of this type of social comparison and can, therefore, positively impact social self-esteem. Taking these insights into account, the following hypothesis is proposed:

*H4c: Feelings of inspiration mediate the relationship between opinion-based social comparison and emerging adults' social self-esteem.*

Lastly, as mentioned before, it is expected that there is no relationship between opinion-based social comparison and appearance self-esteem. In line with this expectation, it is hypothesized that feelings of inspiration do not mediate a relationship between opinion-based social comparison and appearance self-esteem. Hence the following hypothesis is proposed:

*H4d: Feelings of inspiration does not mediate the relationship between opinion-based social comparison and emerging adults' appearance self-esteem.*

In short, this research proposes that the positive relationships between opinion-based social comparison activities and performance- and social self-esteem are mediated by feelings of inspiration.

## **2.5. Moderating Role of Gender**

Females and males differ in their primary source of self-esteem (Heatherton & Wyland, 2003). Females are said to be more influenced by relationships and social interactions whereas men are more influenced by objective success. Heatherton and Wyland (2003) summarize this by stating that "males gain self-esteem from getting ahead, whereas females gain self-esteem from getting along" (p. 222). Therefore, it is expected that the effects

of social comparison activities on social self-esteem are going to be greater for women, whereas the effects on performance self-esteem are going to be greater for men. Moreover, Myers and Crowther (2009) concluded from their meta-analysis that social comparison activities have greater negative effects on women’s body satisfaction than it has on men’s body image.

Hence, in this study, it is expected that gender serves as a moderator in the relationships between social comparison activities and the different types of self-esteem. The reason behind this is that females are envisioned to be more susceptible to the effects on their social- and appearance self-esteem, whereas males are predicted to be more susceptible to effects on their performance self-esteem. Therefore, the following hypotheses are proposed:

*H5a: Effects on social self-esteem will be greater for females than for males.*

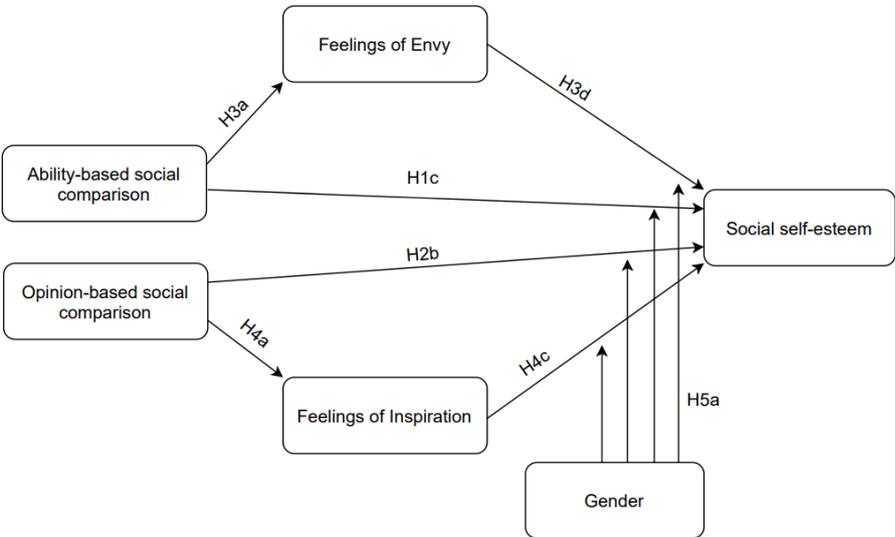
*H5b: Effects on appearance self-esteem will be greater for females than for males.*

*H5c: Effects on performance self-esteem will be greater for males than for females.*

Figure 1, 2 and 3 show the conceptual models that take into account all the above-mentioned hypotheses and visualize the proposed relationships between the variables.

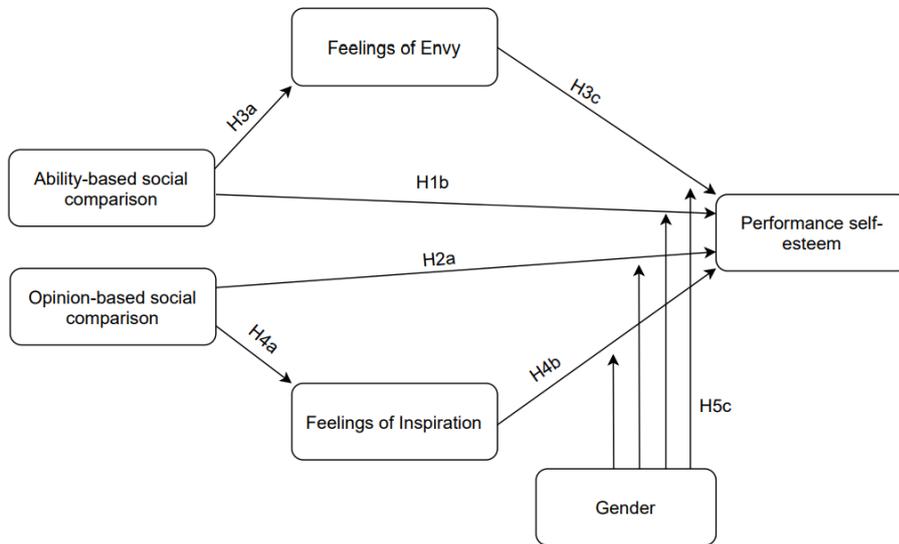
**Figure 1**

*Hypothesized Relationships between Social Comparisons and Social Self-esteem*



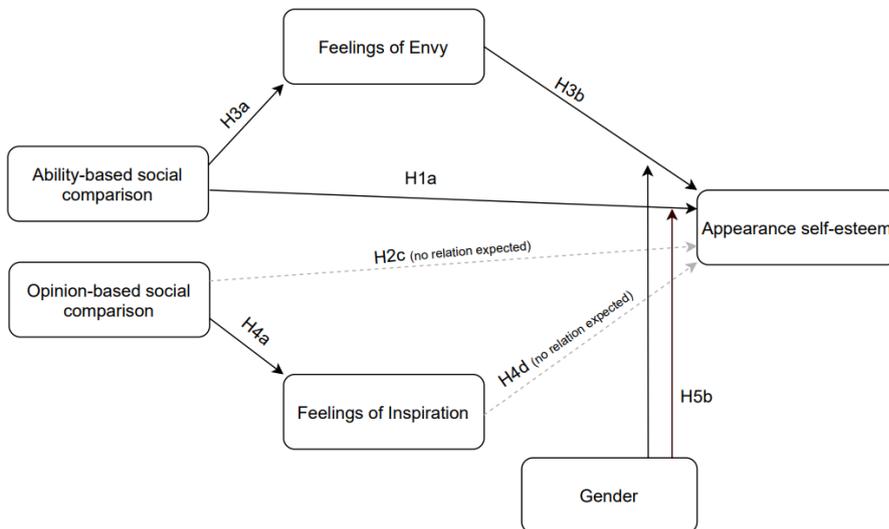
**Figure 2**

*Hypothesized Relationships between Social Comparisons and Performance Self-esteem*



**Figure 3**

*Hypothesized Relationships between Social Comparisons and Appearance Self-esteem*



### **3. Methods**

In this section, the process of participant recruitment is explained and the methods of both the online questionnaire and diary study are elaborated upon.

#### **3.1. Participant Recruitment**

The participant recruitment for both studies was based on the same selection criteria. First, as this research aims to examine people in their emerging adulthood; a period which ranges from 18 to 29 years old, participants for both studies had to fall within this age range. Second, participants were required to possess an active Instagram account, which they were asked to use during their participation in the studies. Moreover, it was decided to include both males and females in the samples as this would allow for examining differences between the gender groups. Furthermore, to make the research generalizable to a specific population, it was decided to only include participants with Dutch or German nationality. Both the Netherlands and Germany are developed European countries with high capita gross national income (GNI) (United Nations, 2021). Moreover, the World Happiness Report, which ranks countries by how happy their citizens perceive themselves to be, showed that both Netherlands and Germany belong in the top-10 happiest countries in the world (Szmigiera, 2021). Hence, it can be expected that emerging adults in both countries grow up in similar conditions. Hence, in this research, the two nationalities will be treated as belonging to the same research population.

For both the online questionnaire as well as the diary study, participants were recruited through convenience sampling. More specifically, friends and acquaintances who possess an Instagram account and fit the research population were asked to participate in the study. For the online questionnaire study, participants were recruited via Instagram, WhatsApp, Facebook, and LinkedIn and were provided with a hyperlink that directed them to the online questionnaire. Moreover, the method of snowball sampling was also used as participants were asked to share and spread the online questionnaire with other people from the research population. The recruitment method of the diary study only included convenience sampling as friends and acquaintances were invited to participate in the study via WhatsApp. The invitation text included information about the research and that participants were expected to fill in a questionnaire with open-ended questions on three different days over the course of a week.

### 3.2. Online Questionnaire Study

To gain insights into the effects that ability- and opinion-based social comparisons on Instagram can have on the state self-esteem of emerging adults, a quantitative questionnaire study was conducted. This type of research fits well with the aim of the study as it allows for examining effects, and possible mediation and moderation effects.

#### 3.2.1. Participants

The final sample of the online questionnaire study included 215 respondents. Participants' ages ranged from 18 to 29 with an average of 21.5 (SD = 2.0). Moreover, participants' Instagram use on a day of use differed between 5 up to 240 minutes with an average of 53.1 minutes (SD = 40.0). Other demographics of the sample can be found in Table 1. Males and females were quite equally distributed in this sample and every participant spent five to ten minutes on Instagram prior to filling in the questionnaire. The unequal distribution of the Dutch and German nationalities does not limit this research as this study does not aim to detect differences between the nationalities. Rather, it regards the two nationalities as belonging to one population. The distribution of age (see Figure 9, in Appendix A) within the sample shows that most participants were between 18 and 24 years old. The current sample is, therefore, less representative of the older ages.

**Table 1**

*Demographics of the Online Questionnaire Sample*

Characteristic	n	%
Gender		
Male	89	41.4
Female	126	58.6
Nationality		
Dutch	153	71.2
German	61	28.4
Both Dutch and German	1	0.5
Highest education obtained		
Primary School	4	1.9
Secondary School	137	63.7

Bachelor's degree (or equivalent level)	57	26.5
Master's degree (or equivalent level)	13	6.0
Other degree	4	1.9
Instagram usage per week		
Less than one day a week	2	0.9
One day a week	3	1.4
Two days a week	4	1.9
Three days a week	5	2.3
Four days a week	6	2.8
Five days a week	20	9.3
Six days a week	22	10.2
Seven days a week	153	71.2

---

### 3.2.2. Procedure

The data collection for the online questionnaire took place from the 28<sup>th</sup> of April to the 7<sup>th</sup> of May in 2021. On the first page of the questionnaire, participants were informed about the topic of the study in general terms ('Instagram use and self-image'). The exact aim of the research was not yet explained to avoid bias in participants' answers. Furthermore, participants were informed that participation was entirely voluntary and that they could withdraw from the study at any time. The data of participants who drop out were removed. Also, participants were informed that their data would be treated anonymously and confidentially.

After obtaining their informed consent, participants continued to the next page of the questionnaire which instructed them to use Instagram for five to ten minutes prior to continuing with the questionnaire. Especially, activities like looking at posts and stories of other users were suggested to increase the likelihood that participants were exposed to social comparisons. After spending time on Instagram, participants were asked whether they actually spent five to ten minutes on Instagram (participants who indicated that they did not, were removed from the data set). Further, questions about their demographics, social comparison activities during their five to ten minutes of Instagram use, and self-esteem were asked. On average, participation in this study took 10 to 15 minutes. As the questionnaire includes the seemingly sensitive topic of self-esteem, the last page of the questionnaire not only debriefed participants about the real purpose of the study but also offered advice to find help for

participants who deal with negative consequences related to low self-esteem. The study was approved by the ethics committee prior to execution.

### **3.2.3. Instrument**

For all items of the online questionnaire, a 5-point Likert Scale of agreement (1 = strongly disagree, 5 = strongly agree) was used. As participation in the study would already take up more time because of the required action of spending five to ten minutes on Instagram, it was considered especially important to make participation accessible. The 5-point Likert scale was able to do this as it is suggested to increase response rate and the quality of responses as well as reduce participant's frustration level compared to a 7-point scale (Babakus & Mongold, 1992). In this section, the items of the online questionnaire as well as their origins will be explained. Table 7 in Appendix B shows an overview of all the items and the associated scales that they are based on.

#### **3.2.3.1. Social Comparison on Instagram**

Social comparison on Instagram was measured by taking items of the Social Media Social Comparison Scale (SMSCS) (Yang et al., 2018) as a starting point. Yang et al. (2018) created this scale by adapting the Iowa-Netherlands Comparison Measure (ICOM). According to Yang et al. (2018), the SMSCS can be properly used to measure social comparison activities. For this study, items of the original items of the SMSCS were modified and new items were added to make them fit the Instagram context and the research purpose. For both the opinion- and ability-based social comparison items, participants were asked to consider the extent to which they compared themselves with others during their most recent Instagram usage and indicate on a 5-point Likert Scale how much they agree with each statement.

*Opinion-based social comparison on Instagram* was measured using seven items. Two items were taken, and slightly adjusted, of the opinion comparison-subscale of the Social Media Social Comparison Scale (SMSCS) (Yang et al., 2018). More specifically, "On social media" was changed to "During my most recent Instagram use" to make sure the items referred to the most recent Instagram use. A sample item is "During my most recent Instagram use, I found out what others think about topics that I want to know more about". Moreover, five more items were added which included realistic opinion-based social comparison activities on Instagram. A sample item of a newly created statement is: "During my most recent Instagram use, I faced opinions of others in their Instagram posts that made

me think about my own opinion”. Higher mean scores indicate higher engagement in opinion-based social comparison on Instagram.

*Ability-based social comparison on Instagram* was measured using six items. Two items were taken, and slightly modified, of the ability comparison-subscale of the Social Media Social Comparison Scale (SMSCS) (Yang et al., 2018). Also, for these items, “On social media” was changed to “During my most recent Instagram use”. A sample item is “During my most recent Instagram use, I compared how I am doing socially with other people”. Moreover, four more items were added which were considered to be realistic ability-based social comparison activities on Instagram. A sample item is: “During my most recent Instagram use, the likes and comments on Instagram posts of others made me think about my own popularity”. A higher mean value indicated a higher engagement in ability-based social comparison on Instagram.

