



Social comparison and mental health

A study investigating the effect of social comparison-objects on the mental health outcomes of Dutch adolescents

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Abstract

This study explores the effect of social comparison on the mental health of Dutch adolescents. More specifically, it examines whether upward-downward social comparison along comparison-objects affects depression, anxieties, eating disorder or general mental health. Additionally, social comparison orientation (SCO) is taken into account to test whether the relation becomes stronger for adolescents who tend to compare themselves a lot.

To do so, a self-designed questionnaire was conducted among 156 first year high school pupils in the Netherlands. Respondents rated themselves compared to their classmates along several items. In the analysis ten comparison-objects were derived from the data using factor analysis and reliability tests. Then, the mental health outcomes were separately regressed by all comparison-objects.

The results showed that the prediction of mental health outcomes depended on the object of comparison. Social comparison on success and weight interpretation were the strongest predictors for the mental health outcomes of Dutch adolescents. Moreover, different comparison objects affected different mental health outcomes. Depression was predicted by social comparison on success, weight interpretation, appearance, sport performance, school performance and popularity. Eating disorders and general mental health were mainly predicted by social comparison on weight interpretation and success. Anxieties were not affected by social comparison on any of the comparison-objects. All results confirmed a relation between upward comparison and poor mental health outcomes. Thus, comparing oneself unfavorably led to worse mental health outcomes than comparing oneself favorably. This relation was hardly affected by the respondents' level of SCO.

Chapter 1. Introduction

1.1 Mental health disorders among adolescents

The current mental health of Dutch adolescents needs attention. In a study questioning over thousand Dutch adolescents, the majority (63%) indicates to have psychological problems (Kruip, Janmaat & Rebel, 2013). In 2012, suicide was in the top three of causes of death among adolescents (WHO, 2012) and 1 in 5 adolescents experienced severe mental health ailments before the age of 19 in the Netherlands (GGZ, 2015). Adolescents are defined within the age range of 12 to 18, attending secondary school as main occupation (Beemen, 2010). Adolescence has long been characterized by low mental health, however mental health ailments worsen over time within this particular life phase (Collishaw, Maughan, Goodman & Pickles, 2004).

The impairment of adolescents' mental health is societal relevant, as it disturbs the transition from childhood to adulthood resulting in even further psychological problems at an older age. Nearly 35% of the global burden of disease is rooted in adolescence (Beemen, 2010; WHO, 2012; Scholes, 2007). The World Health Organization (2016) describes this as follows: *"Poor mental health can have an important effect on the wider health and development of adolescents and is in association with several health and social outcomes such as higher alcohol, tobacco and illicit substances use, adolescent pregnancy, school dropout and delinquent behaviors. There is a growing consensus that healthy development during childhood and adolescence contributes to good mental health and can prevent mental health problems in a later stage"*.

This study defines mental health ailments as depression, anxieties and eating disorders. Focusing on these disorders is reasoned because these are the most common ailments among adolescents (Merikangas, He, Brody, Fisher, Bourdon, & Koretz, 2010).

According to Verhulst, Van der Ende, Ferdinand, Kasius (1997) almost 3% of the Dutch adolescents had a depressive disorder. A more recent self-rapport study revealed that 3.4% of Dutch adolescents had a depression for longer than six months in 2016. The self-reported rates of depression in 2016 doubled in comparison to a similar study conducted in 2014 (CBS, 2017). A depressive disorder is characterized by restlessness, sadness and loss of interest. Depressive adolescents are frequently irritable and additionally cope with learning problems or troubled social behavior. Problematic sleeping, disordered eating behavior and physical ailments often occur simultaneously (Wilde, 2014).

Besides depression, anxieties frequently occurs among adolescents. An interview study shows a 10% prevalence of diagnosed anxiety disorders among Dutch adolescents (Verhulst et al., 1997). Additionally, almost 20% of Dutch adolescents cope with problematic anxiety symptoms (Hale, Raaijmakers, Muris, Hoof, & Meeus, 2008). Anxiety symptoms are an unpleasant cramped mental state of fear, which turn problematic when it becomes excessive, last longer than necessary and when it obstructs daily life (Wilde, 2014).

Moreover, eating disorders are taken into account, as it usually develops in adolescence (NIH, 2015; GGZ, 2006). In Western countries 15 to 19-year-old girls are seen as the largest risk group (Jacobi, Hayward, de Zwaan, 2004; Smink, 2016). An eating disorder refers to disordered eating habits and weight regulations, such as purging food, binge-eating and avoiding or restricting food intake (GGZ, 2006). Consequences of eating disorders can be life threatening and are frequently accompanied by other mental health ailments, such as substance abuse, depression or anxieties (NIH, 2015; Johnson, Cohen and Kasen, 2002).

This study explores the reason why Dutch adolescents suffer from symptoms of depression, anxiety and eating disorders. First, possible causes of mental health disorders are discussed in paragraph 1.2. Paragraph 1.3 explains the sensitive characteristics of adolescence in relation to health outcomes. Subsequently, paragraph 1.4 focusses on social comparison as a possible explanation of the current health status of Dutch adolescents. Paragraph 1.5 continues exploring the relation between social comparison and mental health outcomes. Then, paragraph 1.6 explains the role of social comparison-objects regarding mental health outcomes. The summed-up findings and limitations of current research are set out in paragraph 1.7. Paragraph 1.8 presents how social comparison is explored as a causal mechanism of mental health outcomes and presents the research questions.

1.2 Causes of mental health disorders

A strong and good mental health of Dutch adolescents is compromised by ailments as depression, anxieties and eating disorders (Merikangas et al., 2010). Predicted risk factors are explored to gain insight in the situation at hand.

The probability to develop a mental health ailment is caused by personal and environmental traits. Personal traits are individual risk factors which explain why certain adolescents are more likely to develop mental health ailments than others.

There are four main individual level predictors of mental health ailments:

1. *Genetics*: the personal genetic structure influences the development of depression significantly (Rooijen, 2012b) moderately affects anxiety symptoms (Rooijen, 2012a; Verhulst, 2006) and partly explains symptoms of eating disorder (Bulik, Sullivan & Wade, 2000).
2. *Physiological vulnerability*: a deviant mechanism of hormone regulators for example, affect the predisposition of mental illness (Rooijen, 2012b; Kaye et al., 2005 in GGZ, 2006). Physiological risks predicting anxiety and depression are e.g. physical injury, chronic or severe illness and physical or mental handicaps (Rooijen, 2012a; Rooijen, 2012b). Premature puberty is seen as a risk, since it predicts a higher chance of eating disorders among adolescent girls. However, this is probably mediated