### **3.2.3.2. State Self-esteem**

State self-esteem was measured by taking, and slightly adjusting, 13 of the 20 items of the State Self-Esteem Scale (SSES) (Heatherton & Polivy, 1991). Participants were instructed to consider the extent to which they agreed with each statement on a 5-point Likert Scale. *Social self-esteem* was measured utilizing four items of the social subscale of the SSES. A sample item is: “I am worried about what other people think of me”. *Appearance self-esteem* was measured by four items of the appearance subscale of the SSES. A sample item of this scale is: “I feel satisfied with the way my body looks right now”. *Performance self-esteem* was measured by means of five items of the performance subscale of the SSES. A sample item of this scale is: “I feel smart”.

### **3.2.3.3. Social Comparison-based Emotions**

Social comparison-based emotions were measured by taking the items that Park and Beak (2018) used to measure social comparison-based emotions as a starting. First, *feelings of envy* were measured utilizing three items. All three items were inspired by the item “When you compare yourself with network others on Facebook, how much do they make you feel envious” of Park and Beak (2018). This item was modified to fit the Instagram context and the Likert scale of agreement. A sample item is: “During my most recent Instagram use, I felt feelings of envy towards other Instagram users”. Second, *feelings of inspiration* were measured utilizing three items. The item of Park and Beak (2018) “When you compare

yourself with network others on Facebook, how much do they make you feel inspired” served as a starting point for all three items and was adapted to fit the Instagram context and the Likert scale of agreement. A sample item is: “During my most recent Instagram use, I felt inspired by other Instagram users”.

#### **3.2.4. Pre-tests**

Pre-tests were conducted for the online questionnaire study to measure how long participation took, assure that the questions were understandable, and troubleshoot potential problems. In those pre-tests, different respondents from the research population (age between 18-29 years old, Dutch or German, with an Instagram account) were asked to fill in the questionnaire and to think aloud while doing so. Two rounds of pre-tests were done. Five respondents participated in the first round. This resulted in some useful insights which led to adjustments to the first version. For example, difficult words were replaced by easier words, confusing questions were formulated more clearly, and negatively worded items were made more salient (e.g., by capitalizing denying words and making them bold). Also, a progress bar was added to show participants how far they are in the process of filling in the questionnaire.

The improved, version of the online questionnaire (see Appendix C) was tested again to see whether previous problems were solved and to check whether new problems would arise. In the second round of pre-tests, six respondents filled in the improved questionnaire and voiced whether they experienced any difficulties. The results indicated that previous problems were solved and that the questionnaire was clear and objective. Furthermore, respondents were asked to indicate what they thought the survey aimed to measure, most answers included aspects like ‘comparisons on Instagram’ and ‘how Instagram makes people feel about themselves’, indicating content validity of the survey.

#### **3.2.5. Data Preparation**

The analyses for the online questionnaire were performed using SPSS 25 software taking into account a significance level of .05. Participants that failed to complete the survey or who did not fall into the research population, were deleted from the data. This resulted in deleting 91 incomplete responses, 31 responses from participants that did not belong to the research population, and two responses that included extreme outliers on the construct of performance self-esteem. These extreme outliers were deleted as certain extreme observations could disproportionately influence the parameter estimates. Hence, from the 339 initial

responses, 215 were considered useful and were used during the analysis. Moreover, negatively worded items were reversed coded.

To give a clear overview of the samples of the online questionnaire study (see section 3.2.1 Participants), descriptive statistics were calculated. For categorical variables (e.g., nationality, gender, educational level, and weekly usage) the minimum, maximum, and frequency in percentages were determined. Further, for numerous variables (e.g., age, number of minutes spent on Instagram on a day of usage) the minimum, maximum, mean, and standard deviation were calculated.

### **3.2.6. Factor Analysis**

Based on a first factor analysis, it was decided to exclude three items (A7, O7, Appear3, and Social3(R)) because they did not clearly load onto the expected constructs. After excluding these items, a second factor analysis was conducted. This factor analysis was run in SPSS on the remaining 32 items to measure the internal structure, dimensionality, and construct validity of the questionnaire. The Kaiser-Meyer-Olkin (KMO) measure of the sampling adequacy showed a result of  $KMO = .83$ , which is bigger than the required value of  $.5$ , and, therefore, indicates that enough data was collected to proceed with the factor analysis.

An initial analysis was conducted to obtain the eigenvalues for each factor. This analysis showed that there are seven factors with eigenvalues above the Kaiser's criterion of 1, meaning that seven dimensions can be found in the data. The items that cluster on the same factor suggest that factor 1 represents ability-based social comparison, factor 2 opinion-based social comparison, factor 3 appearance self-esteem, factor 4 feelings of inspiration, factor 5 performance self-esteem, factor 6 social self-esteem, and factor 7 feelings of envy. The factor loadings of the items on the related constructs ranged from  $.471$  to  $.916$ . All loadings were above the criteria values of  $.4$  (Pituch & Stevens, 2015), and can be found in Table 2. The factor loadings of items A6 and O8 and ( $.47$  and  $.57$  respectively) were relatively low. Nevertheless, as they were still above the criterion value of  $.4$  and clearly loaded onto one factor, it was decided to include these items in further analysis.

### **3.2.7. Reliability Analysis**

After creating the constructs, reliability analyses were performed by measuring the Cronbach's alpha of the seven measured constructs. This analysis considered Cronbach's alpha of  $>.7$  to be sufficient. Cronbach's alphas for all constructs were above  $.7$  (see Table 2),

indicating that all constructs can be considered reliable. Also, for all constructs, there were no items that increased Cronbach's alpha if deleted.

**Table 2**

*Factor Loadings and Cronbach's Alphas of the Online Questionnaire Items*

Construct	Cronbach's alpha	Item	Factor loading	
Ability-based social comparison	.825	A3	During my most recent Instagram use, the likes and comments on Instagram POSTS of others made me think about my own popularity.	.744
		A4(R)	During my most recent Instagram use, I did NOT compare with others to see whether I am doing relatively better or worse. (reverse coded)	.737
		A2	During my most recent Instagram use, the Instagram STORIES of others made me think about how interesting my own life is.	.724
		A5	During my most recent Instagram use, I compared how I am doing socially with other people.	.720
		A1	During my most recent Instagram use, I thought about whether I am doing relatively better or worse than other people.	.651
		A6	During my most recent Instagram use, I compared my appearance with that of other people.	.471*
Opinion-based social comparison	.822	O4	During my most recent Instagram use, I encountered other people's opinions on various topics which	.758

			made me think about my own opinion.	
		O3	During my most recent Instagram use, I tried to find out about the opinions of others.	.729
		O2	During my most recent Instagram use, I faced opinions of others in their Instagram POSTS that made me think about my own opinion.	.693
		O5	During my most recent Instagram use, I looked at opinions of others to form my own opinion.	.667
		O1	During my most recent Instagram use, I faced opinions of others in their Instagram STORIES that made me think about my own opinion.	.658
		O6	During my most recent Instagram use, I found out what others think about topics that I want to know more about.	.604
		O8	During my most recent Instagram use, I felt like talking with other Instagram users about mutual opinions and experiences	.570*
Appearance self-esteem	.853	Appear1	I feel satisfied with the way my body looks right now.	.881
		Appear2	I am satisfied with my weight.	.861
		Appear4	I am pleased with my appearance right now.	.795
		Appear3	I feel Unattractive. (reverse coded)	.705
Feelings of inspiration	.928	Inspirat2	During my most recent Instagram use, I felt inspired when I saw the	.916

			posts/stories of other Instagram users.	
		Inspirat3	During my most recent Instagram use, I felt inspired by other Instagram users.	.893
		Inspirat1	During my most recent Instagram use, I experienced feelings of inspiration.	.881
Performance self-esteem	.781	Perform4	I feel confident that I understand things.	.811
		Perform3	I feel smart.	.752
		Perform2(R)	I feel frustrated about my performance. (reverse coded)	.678
		Perform1	I feel confident about my abilities.	.669
		Perform5	I feel like I'm doing well.	.598
Social self-esteem	.810	Social2(R)	I am worried about what other people think of me. (reverse coded)	.827
		Social4(R)	I am concerned about the impression I am making. (reverse coded)	.744
		Social5(R)	I am worried about looking foolish. (reverse coded)	.697
		Social1(R)	I am worried about whether I am seen as a success or failure. (reverse coded)	.653
Feelings of envy	.907	Envy3	During my most recent Instagram use, I felt feelings of envy towards other Instagram users.	.740
		Envy 1	During my most recent Instagram use, I experienced feelings of envy (jealousy).	.738
		Envy2	During my most recent Instagram use, I felt jealous when I saw the	.692

posts/stories of other Instagram users.

---

*Note* \* are relatively low factor loadings. Both section 3.2.6. Factor Analysis and the limitation section include a reflection on these loadings.

### 3.3. Diary Study

A qualitative exploratory diary study was conducted to gain insights into the opinions that emerging adults face and the ability-based social comparisons that they make during their daily Instagram use. This longitudinal design was chosen as the results would show whether the emerging adults vary in the opinions that they face and the social comparisons that they engage in on Instagram on different days of a week.

#### 3.3.1. Participants

The final sample for the diary study included a total of 10 participants (5 females,  $M_{age} = 21$ , 5 Dutch, 5 German) (specific demographics can be found in Table 3). On average, participants spent 50.4 minutes ( $SD = 34.4$ ), ranging from 5 to 132 minutes, per day on Instagram. Participants in this study were also allowed to participate in the online questionnaire study as the purposes of the two different studies were different. Where the online questionnaire aimed at measuring the short term effects that ability- and opinion-based social comparisons on Instagram can have on different state self-esteem, the diary study aimed to find out what types of social comparisons emerging adults make throughout different days of a week.

**Table 3**

*Demographics of the Diary Study Sample*

---

Participant number	Age	Gender	Nationality	Highest education obtained
1	24	Male	German	Bachelor's degree (or equivalent level)
2	23	Male	German	Secondary School
3	21	Male	Dutch	MBO
4	21	Male	Dutch	Bachelor's degree (or equivalent level)

---

5	18	Male	Dutch	Secondary School
6	22	Female	German	Secondary School
7	21	Female	German	Secondary School
8	21	Female	Dutch	Secondary School
9	21	Female	Dutch	Secondary School
10	18	Female	Dutch	Primary School

---

### 3.3.2. Procedure

For the diary study, the data was collected from the 26<sup>th</sup> of April to the 4<sup>th</sup> of May in 2021. During the evening of the three different days of the diary study, all participants were sent a link that would send them to an online questionnaire. It was decided to distribute the link in the evening to assure that participants could reflect on their Instagram use of that day. On the first page of all questionnaires, participants were told about the aim of the study, the voluntary nature of participation, that they could withdraw from the study, that their data would be handled confidentially and anonymously, and they were asked for their consent to participate. After giving their consent, participants were asked to answer questions about their demographics, their Instagram use of that day, the type of ability- and opinion-based comparisons that they made on Instagram on that day, and how these comparisons made them feel. These questions were the same across all three days. After filling out the questionnaire, participants were sent to the last page which thanked them for their participation. On day one and two, the last page included information about when the second or third questionnaire would be sent to them. The last page of the third questionnaire thanked participants for their participation in the study and informed them that they could receive a summary of the results if they wanted to. It took participants between 10 to 13 minutes to fill in one questionnaire. Hence, participation in the entire study (all three days together) took a bit more than 30 minutes.

### 3.3.3. Instrument

The instrument for the diary study included three open-ended questions (see Table 4). The first open-ended question asked participants about the purpose of their Instagram use of that day. The second and third are about the types of opinions and social comparisons that participants faced during their Instagram on that day. To make sure the data collection would

yield rich data, participants were provoked to elaborate on their answers by means of sub-questions.

**Table 4**

*The Open-ended Questions of the Diary Study*

Construct	Item
Purpose of Instagram use	For what purposes did you use Instagram today?
Opinion-based social comparison	Today, were there any opinions that others expressed on Instagram that you agreed/disagreed with? Can you elaborate on (1) what opinion(s) you were exposed to, (2) why you agreed/disagreed, (3) how the opinion(s) made you feel, (4) whether the opinion(s) changed your opinion, (5) how you felt towards the person(s) expressing the opinion(s), and (6) how the opinion(s) made you think or feel about yourself.
Ability-based social comparison	Were there moments, today, that you compared yourself with other Instagram users on how well you are doing (e.g., on a social, appearance, or competency level)? Can you elaborate on (1) the comparisons that you made, (2) why you compared yourself with the other(s), (3) how these comparison(s) made you feel, (4) what you thought when you compared yourself, (5) how you felt towards the one(s) you compared yourself with.

**3.3.4. Pre-test**

To pre-test the diary study, five different respondents from the research population were asked to fill in the questionnaire and to think aloud while doing so. This resulted in some minor adjustments to the first version. For example, it was decided to leave out a question (about strategic self-presentation) as it was too confusing to some participants and it also was also not essential for the aim of the study. Further, the question ‘How long did you spend on Instagram today?’ was clarified by adding ‘(indicate in minutes)’. Also, a progress bar was added to show participants how far they are in the process of filling in the questionnaire.

Moreover, all participants found the questionnaire objective and overall understandable. Based on the input of the pre-tests, the questionnaires for the diary study were improved. See Appendix E for the complete and final diary study questionnaires.

### **3.3.5. Data Preparation and Analysis**

To prepare the data, all written answers to the open-ended questions were put together in a Word document. This Word document was uploaded to the software Atlas.ti, where the qualitative data could be coded and analysed. Even though the diary study resulted in only a limited number of pages of answers (8.5 pages) that had to be analysed, it was considered important to do this in a systematic way. Therefore, a codebook (see Table 8 in Appendix F) was created which included some general codes (gender, participant number, and the day of diary study), six main codes (purpose of Instagram use, opinion-based social comparison, ability-based social comparison, negative feelings, and positive feelings), and subcodes which specified the content of the main codes. Moreover, a second coder (another Communication Science Bachelor student of the University of Twente) was asked to cross-code 20% of the data. The Cohen's kappa of .80, which is higher than .7, indicating that the codebook is a reliable instrument.

## 4. Results

For both the online questionnaire study as well as for the diary study different analyses were performed. In this section, the results of both studies will be reported.

### 4.1. Online Questionnaire

For the online questionnaire study, the proposed hypotheses were tested by means of multiple regression analysis, mediation analyses, and moderated mediation analysis. The results of the analyses are discussed below.

#### 4.1.1. Multiple Regression Analysis

Prior to the multiple regression analysis, the assumptions of multiple linear regression were checked. This analysis showed that the assumptions were met (see Appendix D). Afterwards, three multiple regression analyses (for each state self-esteem model) were conducted to test hypotheses H1a, H1b, H1c, H2a, H2b, and H2c.

##### 4.1.1.1. Social Self-esteem

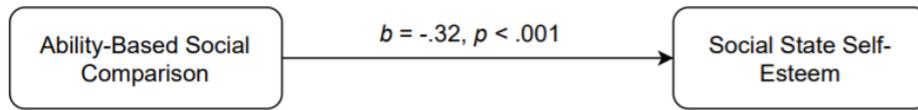
Univariate analysis of variance (ANOVA) was conducted with opinion- and ability-based social comparison activities as independent variables and social self-esteem as the dependent variable. This was done to test the proposed hypotheses H1c and H2b by examining whether social comparison activities explained variance within social self-esteem.

The model was significant,  $F(2, 212) = 15.26, p < .001$ , and explained 11.8% of variance on social self-esteem. Hence, the model provided significant explanatory power for social self-esteem. Further analysis showed a non-significant main effect of opinion-based social comparison,  $b = -.12, SE = .08, t(212) = -1.42, p = .158$ . Therefore, the null hypothesis that opinion-based social comparison does not affect social self-esteem cannot be rejected. These results are not in line with H2b (“Opinion-based social comparison on Instagram will positively affect emerging adults’ social self-esteem”).

Further, the analysis showed a significant negative main effect of ability-based social comparison,  $b = -.32, SE = .07, t(212) = -4.42, p < .001$  (see Figure 4). Therefore, the null hypothesis that ability-based social comparison does not affect social self-esteem can be rejected. Hence, confidence is gained in the alternative hypothesis that ability-based social comparison directly affects social self-esteem (in line with H1c).

**Figure 4**

*Significant Main Effect of Ability-based Social Comparison on Social Self-esteem*



#### **4.1.1.2. Performance Self-esteem**

Univariate analysis of variance (ANOVA) was conducted with opinion- and ability-based social comparison activities as independent variables and performance self-esteem as dependent variable. This was done to test the proposed hypotheses H1b and H2a by examining whether social comparison activities explained variance within the performance self-esteem.

The model was significant,  $F(2, 212) = 3.73, p = .026$ , and explained 2.5% of variance on performance self-esteem. Hence, the model provided significant explanatory power for performance self-esteem. Further analysis showed a non-significant negative main effect of opinion-based social comparison,  $b = -.12, SE = .06, t(212) = -1.91, p = .057$ . Therefore, the null hypothesis that opinion-based social comparison does not affect performance self-esteem cannot be rejected. These results are not in line with H2b (“Opinion-based social comparison on Instagram will positively affect emerging adults’ performance self-esteem”).

Further, the analysis showed a non-significant negative main effect of ability-based social comparison,  $b = -.06, SE = .05, t(212) = -1.09, p = .275$ . Therefore, the null hypothesis that ability-based social comparison does not affect performance self-esteem cannot be rejected. The results are not in line with H1b (“Ability-based social comparison on Instagram will negatively affect emerging adults’ performance self-esteem”).

#### **4.1.1.3. Appearance Self-esteem**

Univariate analysis of variance (ANOVA) was conducted with opinion- and ability-based social comparison activities as independent variables and appearance self-esteem as the dependent variable. This was done to test the proposed hypotheses H1a and H2c by examining whether social comparison activities explained variance within the appearance self-esteem.

The model was non-significant,  $F(2, 212) = 1.54, p = .22$ , and explained 0.5% of variance on appearance self-esteem. Hence, the model provides non-significant explanatory power for appearance self-esteem. Further analysis showed a non-significant negative main effect of opinion-based social comparison,  $b = -.04, SE = .09, t(212) = -.46, p = .648$ . Therefore, the null hypothesis that opinion-based social comparison does not affect appearance self-esteem can be rejected (in line with H2c).

Further, the analysis showed a non-significant negative main effect of ability-based social comparison,  $b = -.10, SE = .07, t(212) = -1.40, p = .163$ . Therefore, the null hypothesis that ability-based social comparison does not affect appearance self-esteem cannot be rejected. These results are not in line with H1a (“Ability-based social comparison on Instagram will negatively affect emerging adults’ appearance self-esteem”).

#### **4.1.2. Mediating Analyses**

Simple mediation analysis was conducted using Model 4 of the PROCESS v3.5 for SPSS tool of Andrey Hayes to test H3a, H3b, H3c, H3d, H4a, H4b, H4c, and H4d.

##### **4.1.2.1. Social Self-esteem**

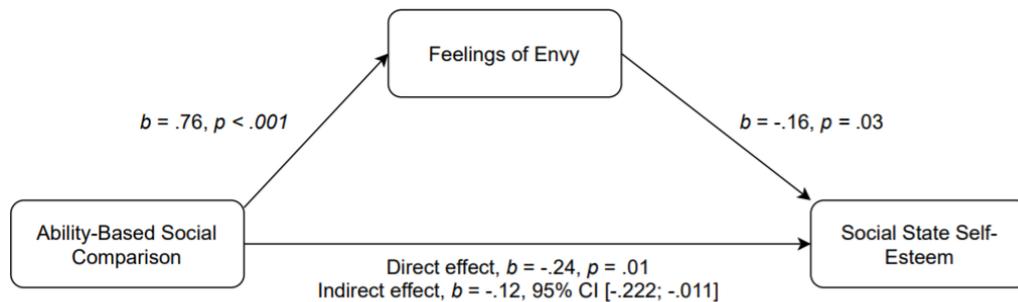
Although there was a significant effect of opinion-based social comparison on feelings of inspiration ( $b = .48, SE = .09, t(213) = 5.46, p < .001$ ) (in line with H4a: “Opinion-based social comparison on Instagram will positively affect emerging adults’ feelings of inspiration”), there was a non-significant effect of opinion-based social comparison on social self-esteem through feelings of inspiration,  $b = -.01, 95\% \text{ Bca CI } [-.073; .051]$ . Therefore, the null hypothesis that feelings of inspiration do not mediate the relationship between opinion-based social comparison and social self-esteem cannot be rejected. These results do not support H4c (“Feelings of inspiration mediate the relationship between opinion-based social comparison and emerging adults’ social self-esteem”).

Further, besides the positive significant effect of ability-based social comparison on feelings of envy ( $b = .76, SE = .06, t(213) = 12.16, p < .001$ ) (in line with H3a: “Ability-based social comparison on Instagram will positively affect emerging adults’ feelings of envy”), there was a significant negative effect of ability-based social comparison on social self-esteem through feelings of envy,  $b = -.12, 95\% \text{ Bca CI } [-.222; -.011]$  (see Figure 5). Therefore, the null hypothesis that feelings of envy do not mediate the relationship between ability-based social comparison and social self-esteem can be rejected. Hence, confidence is gained in the

alternative hypothesis that feelings of envy mediate the relationship between ability-based social comparison and social self-esteem (H3d).

**Figure 5**

*Direct and indirect effect (via Feelings of Envy) of Ability-based Social Comparison on Social Self-esteem*



*Note.* The confidence interval for the indirect effect is a Bca bootstrapped CI based on 5000 samples.

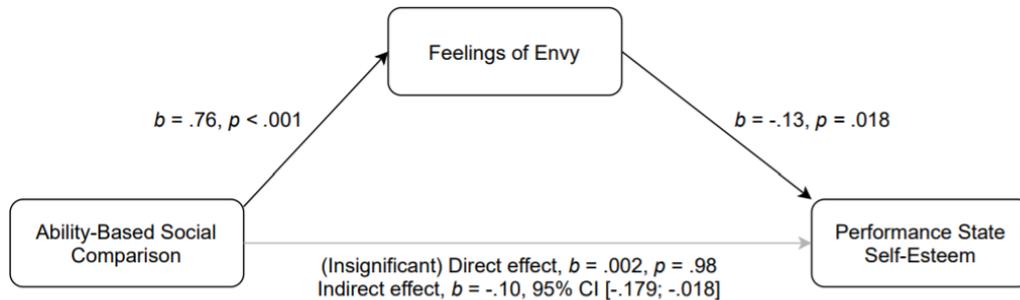
#### 4.1.2.2. Performance Self-esteem

There was a non-significant indirect effect of opinion-based social comparison on performance self-esteem through feelings of inspiration,  $b = .002, 95\% \text{ Bca CI } [-.043; .050]$ . Therefore, the null hypothesis that feelings of inspiration do not mediate the relationship between opinion-based social comparison and performance self-esteem cannot be rejected. These results are not in line with H4b (“Feelings of inspiration mediate the relationship between opinion-based social comparison and emerging adults’ performance self-esteem”).

Moreover, even though the direct effect of ability-based social comparison on performance self-esteem is non-significant,  $b = .002, SE = .06, t(212) = 0.02, p = .98$ , there is a significant indirect effect of ability-based social comparison on performance self-esteem through feelings of Envy,  $b = -.10, 95\% \text{ Bca CI } [-.179; -.018]$  (see Figure 6). Therefore, the null hypothesis that feelings of envy do not mediate the relationship between ability-based social comparison and performance self-esteem can be rejected. Hence, confidence is gained in the alternative hypothesis that feelings of envy mediate the relationship between ability-based social comparison and performance self-esteem (H3c).

**Figure 6**

*Indirect effect of Ability-based Social Comparison on Performance Self-esteem via Feelings of Envy*



*Note.* The confidence interval for the indirect effect is a Bca bootstrapped CI based on 5000 samples.

#### 4.1.2.3. Appearance Self-esteem

There was a non-significant negative effect of opinion-based social comparison on appearance self-esteem through feelings of inspiration,  $b = .01, 95\% \text{ Bca CI } [-.056; .073]$ . Therefore, the null hypothesis that feelings of inspiration mediate the relationship between opinion-based social comparison and appearance self-esteem cannot be rejected. These results are in line with H4d (“Feelings of inspiration will not mediate the relationship between opinion-based social comparison and emerging adults’ appearance self-esteem”).

Further, there was a non-significant negative effect of ability-based social comparison on appearance self-esteem through feelings of envy,  $b = -.09, 95\% \text{ Bca CI } [-.197; .0179]$ . Hence, the null hypothesis that feelings of envy do not mediate the relationship between ability-based social comparison and appearance self-esteem cannot be rejected. These results are not in line with H3b (“Feelings of envy mediate the relationship between ability-based social comparison and emerging adults’ appearance self-esteem”).

#### 4.1.3. Moderated Mediation Analyses

Moderated mediation analysis was conducted using Model 15 of the PROCESS v3.5 for SPSS tool of Andrey Hayes to test H5a, H5b, and H5c.

#### 4.1.3.1. Social Self-esteem

There was a non-significant interaction of gender in the relationship between opinion-based social comparison and social self-esteem ( $b = -.10$ ,  $SE = .23$ ,  $t(209) = -0.43$ ,  $p = .670$ ). Hence, the null hypothesis that gender moderates the relationship between opinion-based social comparison and social self-esteem cannot be rejected. Also, the interaction of gender and feelings of inspiration was non-significant ( $b = -.08$ ,  $SE = .14$ ,  $t(209) = -0.55$ ,  $p = .586$ ). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of inspiration and social self-esteem cannot be rejected.

There was a non-significant interaction of gender in the relationship between ability-based social comparison and social self-esteem ( $b = .11$ ,  $SE = .17$ ,  $t(209) = 0.61$ ,  $p = .544$ ). Hence, the null hypothesis that gender moderates the relationship between ability-based social comparison and social self-esteem cannot be rejected. Also, the interaction of gender and feelings of envy was non-significant ( $b = .20$ ,  $SE = .15$ ,  $t(209) = 1.36$ ,  $p = .176$ ). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of envy and social self-esteem cannot be rejected. These results are not in line with H5a (“The effects on social self-esteem will be greater for females than for males”).

#### 4.1.3.2. Performance Self-esteem

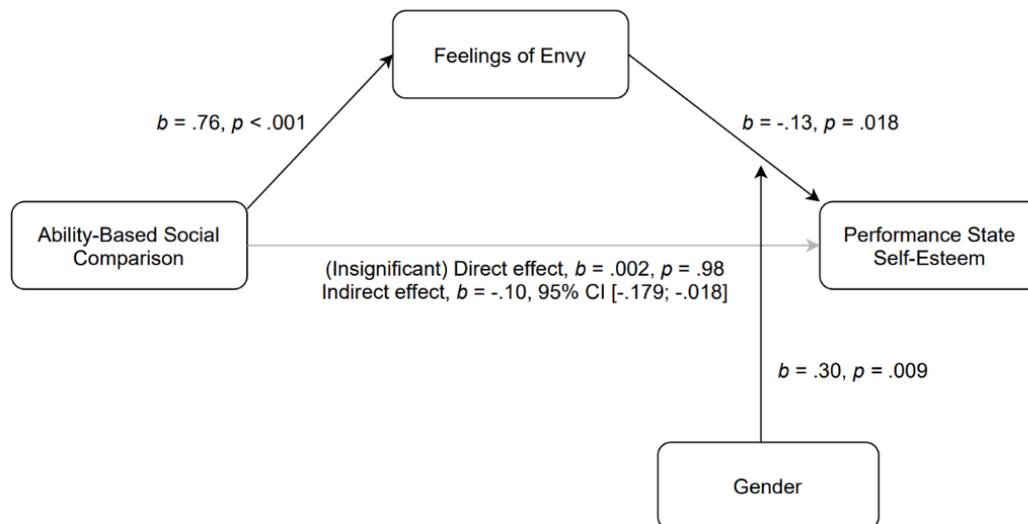
There was a non-significant interaction of gender in the relationship between opinion-based social comparison and performance self-esteem ( $b = -.12$ ,  $SE = .14$ ,  $t(209) = -0.86$ ,  $p = .393$ ). Hence, the null hypothesis that gender moderates the relationship between opinion-based social comparison and performance self-esteem cannot be rejected. Also, the interaction of gender and feelings of inspiration was non-significant ( $b = -.04$ ,  $SE = 0.10$ ,  $t(209) = -.38$ ,  $p = .708$ ). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of inspiration and performance self-esteem cannot be rejected.

There was a non-significant interaction of gender in the relationship between ability-based social comparison and performance self-esteem ( $b = -.02$ ,  $SE = .14$ ,  $t(209) = -0.13$ ,  $p = .899$ ). Hence, the null hypothesis that gender moderates the relationship between ability-based social comparison and performance self-esteem cannot be rejected. The interaction of gender and feelings of envy was significant ( $b = .30$ ,  $SE = .12$ ,  $t(209) = 2.64$ ,  $p = .009$ ) (see Figure 7). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of envy and performance self-esteem can be rejected. Hence, confidence is gained in

the alternative hypothesis that gender mediates the relationship between feelings of envy and performance self-esteem.

**Figure 7**

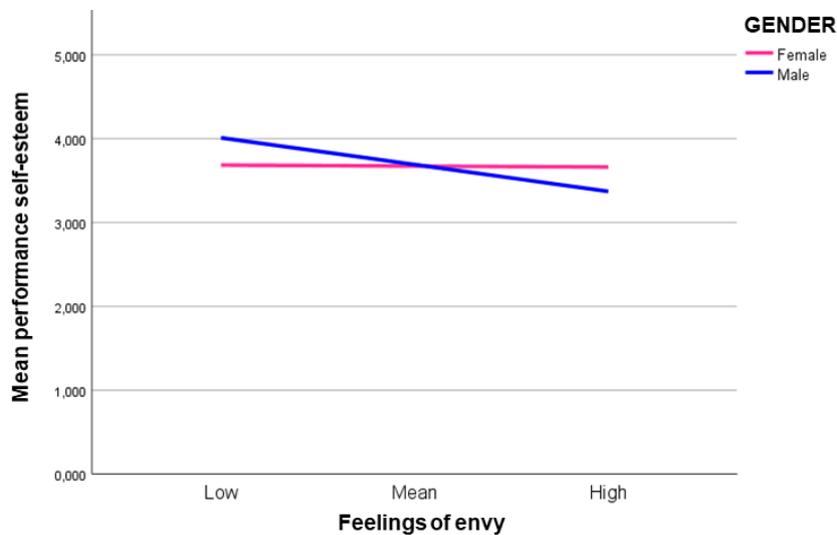
*Effect of Feelings of Envy on Performance Self-esteem moderated by Gender*



Further analysis of the moderation effect showed that for males, there is a significant relationship between feelings of envy and performance self-esteem,  $b = .32, SE = .10, t(209) = -3.26, p = .001$ , whereas for females, this relationship was non-significant,  $b = -.01, SE = .06, t(209) = -0.18, p = .858$  (See Figure 8). These results are partially – only regarding the relationship between feelings of envy and performance self-esteem - in line with H5c (“The effects on performance self-esteem will be greater for males than for females”).

**Figure 8**

*Effect of Feelings of Envy on Performance Self-esteem for Males and Females*



#### **4.1.3.3. Appearance Self-esteem**

There was a non-significant interaction of gender in the relationship between opinion-based social comparison and appearance self-esteem ( $b = -.05$ ,  $SE = .18$ ,  $t(209) = -0.29$ ,  $p = .775$ ). Hence, the null hypothesis that gender moderates the relationship between opinion-based social comparison and appearance self-esteem cannot be rejected. Also, the interaction of gender and feelings of inspiration was non-significant ( $b = -.14$ ,  $SE = .14$ ,  $t(209) = -1.02$ ,  $p = .310$ ). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of inspiration and appearance self-esteem cannot be rejected.

There was a non-significant interaction of gender in the relationship between ability-based social comparison and appearance self-esteem ( $b = -.03$ ,  $SE = .19$ ,  $t(209) = -0.18$ ,  $p = .857$ ). Hence, the null hypothesis that gender moderates the relationship between ability-based social comparison and appearance self-esteem cannot be rejected. Also, the interaction of gender and feelings of envy was non-significant ( $b = .05$ ,  $SE = .15$ ,  $t(209) = 0.33$ ,  $p = .744$ ). This suggests that the null hypothesis that gender does not moderate the relationship between feelings of envy and appearance self-esteem cannot be rejected. These results are not in line with H5b (“The effects on appearance self-esteem will be greater for females than for males”).

#### **4.1.4. Summary of the Findings**

To sum up, the analyses showed that opinion-based social comparison on Instagram is not significantly related to any of the state self-esteem of emerging adults. In contrast, ability-based social comparisons on Instagram showed a negative significant main effect on emerging adults' social self-esteem. Moreover, the mediation analysis indicated that feelings of envy mediate a part of this direct relationship. Furthermore, the mediation analysis also showed that there is a significant negative indirect effect of ability-based social comparison on performance state self-esteem via feelings of envy. Lastly, this indirect effect is moderated by gender. More specially, for males, there was a significant negative effect of feelings of envy on performance self-esteem, whereas there was not for females.

#### **4.2. Diary Study**

For the diary study, participants' answers were analysed to find out more about why they use Instagram, the type of opinions that they face on the app, and the ability-based social comparisons that they make during their daily Instagram use. The results of these analyses are discussed below.

##### **4.2.1. Purpose of Instagram Use**

The results show that participants used Instagram for various purposes. Most often participants mentioned using Instagram for purposes like entertainment, to pass time, or to stay updated about other people's life. Furthermore, interacting with friends, distracting oneself, and updating others about one's own life were also mentioned as reasons for Instagram use, however, to a lesser extent.

##### **4.2.2. Opinion-based Social Comparison**

Table 5 shows the type of opinions that participants were exposed to during three different days. As can be seen, most often participants indicated that they did not face any opinions. They indicated that they either did not see opinions on Instagram or simply did not care about them. Participant 3, for example, wrote "I didn't see opinions, or I didn't care about them". Moreover, other participants noted that they did not deliberately read and think about opinions that they saw on Instagram. For example, participant 2 said: "I didn't really check the things I saw, to be honest. I was just skipping through everything. This is actually something I do a lot. I also noticed that sometimes, I cannot even recall what I have seen on

Instagram right after I closed the app. I think sometimes opening the app is just binge behaviour”.

Further, if participants did engage in opinion-based social comparisons, opinions about corona were talked about the most. Those opinions included statements about corona measures and regulations like the curfew and the vaccination policy. For example, Participant 2 states that “Some [opinions] were corona-related and hating on the government for some bad moves during the vaccination campaigns”.

Moreover, three participants reported being exposed to opinions about politics. These opinions were either about elections (Participant 2: “Elections are coming up in Germany this September and the political discussions about the future of Germany are insanely heated up at the moment.”) or about how the government handles the corona situation (Participant 1: “Some [opinion included] political discourses about Corona and the regulations around it”).

Further, three participants faced opinions about unjust situations, for example, Participant 6 reported having seen opinions about how people with a handicap are sometimes exploited and Participant 4 faced opinions about the unequal payment of males and females in the sports world.

Two female participants faced opinions about lifestyle. These opinions included attitudes towards healthy behaviours (Participant 7: “I was exposed to a fitness Instagrammer who always promotes very healthy eating and a lot of workouts”) and body image (Participant 6: “I saw a reel about body positivity and what a normal healthy body can look like. It was a girl calling out boys that call girls chummy even though this is just a normal stomach which carries the organs.”).

Lastly, opinions about sports, music, specific persons (Participant 4: “I follow someone from “ex on the beach” and [...] someone posted that she is a slut.”), and climate change were only mentioned once or twice.

**Table 5**

*Opinions that Participants were exposed to on Instagram during the Diary Study*

Participant	Gender	Day 1	Day 2	Day 3
1	Male	Political opinion	Corona opinion	Music opinion

---

		Corona opinion		
2	Male	Political opinion	No opinions	Corona opinion
3	Male	No opinions	No opinions	No opinions
4	Male	Corona opinion	Sports opinion Opinion about a person	Opinion about a person Sports opinion Injustice opinion
5	Male	No opinions	No opinions	Sport opinion Injustice opinion
6	Female	Lifestyle opinion	Climate change opinion	Injustice opinion
7	Female	Lifestyle opinion	Lifestyle opinion	Corona opinion
8	Female	No opinions	No opinions	No opinions
9	Female	No opinions	No opinions	No opinions
10	Female	Political opinion	No opinions	No opinions

---

#### 4.2.3. Ability-based Social Comparisons

Table 6 shows the type of ability-based social comparisons that participants made on Instagram during three different days. The most often mentioned ability-based social comparison regarded the comparison of appearance. Some participants wrote about comparing the appearance of their own feed with that of others. For example, Participant 6 explained “I compared my feed to one of my friends. I compared myself because I wanted to see whether my feed was sending the right message and also matches with my personality. It made me think about how I appear to others”. However, the most often mentioned comparison of appearance included comparing one’s own body with that of others. For

instance, Participant 10 wrote: “I saw many pictures of beautiful girls and then you see yourself in the mirror and think about your own body”. The results showed that four out of the five girls mentioned comparing their appearance with others at least once in the three days of the diary research. In contrast, only two male participants indicated making such a comparison once.

As can be seen, some participants mentioned that they did not compare themselves with others. Nevertheless, over the course of the three days, all participants compared themselves at least on one day with other Instagram users. On days that participants did not compare themselves with others, some indicated that they thought comparing oneself is pointless (Participant 2: “I didn’t compare myself with others on Instagram today and I learned to not do it because it’s pointless. We all know that it’s not the real world”) or that they were too busy to compare themselves (Participant 9: “Today I quickly looked at Instagram without looking well into what was said or posted, so I didn't compare myself with anyone”).

Further, four participants indicated comparing their social life with that of others on Instagram at least once during the diary study. This type of comparison either included comparing amounts of followers or comments (Participant 4: “The amount of reactions looked like he has a lot of friends which made me think why I don’t have that) or one’s ‘real’ social life (Participant 9: “I saw a lot of Kings Day pictures. When I saw them I thought; they did have fun with their friends while I didn't make any plans”).

Moreover, four participants reported comparing their behaviour with others in times of corona. These comparisons either included comparing oneself to others in more carefree situations (Participant 1: “[I made] comparisons with people in corona 'free' countries / countries with less regulations (AUS/UK). Being exposed to carefree activities via their Instagram stories and then acknowledging again that we're far away from that in NL”) or with how others are coping with the corona measures.

Further, ability-based comparisons of knowledge (Participant 1: “my taste in music is what's right for me and I like to base that on thinking that I "know" music, the industry, and the context. With differing opinions, I often assume that [the] person doesn't”), wealth (Participant 4: “I compared myself with some influencers about money. They seemed to have a lot of money because of the luxury cars and houses they show”), sport- (Participant 9: “I saw a post of a girl that used to do sports with me and is now influencing a bit. I compared myself to her with regards to how much we sport at this point because she does sport a lot now”), work- (Participant 3: “people that inspire me in my line of work showed some stats or

achievements”), and study achievements (Participant 6: “I saw a post of a friend who was working on some uni work and I compared my study progress with that person. I compared myself to reassure myself that I am on track and doing just fine”) were only mentioned once or twice.

**Table 6**

*Participants’ Ability-based Social Comparisons on Instagram during the Diary Study*

Participant	Gender	Day 1	Day 2	Day 3
1	Male	Corona behaviour	Corona behaviour	Knowledge
2	Male	No comparison	No comparison	Knowledge
3	Male	Work	Work	No comparison
4	Male	Social life	Wealth	Appearance
5	Male	Social life	No comparison	Appearance
6	Female	Corona behaviour	School	Appearance
7	Female	Appearance	Appearance	Corona behaviour
8	Female	Appearance Social life	No comparison	No comparison
9	Female	Sport achievements	Social life	No comparison
10	Female	Appearance	Appearance	Corona behaviour

#### **4.2.4. Summary of the Findings**

To sum up, the analyses of the diary study showed that the participants use Instagram most often for entertainment purposes, to pass time, or to stay updated about other people's lives. Further, the analyses indicated that the participants engage more often in ability-based social comparison than in opinion-based social comparison during their daily Instagram use. In fact, they most often indicated not having encountered any opinions during their daily Instagram use. Opinions that they did face, were often related to the corona measures, politics or unjust situations. Lastly, all participants reported having engaged in ability-based social comparisons on at least one day of the diary study. Comparing appearances was reported the most, especially by the female participants. Moreover, also ability-based social comparisons of social lives and behaviours in times of the corona pandemic were mentioned a couple of times.

## 5. Discussion

The current study aimed at answering the following research questions: *'How do ability- and opinion-based social comparison on Instagram affect female and male emerging adults' social-, appearance-, and performance state self-esteem, taking into account the possible mediating role of feelings of envy and inspiration?'* To do this, two studies were conducted. In this section, the findings of both studies will be discussed, implications for research will be elaborated upon, and recommendation for future research will be provided.

To examine the effects of ability- and opinion-based social comparison on Instagram on emerging adults' social-, appearance-, and performance self-esteem, the possible mediating effect of social comparison-based emotions, and the moderating effect of gender, a quantitative online questionnaire study was conducted.

The analysis of this study yielded some significant findings. First, a significant main effect of ability-based social comparison on Instagram on emerging adults' social self-esteem was found. This means that emerging adults who engaged in the competitive type of social comparison on Instagram were more likely to experience lower social self-esteem. This finding is in line with previous research which found that people with a tendency to compare themselves to see how they are doing relative to others, evaluate their own social life based on what they see in others (Buunk et al., 2007). As most of the social comparisons on SNSs are directed upwards (Vogel et al., 2014), people's evaluations regarding their social life and -competencies are likely to decrease (Buunk et al., 2007).

In addition, the mediation analyses showed significant negative indirect effects of ability-based social comparison on social- and performance- self-esteem through feelings of envy. This means that emerging adults who made competitive and judgemental comparisons on Instagram were likely to experience feelings of envy, which in turn, affected their social- and performance self-esteem negatively. This finding is in line with previous research which showed that feelings of envy are activated when one sees that others possess or accomplished something desirable (Lim & Yang, 2015), which is likely the case when Instagram users are exposed to the perfect online presentations of others. Moreover, previous studies found that feelings of envy can underlie the negative relationship between judgemental social comparison and well-being (Park & Beak, 2018; Appel et al., 2016; Nabi & Nekblusek, 2014).

Furthermore, the moderation analysis showed that the interaction of gender was significant in the relationship between feelings of envy and performance self-esteem. More

specifically, the analysis showed that the negative relationship between feelings of envy and performance self-esteem was significant for males, whereas it was not for females. These findings are in line with previous research which suggests that males' self-esteem is more affected by objective success and getting ahead than females (Heatherton & Wyland, 2003).

To reflect, these findings add to previous research that competitive social comparison on social media not only affects one's overall self-esteem but also how emerging adults evaluate themselves as social beings. Moreover, these findings specify the previously established mediation effect of feelings of envy in the relationship between ability-based social comparison and well-being. This study, namely, showed that feelings of envy, caused by competitive social comparisons on Instagram, negatively influence how male emerging adults evaluate their general competence and how emerging adults evaluate themselves as a social being. This research, however, did not investigate how long these effects last and whether they make a lasting impact on one's self-esteem. This is something for future research to examine.

The analysis, however, also yielded non-significant results. To start with, the analysis regarding appearance self-esteem only showed non-significant results. As expected, engaging in activities of socially comparing opinions on Instagram was not associated with changes in emerging adults' evaluation of their overall appearance. This result was expected as opinion-based social comparisons are about comparing opinions, beliefs, and norms and are expected to influence people's opinion and norm- and belief system (Festinger, 1954) and not how they physically evaluate themselves. Also, it was found that ability-based social comparison did not affect how emerging adults evaluate their own appearance. This finding is not in line with previous research which showed that online comparison can lead to a more negative body image and body dissatisfaction (Eyal & Te'eni-Harari, 2013; Myers & Crowther, 2009). This study hypothesized that emerging adults would face upward social comparisons when they compared physical bodies and appearances. As upward social comparison is associated with negative consequences on people's self-evaluation (Vogel et al., 2014), it was expected that ability-based social comparison would negatively affect appearance self-esteem. Lastly, besides the fact that opinion-based social comparisons were positively and significantly related to feelings of inspiration, all mediation analyses as well as the moderation analyses regarding appearance self-esteem showed non-significant results. This was not surprising as the overall model itself as well as the main effects in the model already showed non-significant results.

To reflect on these non-significant findings of appearance self-esteem, it could be the case that participants also engaged in downward appearance comparisons (comparing oneself to someone who is relatively less attractive). This type of comparison has shown to neutralize the negative effects of social comparison (Tiggeman & Anderberg, 2019). The possible mixture of upward and downward appearance comparisons of the participants could result in unclear and non-significant findings, which can explain the unexpected non-significant findings. Hence, future research should take into account the direction of comparison when examining the relationship between social comparison on social media and appearance self-esteem.

Furthermore, the analysis regarding performance self-esteem showed that engaging in opinion-based social comparison on Instagram was not associated with changes in emerging adults' performance self-esteem. Moreover, the mediation analysis, which tested whether feelings of inspiration mediated the effect of opinion-based social comparison on performance self-esteem, also yielded no significant results. These findings were unexpected, as previous researchers have argued that comparison of opinions can lead to increased knowledge of facts and social norms (Suls et al., 2002; Festinger, 1954), which was hypothesized to increase emerging adults' overall sense of competence. Moreover, feelings of inspiration were expected to stimulate individuals to transcend themselves (Meier & Schäfer, 2018), which was expected to enhance the effects on emerging adults' performance self-esteem. Further, the moderation analysis showed that, in this study, males and females' performance self-esteem were not differently affected by opinion-based social comparison. This was not in line with previous research which indicates that males' self-esteem is more likely to be affected by subjective success and 'getting ahead' (Heatherton & Wyland, 2003).

To reflect on these non-significant findings, it could be the case that opinion-based social comparison does not affect performance self-esteem in the short term as acquiring knowledge, putting it into practice, and transcending oneself takes time. This could explain why this study did not find short-term effects. Future research should examine whether comparing opinions on social media can enhance people's evaluation of their general competence in the long term and whether these effects are differently experienced by males and females. An alternative explanation for the above-mentioned non-significant findings of opinion-based social comparison on performance self-esteem could be that emerging adults did not engage in opinion-based social comparison during their most recent Instagram use. This way of reasoning is plausible as the diary study (which will be elaborated on in the next section) pointed out that most often participants did not face any opinions during their daily

Instagram use. Hence, future research should further examine whether emerging adults do actually engage in opinion-based social comparisons on Instagram or not.

Moreover, even though the analysis showed a significant indirect relationship, with ability-based social comparison influencing emerging adults' performance self-esteem via feelings of envy, there was no significant (direct) main effect of ability-based social comparison on performance self-esteem. This finding was not in line with previous research which already established a direct negative relationship between judgemental social comparisons and individuals' performance self-esteem (Ozimek & Bierhoff, 2020). It could be that feelings of envy entirely account for the relationship between ability-based social comparison and performance self-esteem. Hence, future research should further examine whether the relationship between ability-based social comparison and performance self-esteem still holds above and beyond the mediating effects of feelings of envy.

Furthermore, the analysis regarding social self-esteem showed that in this study, opinion-based social comparison on Instagram was not associated with changes in emerging adults' social self-esteem. This finding was not in line with previous research which suggests that socially comparing opinions can result in better social outcomes, like higher connectedness, social acceptance, and social conformity (Park & Beak, 2018; Suls et al., 2000). Further, the analysis showed that feelings of inspiration did not mediate the relationship between opinion-based social comparison on Instagram and emerging adults' social self-esteem. This was not in line with previous research which suggested that opinion-based social comparison activities are likely to evoke feelings of inspiration (Park & Beak, 2018), which were expected to increase social self-esteem as seeing the comparison target as an inspiring model with which one could engage in the social process of meaning creation would enlarge someone's social network and social capabilities. Lastly, the moderation analysis showed that males' and female's social self-esteem were not affected differently by ability- and opinion-based social comparisons on Instagram. This was not in line with previous research which suggests that females' self-esteem is more likely to be influenced by relationships and interaction than men (Heatherton & Wyland, 2003).

To reflect on these non-significant findings, one could argue that opinion-based social comparison activities do not instantly influence emerging adults' social self-esteem, but that the process of joint meaning creation and feeling more connected with others takes time. This would explain why this study did not find any short-term effects. Hence, future research should examine whether comparing opinions on social media can enhance people's evaluation of themselves as social beings in the long term. On the other hand, it could also be the case

that emerging adults do not engage in opinion-based social comparison on Instagram regularly, which explains why there was no effect found on social self-esteem. This could also be a reasonable explanation as the diary study (which will be elaborated upon below) pointed out that most often participants mentioned not having seen opinions on Instagram.

To explore which types of opinions and ability-based social comparisons emerging adults face during their daily Instagram use and whether these are different for males and females, an exploratory diary study was conducted. As mentioned before, the results regarding the opinion-based social comparisons showed that, over the course of three days, emerging adults most often indicated that they did not face any opinions of others on Instagram. This finding could explain the non-significant results of opinion-based social comparison on all state self-esteem found in the online questionnaire study. If emerging adults do not regularly face opinions on Instagram, they are also less likely to be influenced by them. In line with this, Yang et al. (2018) argued that opinion-based social comparison relies more heavily on written text. Instagram, however, mainly includes visualized communication. Hence, future research should examine whether opinion-based social comparisons are more common on other, more text-based, SNSs (e.g., Twitter, Facebook, or LinkedIn) and whether opinion-based social comparisons on these SNSs do result in effects on the state self-esteem of emerging adults.

Further, if participants did engage in opinion-based social comparison, the opinions that they encountered differed per day. Opinions about corona measures and regulations were talked about the most. During times of the diary study, citizens of both the Netherland and Germany faced restrictive measures in the fight against the COVID-19 virus. Hence, the corona measures influenced important parts of people's lives, resulting in many people sharing their opinions about it. Furthermore, opinions about politics and unjust situations were also faced a couple of times by participants. These findings suggest that opinions faced by emerging adults on Instagram are often related to situations that have a great impact on their own or others' lives. Future research should future examine whether these types of opinions are indeed most often faced on Instagram and other SNSs.

Moreover, opinions about lifestyle, which includes opinions about healthy behaviour and body image were only reported by females. This is in line with previous research which suggests that females place more value on appearances than males (Heatherton & Wyland, 2003). It could be the case that female more deliberately look or search for opinions about lifestyle, which can lead to algorithms selectively presenting certain types of opinions to

females. Future research should further examine whether algorithms on SNSs result in males and females facing different types of opinions and what this means for their state self-esteem.

In contrast to opinion-based social comparison, the results regarding ability-based social comparison showed that all participants engaged in competitive social comparison at least once in the three days of the diary study. This indicates that emerging adults were more likely to compare abilities than opinions during their daily Instagram use. It could be that people can engage easier in ability-based social comparisons through the visual communication on Instagram. For example, by looking at posts and pictures of others, one can more readily compare whether they are relatively more or less attractive, social, and competent. This finding can possibly explain why the online questionnaire did find significant results for ability-based social comparison on some aspects of emerging adults' self-esteem, whereas it did not for opinion-based social comparisons. Future research should examine whether ability-based social comparisons are also as prominent on non-visual-based SNSs.

Furthermore, the most often reported comparison regarded comparing appearance. This type of comparison was mentioned most often by female participants. This is in line with previous research that found that female's self-esteem is especially susceptible to sources related to appearances (Heatherton & Wyland, 2003). Furthermore, comparisons regarding one's social life were mentioned often by both males and females. This is in line with the finding of the online questionnaire which indicates that the effect of ability-based social comparison on social self-esteem is not moderated by gender. Both genders seem to face competitive comparisons regarding their social life.

Further, future research should examine which types of people (e.g. personality type, age groups, nationality) are more susceptible to different types of social comparison. Insights gained from such research could improve and target help for people experiencing negative consequences related to low self-esteem. Moreover, future research should also take into account other social media contexts like Snapchat and other upcoming popular social media platforms like TikTok and how these types of platforms influence aspects of emerging adults' self-esteem and well-being. For instance, it would be interesting to see whether performance self-esteem would be more affected by social comparisons on LinkedIn, were users tend to share more content related to work achievements.

## **5.1. Limitations**

A couple of limitations of the study can be noted. First, the research sample mainly included emerging adults in the age range of 18 to 24. This means that the 'older' emerging

adults (25-29) were underrepresented. Hence, findings of this study will probably be more applicable to the 'younger' emerging adults than the 'older ones'. Moreover, the sample showed an unequal distribution regarding nationality. More specifically, this study included more Dutch than German participants. As the researcher's network included a lot of Germans living or studying in the Netherlands, it can be expected that the findings of the study are more applicable to emerging adults in the Netherlands.

Moreover, methods of convenience sampling and snowball sampling were used to recruit participants. These methods are associated with some limitations. Making use of one's network to recruit participants can, namely, make findings of the study less generalizable to the research population as a whole as it includes a non-random selection of participants. Moreover, these types of recruitment methods make it harder to replicate the study.

Furthermore, this study made use of both an online questionnaire as well as a diary study. These types of research rely on the self-reporting of participants. One of the main limitations of self-report data is the risk of invalid answers due to response bias. Especially in research about well-being, participants tend to provide socially desirable answers to the measures, which can impact the validity of the data (Caputo, 2017).

Lastly, the factor loading of the items O8 (.57) and A6 (.47) were lower than the factor loadings of other items. Lower factor loadings can limit the study as they can potentially lower the construct validity. However, as these factor loadings were still above the criteria of .4 (Pituch & Stevens, 2015) and they clearly loaded into one factor, it was decided to include them in further analysis.

## **5.2. Practical Implications**

Taking the findings of this research into account, some practical implications can be considered. First, Instagram can improve its application in ways that reduce possibilities for ability-based social comparison. For example, the platform can consider getting rid of popularity statistics, like follower-, likes-, and comment counts. This way Instagram users are less able to readily compare their popularity with that of others, which can diminish potential negative effects on their social self-esteem. As a matter of fact, during the course of this study, Instagram publicly announced that starting from the end of May 2021, users can decide to hide their like counts (Instagram, 2021), which can already be considered a step forward. Future research could examine whether this function results in different outcomes for emerging adults' social self-esteem. Moreover, Instagram is advised to even take a step

further by also hiding users' follower- and comment counts to make an even greater positive impact on emerging adults' social self-esteem.

Second, parents, educational institutions, and organizers of health campaigns can take the insights of this research into account to support emerging adults in their social media use in ways that are beneficial to their self-esteem and well-being. For example, they can consider providing emerging adults with the right tools and training to deal with feelings of envy and with ability-based social comparisons in ways that are non-destructive to their self-esteem. To do this most effectively, they could consider tailoring their advice and training based on the gender of the emerging adults. For instance, this research showed that males are more susceptible to effects on their performance self-esteem, whereas females tend to compare their appearances more often during their daily Instagram use. Hence, males should be provided advice or training in how to deal with feelings of envy and potential negative consequences on how they evaluate their own general competence, whereas females should be supported in dealing with online appearance comparisons.

### **5.3. Conclusion**

To answer the research question, this research found that ability-based social comparisons are more often engaged in than opinion-based social comparisons during the daily Instagram use of emerging adults. The competitive ability-based social comparison on Instagram results in emerging adults evaluating their social life more negatively. This is probably due to emerging adults facing perfect images of other people's social lives and the more favourable popularity metrics of others (e.g., follower count, likes, comments) on Instagram, which they competitively compare themselves to. As a result, they evaluate their own social lives more negatively. Moreover, ability-based social comparison is likely to activate feelings of envy which, in turn, negatively affects one's social- as well as performance self-esteem.

Furthermore, opinion-based social comparisons did, in this study, not show any short-term effects on emerging adults state self-esteem. It could be the case that these effects only show in the long term or that they only occur in other SNSs contexts that are more focused on verbal communication. This is something for future research to further investigate. Moreover, this study found that the effects on performance self-esteem were profound for males (and not for females), whereas females' social comparisons more often included comparing appearances.

## References

- Antonelli, W. (2020, September 1). *A beginner's guide to Instagram, the wildly popular photo-sharing app with over a billion users*. Business Insider. Retrieved from <https://www.businessinsider.nl/what-is-instagram-how-to-use-guide?international=true&r=US>
- Appel, H., Gerlach, A. L., & Crusius, J. (2016). The interplay between Facebook use, social comparison, envy, and depression. *Current Opinion in Psychology*, 9, 44–49. <https://doi.org/10.1016/j.copsyc.2015.10.006>
- Arnett, J. J., Žukauskienė, R., & Sugimura, K. (2014). The new life stage of emerging adulthood at ages 18–29 years: Implications for mental health. *Adolescent Mental Health*, 1(7), 569–576. [https://doi.org/10.1016/S2215-0366\(14\)00080-7](https://doi.org/10.1016/S2215-0366(14)00080-7)
- Arsandaux, J., Galéra, C., & Salamon, R. (2020). The association of self-esteem and psychosocial outcomes in young adults: A 10-year prospective study. *Child and Adolescent Mental Health*, 26(2), 106–113. <https://doi.org/10.1111/camh.12392>
- Babakus, E., & Mangold, W. G. (1992). Adapting the SERVQUAL scale to hospital services: An empirical investigation. *Health Services Research*, 26(6), 767–786. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1069855/>
- Baumeister, R. F., Campbell, J. D., Kreuger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1–44. <https://doi.org/10.1111/1529-1006.01431>
- Burleson, K., Leach, C. W., & Harrington, D. M. (2010). Upward social comparison and self-concept: Inspiration and inferiority among art students in an advanced programme. *British Journal of Social Psychology*, 44(1), 109–123. <https://doi.org/10.1348/014466604X23509>
- Buunk, A. P., Groothof, H. A. K., & Siero, F. W. (2007). Social comparison and satisfaction with one's social life. *Journal of Social and Personal Relationships*, 24(2), 197–205. <https://doi.org/10.1177/0265407507075410>
- Campbell, W. K., Rudich, E. A., & Sedikides, C. (2002). Narcissism, self-esteem, and the positivity of self-views: Two portraits of self-love. *Personality and Social Psychology Bulletin*, 28(3), 358–368. <https://doi.org/10.1177/0146167202286007>

- Caputo, A. (2017). Social desirability bias in self-reported well-being measures: Evidence from an online survey. *Universitas Psychologica*, *16*(2). <https://doi.org/10.11144/Javeriana.upsy16-2.sds>
- Colmsee, I. S., Hank, P., & Bošnjak, M. (2021). Low self-esteem as a risk factor for eating disorders. *Zeitschrift Für Psychologie*, *229*(1), 48–69. <https://doi.org/10.1027/2151-2604/a000433>
- Corcoran, K., Crusius, J., & Mussweiler, T. (2011). *Social comparison: Motives, standards, and mechanisms*. In D. Chadee (Ed.), *Theories in Social Psychology* (p. 119–139). Wiley Blackwell.
- De Vries, D. A., & Kühne, R. (2015). Facebook and self-perception: Individual susceptibility to negative social comparison on Facebook. *Personality and Individual Differences*, *86*, 217–221. <https://doi.org/10.1016/j.paid.2015.05.029>
- Eyal, K., & Te'eni-Harari, T. (2013). Explaining the relationship between media exposure and early adolescents' body image perceptions. *Journal of Media Psychology*, *25*(3), 129–141. <https://doi.org/10.1027/1864-1105/a000094>
- Faelens, L., Hoorelbeke, K., Soenens, B., Van Gaeveren, K., De Marez, L., De Raedt, R., & Koster, E. H. (2021). Social media use and well-being: A prospective experience-sampling study. *Computers in Human Behavior*, *114*, 106510. <https://doi.org/10.1016/j.chb.2020.106510>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117–140. <https://doi.org/10.1177/001872675400700202>
- Heatherton, T. F., & Polivy, J. (1991). Development and validation of a scale for measuring state self-esteem. *Journal of Personality and Social Psychology*, *60*(6), 895–910. <https://doi.org/10.1037/0022-3514.60.6.895>
- Heatherton, T. F., & Wyland, C. L. (2003). *Assessing self-esteem*. In S. J. Lopez & C. R. Snyder (Eds.), *Positive psychological assessment: A handbook of models and measures* (p. 219–233). American Psychological Association. <https://doi.org/10.1037/10612-014>
- Huang, Y. T., & Su, S. F. (2018). Motives for Instagram use and topics of interest among young adults. *Future Internet*, *10*(8), 77. <https://doi.org/10.3390/fi10080077>
- Instagram. (n.d.). *Product evolution: Celebrating 10 years of Instagram*. <https://about.instagram.com/about-us/instagram-product-evolution>
- Instagram. (2021, May 26). Giving People More Control on Instagram and Facebook. <https://about.instagram.com/blog/announcements/giving-people-more-control>

- Kruglanski, A. W., & Mayseless, O. (1990). Classic and current social comparison research: Expanding the perspective. *Psychological Bulletin*, *108*(2), 195–208. <https://doi.org/10.1037/0033-2909.108.2.195>
- Latif, K., Weng, Q., Pitafi, A. H., Ali, A., Siddiqui, A. W., Malik, M. Y., & Latif, Z. (2021). Social comparison as a double-edged sword on social media: The role of envy type and online social identity. *Telematics and Informatics*, *56*, 101470. <https://doi.org/10.1016/j.tele.2020.101470>
- Lim, M., & Yang, Y. (2015). Effects of users' envy and shame on social comparison that occurs on social network services. *Computers in Human Behaviour*, *51*, 300–311. <https://doi.org/10.1016/j.chb.2015.05.013>
- Lin, R., & Utz, S. (2015). The emotional responses of browsing Facebook: Happiness, envy, and the role of tie strength. *Computers in Human Behavior*, *52*, 29–38. <https://doi.org/10.1016/j.chb.2015.04.064>
- Meier, A., & Schäfer, S. (2018). The positive side of social comparison on social network sites: How envy can drive inspiration on Instagram. *Cyberpsychology, Behavior, and Social Networking*, *21*(7), 411–417. <https://doi.org/10.1089/cyber.2017.0708>
- Myers, T. A., & Crowther, J. H. (2009). Social comparison as a predictor of body dissatisfaction: A meta-analytic review. *Journal of Abnormal Psychology*, *118*(4), 683–698. <https://doi.org/10.1037/a0016763>
- Nabi, R. L., & Keblusek, L. (2014). Inspired by hope, motivated by envy: Comparing the effects of discrete emotions in the process of social comparison to media figures. *Media Psychology*, *17*(2), 208–234. <https://doi.org/10.1080/15213269.2013.878663>
- Ozimek, P., & Bierhoff, H. W. (2020). All my online-friends are better than me – three studies about ability-based comparative social media use, self-esteem, and depressive tendencies. *Behaviour & Information Technology*, *39*(10), 1110–1123. <https://doi.org/10.1080/0144929X.2019.1642385>
- Park, K., & Yang, T. C. (2017). The long-term effects of self-esteem on depression: The roles of alcohol and substance use during young adulthood. *The Sociological Quarterly*, *58*(3), 429–446. <https://doi.org/10.1080/00380253.2017.1331718>
- Park, S. Y., & Beak, Y. M. (2018). Two faces of social comparison on Facebook: The interplay between social comparison orientation, emotions, and psychological well-being. *Computers in Human Behavior*, *79*, 83–93. <https://doi.org/10.1016/j.chb.2017.10.028>

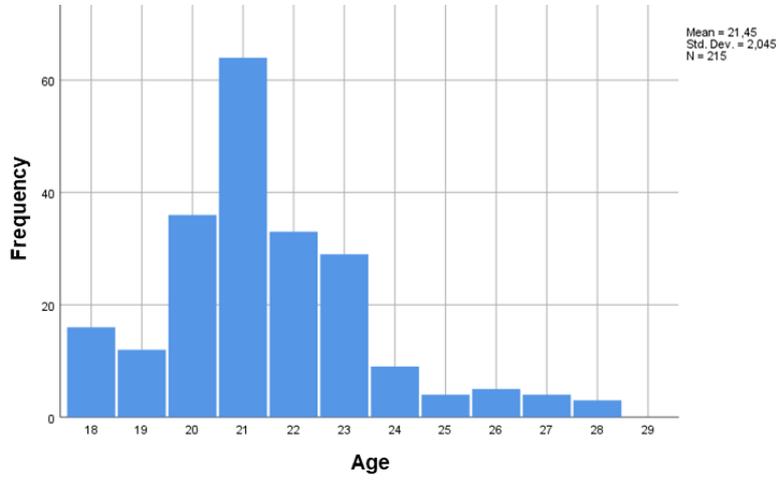
- Pituch, K. A., & Stevens, J. P. (2015). ). *Applied Multivariate Statistics for the Social Sciences: Analyses with SAS and IBM's SPSS* (6th ed.). Routledge.  
<https://doi.org/10.4324/9781315814919>
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, 27(2), 151–161.  
<https://doi.org/10.1177/0146167201272002>
- Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton University Press.  
<https://doi.org/10.1515/9781400876136>
- Sebre, S. B., & Miltuze, A. (2021). Digital media as a medium for adolescent identity development. *Technology, Knowledge and Learning*.  
<https://doi.org/10.1007/s10758-021-09499-1>
- Smith, R. H., & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 133(1), 46–64. <https://doi.org/10.1037/0033-2909.133.1.46>
- Suls, J., Martin, R., & Wheeler, L. (2000). Three kinds of opinion comparison: The triadic model. *Personality and Social Psychology Review*, 4(2), 219–237.  
[https://doi.org/10.1207/S15327957PSPR0403\\_2](https://doi.org/10.1207/S15327957PSPR0403_2)
- Summerville, A., & Roesse, N. J. (2008). Dare to compare: Fact-based versus simulation-based comparison in daily life. *Journal of Experimental Social Psychology*, 44(3), 664–671.  
<https://doi.org/10.1016/j.jesp.2007.04.002>
- Szmigiera, M. (2021, March 30). *Ranking of happiest countries worldwide 2020, by score*. Statista. Retrieved from <https://www.statista.com/statistics/1225047/ranking-of-happiest-countries-worldwide-by-score/>
- Tankovska, H. (2021, February 10). *Instagram: distribution of global audiences 2021, by age group*. Statista. Retrieved from <https://www.statista.com/statistics/325587/instagram-global-age-group>
- Tiggemann, M., & Anderberg, I. (2019). Social media is not real: The effect of ‘Instagram vs reality’ images on women’s social comparison and body image. *New Media & Society*, 22(12), 2183–2199. <https://doi.org/10.1177/1461444819888720>
- United Nations. (2021). Country classifications. In *World Economic Situation and Prospects 2021* (pp. 123–131). <https://doi.org/10.18356/9789210054980c007>
- Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social comparison, social media, and self-esteem. *Psychology of Popular Media Culture*, 3(4), 206–222.  
<https://doi.org/10.1037/ppm0000047>

- Wang, J. L., Wang, H. Z., Gaskin, J., & Hawk, S. (2017). The mediating roles of upward social comparison and self-esteem and the moderating role of social comparison orientation in the association between social networking site usage and subjective well-being. *Frontiers in Psychology, 8*, 771. <https://doi.org/10.3389/fpsyg.2017.00771>
- Yang, C. C., Holden, S. M., & Carter, M. D. (2018). Social media social comparison of ability (but not opinion) predicts lower identity clarity: Identity processing style as a mediator. *Journal of Youth and Adolescence, 47*, 2114–2128. <https://doi.org/10.1007/s10964-017-0801-6>

## Appendix A - Age Distribution of the Online Questionnaire Sample

**Figure 9**

*Age Distribution of the Participants of the Online Questionnaire Study*



## Appendix B - The Online Questionnaire Items and the Scales that they are based on

**Table 7**

*Overview of the Final Items of the Online Questionnaire and their Origins*

Construct	Final included item	Origin of item
Opinion-based social comparison	O1. During my most recent Instagram use, I faced opinions of others in their Instagram STORIES that made me think about my own opinion.	Newly created
	O2. During my most recent Instagram use, I faced opinions of others in their Instagram POSTS that made me think about my own opinion.	Newly created
	O3. During my most recent Instagram use, I tried to find out about opinions of others.	Newly created
	O4. During my most recent Instagram use, I encountered other people's opinions on various topics which made me think about my own opinion.	Newly created
	O5. During my most recent Instagram use, I looked at opinions of others to form my own opinion.	Newly created

	O6. During my most recent Instagram use, I found out what others think about topics that I want to know more about.	Based on SMSCS item: When using social media, I try to find out what others think about something that I want to learn more about (Yang et al., 2018)
	O7. During my most recent Instagram use, other users provided me with interesting insights.	Newly created
	O8. During my most recent Instagram use, I felt like talking with other Instagram users about mutual opinions and experiences.	Based on SMSCS item: On social media, I talk with others about mutual opinions and experiences. (Yang et al., 2018)
Ability-based social comparison	A1. During my most recent Instagram use, I thought about whether I am doing relatively better or worse than other people.	Based on SMSCS item: I don't really use social media to compare with others to see how well I'm doing (reversely coded) (Yang et al., 2018)
	A2. During my most recent Instagram use, the Instagram STORIES of others made me think about how interesting my own life is.	Newly created
	A3. During my most recent Instagram use, the likes and comments on Instagram POSTS of others made me	Newly created

think about my own popularity.

A4(R). During my most recent Instagram use, I did **NOT** compare with others to see whether I am doing relatively better or worse.

Based on SMSCS item: I don't really use social media to compare with others to see how well I'm doing (reversely coded) (Yang et al., 2018)

A5. During my most recent Instagram use, I compared how I am doing socially with other people.

Based on SMSCS item: On social media, I compare how I am doing socially with other people (Yang et al., 2018)

A6. During my most recent Instagram use, I compared my appearance with that of other people.

Newly created

A7. During my most recent Instagram use, I compared my own skills with that of other Instagram users.

Newly created

Social self-esteem

Social1(R). I am worried about whether I am seen as a success or failure.

Based on SSES item: I am worried about whether I am regarded as a success or failure. (Heatherton & Polivy, 1991)

Social2(R). I am worried about what other people think of me.

Based on SSES item: I am worried about what other people think of me. (Heatherton & Polivy, 1991)

	Social3(R). I feel less than others at this moment.	Based on SSES item: I feel inferior to others at this moment. (Heatherton & Polivy, 1991)
	Social4(R). I feel concerned about the impression I am making.	Based on SSES item: I feel concerned about the impression I am making. (Heatherton & Polivy, 1991)
	Social5(R). I am worried about looking foolish.	Based on SSES item: I am worried about looking foolish. (Heatherton & Polivy, 1991)
Appearance self-esteem	Appear1. I feel satisfied with the way my body looks right now.	Based on SSES item: I feel satisfied with the way my body looks right now. (Heatherton & Polivy, 1991)
	Appear2. I am satisfied with my weight.	Based on SSES item: I am dissatisfied with my weight. (Heatherton & Polivy, 1991)
	Appear3. I feel good about myself.	Based on SSES item: I feel good about myself. (Heatherton & Polivy, 1991)
	Appear4. I am pleased with my appearance right now.	Based on SSES item: I am pleased with my appearance right now. (Heatherton & Polivy, 1991)
	Appear5(R). I feel UNattractive.	Based on SSES item: I feel unattractive. (Heatherton & Polivy, 1991)
Performance self-esteem	Perform1. I feel confident about my abilities.	Based on SSES item: I feel confident about my abilities. (Heatherton & Polivy, 1991)

	Perform2(R). I feel frustrated about my performance.	Based on SSES item: I feel frustrated or rattled about my performance. (Heather-ton & Polivy, 1991)
	Perform3. I feel smart.	Based on SSES item: I feel as smart as others. (Heather-ton & Polivy, 1991)
	Perform4. I feel confident that I understand things.	Based on SSES item: I feel confident that I understand things. (Heather-ton & Polivy, 1991)
	Perform5. I feel like I'm doing well.	Based on SSES item: I feel like I'm not doing well. (Heather-ton & Polivy, 1991)
Feelings of envy	Envy1. During my most recent Instagram use, I experienced feelings of envy (jealousy).	Based on item of Park & Beak (2018): When you compare yourself with network others on Facebook, how much do they make you feel envious
	Envy2. During my most recent Instagram use, I felt jealous when I saw the posts/stories of other Instagram users.	Based on item of Park & Beak (2018): When you compare yourself with network others on Facebook, how much do they make you feel envious
	Envy3. During my most recent Instagram use, I felt feelings of envy towards other Instagram users.	Based on item of Park & Beak (2018): When you compare yourself with network others on Facebook, how much do they make you feel envious
Feelings of inspiration	Inspirat1. During my most recent Instagram use, I experienced feelings of inspiration.	Based on item of Park & Beak (2018): When you compare yourself with network others on Facebook, how much do they make you feel inspired

Inspirat2. During my most recent Instagram use, I felt inspired when I saw the posts/stories of other Instagram users.

Based on item of Park & Beak (2018):  
When you compare yourself with network others on Facebook, how much do they make you feel inspired

Inspirat3. During my most recent Instagram use, I felt inspired by other Instagram users.

Based on item of Park & Beak (2018):  
When you compare yourself with network others on Facebook, how much do they make you feel inspired

## Appendix C - The Online Questionnaire

-----Page 1-----

Dear respondent,

You are being invited to participate in a research study about Instagram use and self-image.

This study is being conducted by Kim Beenen from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

The purpose of the study is to see what short-term effects actual Instagram use can have on individuals' self-image. The survey will take you approximately 10 minutes to complete. The data will be used solely for the researcher's Bachelor Thesis in Communication Science. Moreover, the data will be handled confidentially and anonymously.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any question.

This questionnaire contains specific questions about your self-image. If you feel uncomfortable answering questions about your self-image, please feel free to not continue with this questionnaire.

We believe there are no known risks associated with this study and all precautions are being taken to minimize potential harms, such as to your anonymity. We will minimize any risks by storing the data offline and anonymize your provided responses.

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to provide a reason.

- Yes, I consent
- No, I do not consent

Researcher contact details:

Kim Beenen

k.t.beenen@student.utwente.nl

-----Page 2-----

Welcome to this study! Before starting the questionnaire, I would like to ask you to open up Instagram and scroll through the posts of other Instagram users and watch Instagram stories of people you follow for about 5-10 minutes. When you are done (or just have done so prior to this questionnaire), please continue to the next page.

-----Page 3-----

Did you spend around 5-10 minutes (or longer) on Instagram before filling in the survey?

- Yes
- No

In my most recent Instagram use, I... (multiple answers can be selected)

- Scrolled through the posts of other Instagram users
- Watched stories of other Instagram users
- Liked posts
- Commented on others' posts
- Send a DM (direct message)
- Watched Reels
- Watched Videos
- I did not use Instagram for 5-10 minutes
- Other, namely ....SPACE FOR WRITTEN ANSWER...

-----Page 4-----

How old are you?

...SPACE FOR WRITTEN ANSWER...

What is your nationality?

- Dutch
- German

- Other, namely ...SPACE FOR WRITTEN ANSWER...

What is your gender?

- Male
- Female
- Other
- Prefer not to say

What is your highest obtained educational level (highest education that you successfully completed)?

- Primary School
- Secondary School (similar to high school)
- Bachelor's or equivalent level
- Master's or equivalent level
- PhD or equivalent level
- Other degree, namely ...SPACE FOR WRITTEN ANSWER...

On a day that you use Instagram, how many minutes in total do you spend on the application?  
...SPACE FOR WRITTEN ANSWER...

On average, how many days per week do you use Instagram?

Less than 1 day a week

- 1 day a week
- 2 days a week
- 3 days a week
- 4 days a week
- 5 days a week
- 6 days a week
- 7 days a week

Please keep in mind the activities that you engaged in during your most recent Instagram use and indicate how much you agree with the following statements.

During my most recent Instagram use, I faced opinions of others in their Instagram STORIES that made me think about my own opinion.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I faced opinions of others in their Instagram POSTS that made me think about my own opinion.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I tried to find out about opinions of others.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I encountered other people's opinions on various topics which made me think about my own opinion.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I looked at opinions of others to form my own opinion.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I found out what others think about topics that I want to know more about.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, other users provided me with interesting insights.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I felt like talking with other Instagram users about mutual opinions and experiences.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I thought about whether I am doing relatively better or worse than other people.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, the Instagram STORIES of others made me think about how interesting my own life is.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, the likes and comments on Instagram POSTS of others made me think about my own popularity.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I did **NOT** compare with others to see whether I am doing relatively better or worse.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I compared how I am doing socially with other people.

- Strongly disagree
- Disagree

- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I compared my appearance with that of other people.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I compared my own skills with that of other Instagram users.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

-----Page 7-----

The following questions are about how you currently feel about yourself. Please indicate how much you agree with the following statements.

I am worried about whether I am seen as a success or failure.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I am worried about what other people think of me.

- Strongly disagree

- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel less than others at this moment.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel concerned about the impression I am making.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I am worried about looking foolish.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel satisfied with the way my body looks right now.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I am satisfied with my weight.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel good about myself.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I am pleased with my appearance right now.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel UNattractive.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel confident about my abilities.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree

- Strongly agree

I feel frustrated about my performance.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel smart.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel confident that I understand things.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I feel like I'm doing well.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

The following questions are about how you felt during your most recent Instagram use. Please indicate how much you agree with the following statements.

During my most recent Instagram use, I experienced feelings of envy (jealousy).

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I felt jealous when I saw the posts/stories of other Instagram users.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I felt feelings of envy towards other Instagram users.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I experienced feelings of inspiration.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I felt inspired when I saw the posts/stories of other Instagram users.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

During my most recent Instagram use, I felt inspired by other Instagram users.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

-----Page 9-----

CLICK TO THE NEXT PAGE TO FINISH THE QUESTIONNAIRE

When you click to the next page, you finish the questionnaire and you consent one more time to participate in the study.

The real purpose of this study was to find out what short-term effects different types of social comparison activities on Instagram can have on the different social-, appearance-, and performance aspects of young adults' self-esteem.

If you experience any negative consequences related to a negative self-image you can find help by, for example, asking your general practitioner for advice.

If you have any questions regarding this research, or you want to have a summary of the final results of the study, feel free to contact Kim Beenen (k.t.beenen@student.utwente.nl).

Thank you very much for participating! Feel free to share the link of this survey with others, it is very much appreciated 😊

Click to the next page to end the questionnaire.

## Appendix D - Checking Assumptions of Multivariate Linear Regression

### Outliers

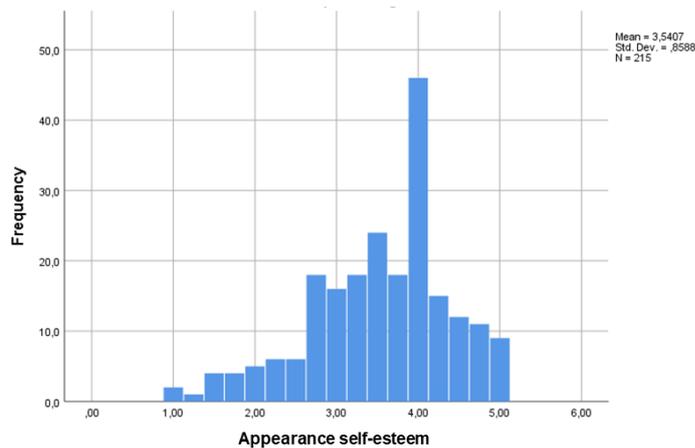
The data was checked on outliers. As mentioned before, two responses were deleted as they included extreme outliers for performance self-esteem. In the final data set, there were no extreme outliers included.

### Assumption of Normality

The assumption of normality was tested for the three dependent variables by examining histograms, P-P plots, and Q-Q plots (see Figure 10, 11, 12, 13, 14, and 15). For all three dependent variables (appearance-, performance-, and social self-esteem), the histograms show shaped that suggest normality. Moreover, even though they deviate slightly for appearance- and performance self-esteem, the data points in the P-P plot and Q-Q fall, overall, close to the 'ideal' diagonal line. Hence, overall, the assumption of normality seems to be met for all dependent variables.

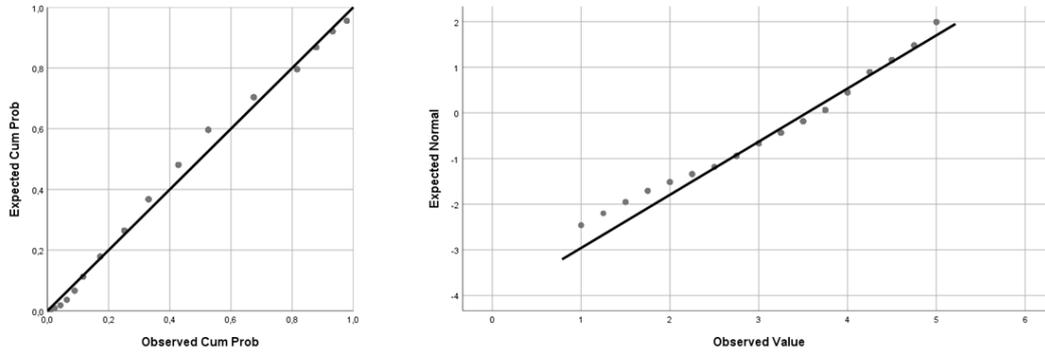
**Figure 10**

*Histogram of Appearance Self-esteem to check for Normality*



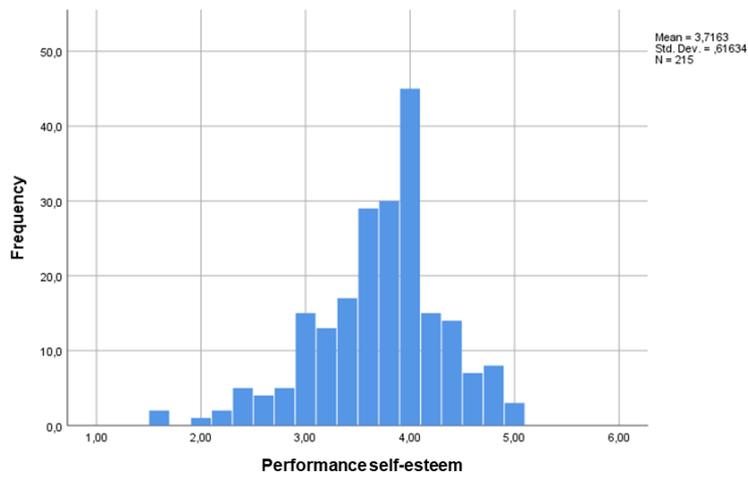
**Figure 11**

*P-P plot and Q-Q plot (respectively) of Appearance Self-esteem*



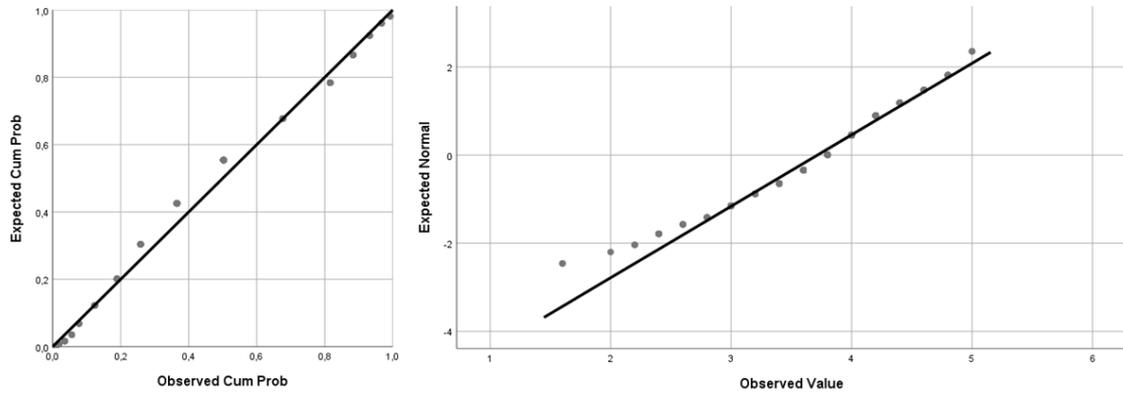
**Figure 12**

*Histogram of Performance Self-esteem to check for Normality*



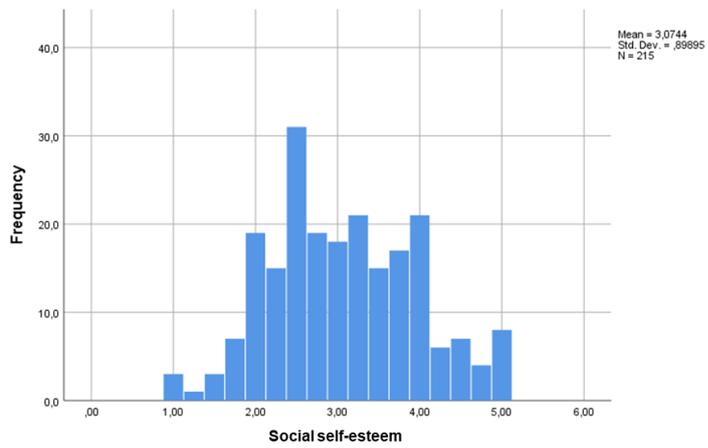
**Figure 13**

*P-P plot and Q-Q plot (respectively) of Performance Self-esteem*



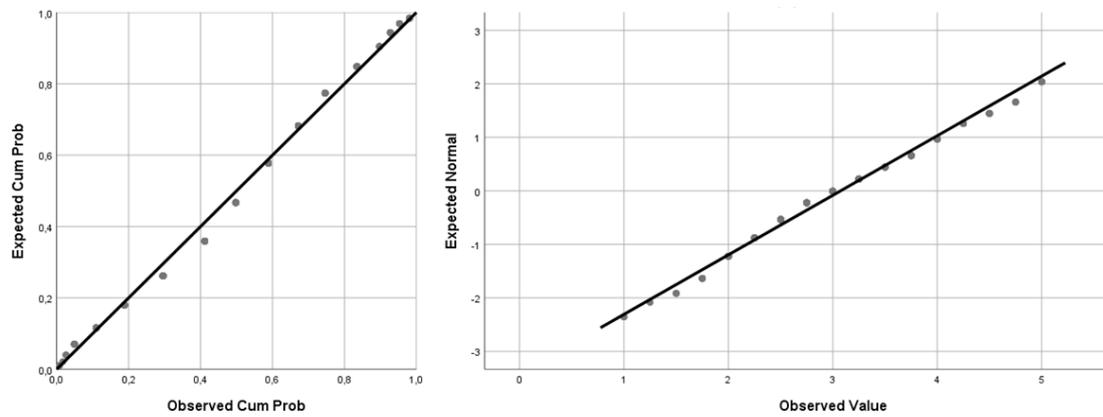
**Figure 14**

*Histogram of Social Self-esteem to check for Normality*



**Figure 15**

*P-P plot and Q-Q plot (respectively) of Social Self-esteem*

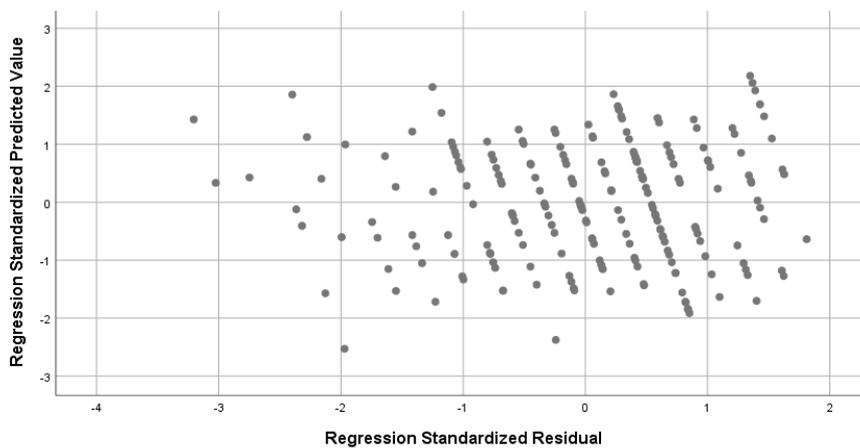


### Assumption of Homoscedasticity and Linearity

To check the assumption of homoscedasticity and linearity, it was checked whether there was a systematic relationship between the predicted values and the errors of the model. For both assumptions, the scatter plot of standardized predicted values against standardized residuals were examined. There was no clear funnel or curve shape to be found in the scatter plots (see Figures 16, 17 and 18), meaning that both the assumptions of homoscedasticity and linearity are met.

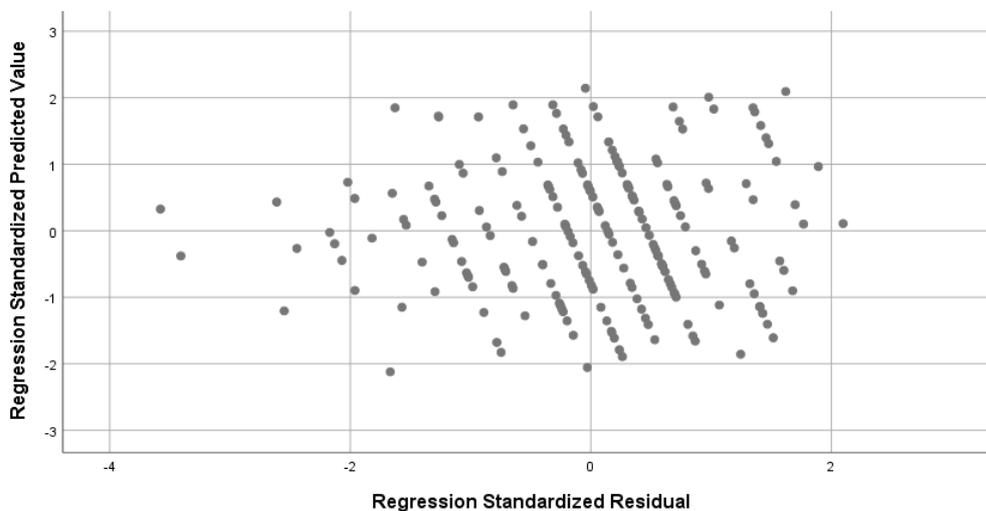
**Figure 16**

*Scatterplot to check Homoscedasticity and Linearity for Appearance Self-esteem*



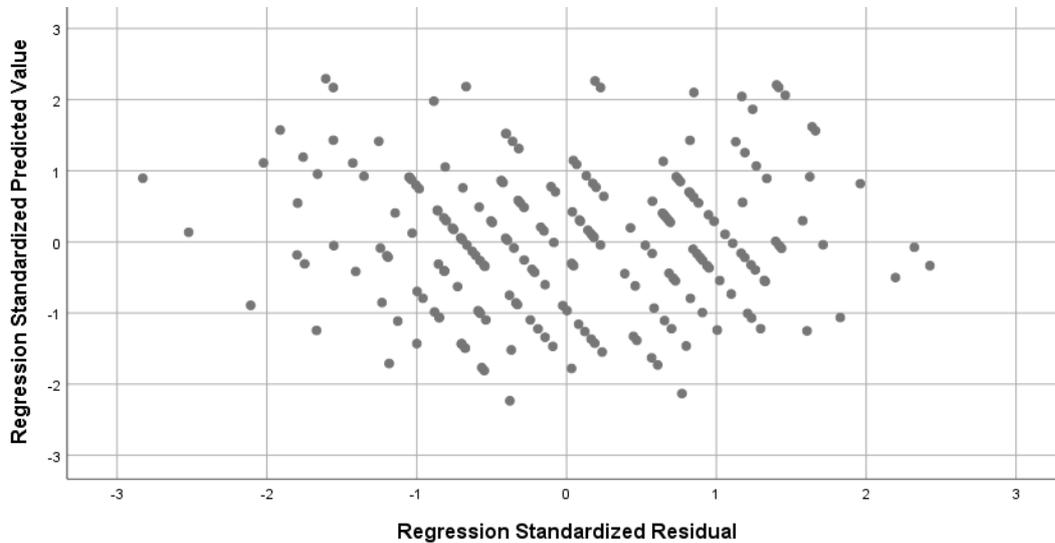
**Figure 17**

*Scatterplot to check Homoscedasticity and Linearity for Performance Self-esteem*



**Figure 18**

*Scatterplot to check Homoscedasticity and Linearity for Social Self-esteem*



### **Assumption of Independence**

To check the assumption of interdependence, it was checked whether the errors in the model were unrelated to each other using the Durbin-Watson test. The Durbin-Watson value of Social State Self-Esteem was 2.08, of Appearance State Self-Esteem 1.76, and of Performance State Self-Esteem 2.07. All these values fall between 1 and 3, indicating that there is no cause for concern.

### **Assumption of Multicollinearity**

Lastly the assumption of multicollinearity was checked by examining correlation matrix of predictor variables and by calculating the variance inflation factor (VIF). The correlation matrix showed that there were no predictor variables that correlate highly (above .8 or .9). Moreover, the VIF-values of the predictors are all below 10. These results indicate that there is no multicollinearity.

## Appendix E - Diary Study Questionnaire

-----Page 1-----

Dear respondent,

You are being invited to participate in a diary study about actual Instagram use. You will be asked to fill in questionnaires about your daily Instagram use during the evening (starting from 18:00) of 3 different days in the course of a week. The researcher will provide you with the link to the survey on the specific days.

This study is being conducted by Kim Beenen from the Faculty of Behavioural, Management and Social Sciences at the University of Twente.

The purpose of the study is to see what young adults' daily use of Instagram looks like. The survey includes open-ended questions and will take you approximately 10 minutes to complete. The data will be used solely for the researcher's Bachelor Thesis in Communication Science. Moreover, the data will be handled confidentially and anonymously.

Your participation in this study is entirely voluntary and you can withdraw at any time. You are free to omit any question.

We believe there are no known risks associated with this study and all precautions are being taken to minimize potential harms, such as to your anonymity. We will minimize any risks by storing the data offline and anonymize your provided responses.

You are about to begin with the first questionnaire.

I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to provide a reason.

- Yes, I consent
- No, I do not consent

Researcher contact details:

Kim Beenen

k.t.beenen@student.utwente.nl

-----Page 2-----

What is your age?

... SPACE FOR WRITTEN ANSWER ...

What is your gender?

- Male
- Female
- Other
- Prefer not to say

What is your nationality?

- Dutch
- German
- Other, namely ...SPACE FOR WRITTEN ANSWER...

What is your highest obtained (successfully completed) educational level?

- Primary School
- Secondary School (similar to high school)
- Bachelor's or equivalent level
- Master's or equivalent level
- PhD or equivalent level
- Other degree, namely ...SPACE FOR WRITTEN ANSWER...

-----Page 3-----

The following open-ended questions are about your Instagram use during this day. Please read the question and write your answers in the text boxes.

In total, how long did you spend on Instagram today? (indicate in minutes)

... SPACE FOR WRITTEN ANSWER...

What activities did you engage in on Instagram today?

- Watched stories of other Instagram users
- Liked posts
- Commented on others' posts
- Send a DM (direct message)
- Watched Reels
- Watched Videos
- Uploaded a post'
- Uploaded a story
- Looked at my follower rate
- Looked at my own profile
- Send a follower request
- Other, namely ...SPACE FOR WRITTEN ANSWER...

For what purposes did you use Instagram today?

...SPACE FOR WRITTEN ANSWER...

Today, were there any opinions that others expressed on Instagram that you agreed/disagreed with? Can you elaborate on (1) what opinion(s) you were exposed to, (2) why you agreed/disagreed, (3) how the opinion(s) made you feel, (4) whether the opinion(s) changed your opinion, (5) how you felt towards the person(s) expressing the opinion(s), and (6) how the opinion(s) made you think or feel about yourself.

... SPACE FOR WRITTEN ANSWER ...

Were there moments, today, that you compared yourself with other Instagram users on how well you are doing (e.g. on a social, appearance, or competency level)? Can you elaborate on (1) the comparisons that you made, (2) why you compared yourself with the other(s), (3) how these comparison(s) made you feel, (4) what you thought when you compared yourself, (5) how you felt towards the one(s) you compared yourself with.

... SPACE FOR WRITTEN ANSWER ...

When you click to the next page, you finish the questionnaire and you consent one more time to participate in the study.

Thank you for taking your time to fill in the 1<sup>st</sup>/2<sup>nd</sup>/3<sup>rd</sup> questionnaire.

(The day after tomorrow, I'll ask you to fill in the 2<sup>nd</sup>/3<sup>rd</sup> questionnaire.)

If you have any questions regarding this research, or you want to have a summary of the final results of the study, feel free to contact Kim Beenen ([k.t.beenen@student.utwente.nl](mailto:k.t.beenen@student.utwente.nl)).

Click to the next page to end the questionnaire.

## Appendix F - Codebook Diary Study

**Table 8**

*Codebook for the Diary Study*

#	Main code	#	Sub-code	Explanation
	Day 1			
	Day 2			
	Day 3			
	Participant 1			
	Participant 2			
	Participant 3			
	Participant 4			
	Participant 5			
	Participant 6			
	Participant 7			
	Participant 8			
	Participant 9			
	Participant 10			
	Male			
	Female			
1.	Purpose of Insta use	1.1.	Distraction	Using Instagram to procrastinate or distract oneself
		1.2.	Passing time	Using Instagram to pass time or to fight boredom
		1.3.	Entertainment	Using Instagram to enjoy oneself, for fun, or for relaxation
		1.4.	Interact with friends	Using Instagram to interact with friends, send DMs, etc.
		1.5.	Stay updated	Using Instagram to stay updated on other people's lives (incl. watching feed, stories, etc.)

2. Opinion-based social comparison	1.6. Update others about own life	Using Instagram to share experiences, posts, insights of own life Comparisons of thoughts, attitudes, values, and beliefs.
	2.1. Political opinion	Concerning opinions about political parties and government
	2.2. Corona opinion	Concerning opinion about the corona situation, regulations, behaviours etc.
	2.3. Music opinion	All opinions related to music
	2.4. Sports opinion	All opinions related to sport
	2.5. Lifestyle opinion	All opinions related to life style, health, and body image
	2.6. Opinion about a person	Concerns opinions about people (incl. celebrities)
	2.7. Climate change opinion	All opinions related to climate change
	2.8. Opinion about Injustice	All opinions related to injustice or unfair cases
	2.9. No opinions	All content related to participants not seeing, recalling, or focusing on opinion content on Insta (incl. reasons why)

3. Ability-based social comparison
- Comparing achievement and performance in the widest sense, is inherently judgmental and competitive, and focuses on how well one is doing relative to others.
- 3.1. Appearance  
Concerning all comparisons regarding beauty and body, comparisons of own feed with others
  - 3.2. Sport achievements  
Concerning all comparison regarding sporting, working out, fitness, sport achievements
  - 3.3. Knowledge  
Concerning all comparisons around knowledge (e.g., about music or politics)
  - 3.4. Work  
Concerning all comparisons regarding work performance (e.g. entrepreneurs)
  - 3.5. School  
Concerning all comparisons regarding school performance
  - 3.6. Wealth  
Comparing luxury or money
  - 3.7. Social life  
Comparing how social you are (e.g. looking at social lives of others, comparing number of comments, likes, followers)
  - 3.8. Corona behaviour  
Concerning all comparisons of desirable corona-care-free situations that other people are in
  - 3.9. No comparison  
All content related to making no comparison with others (incl. reason why)

4	Negative feelings	4.1	Negative feelings towards self	Doubting the self, feeling displeased with self, or feeling guilty, feeling jealous
		4.2.	Negative feelings towards others	Not understanding others or feeling disappointed in them, Feeling distance between you and other people or a 'us VS them' feeling, thinking other person is incapable (e.g., think other is not knowledgeable, or incompetent)
5.	Positive feelings	5.1.	Positive feelings towards self	Feeling inspired or motivated, Feeling confident or proud, feelings related to self-acceptation, feeling better than/superior to others, feeling of being enlightened and being aware
		5.2.	Positive feelings towards other	Feeling understood by the other, feeling happy for the other, feeling respect towards other
6.	Neutral feelings			Feeling neutral

---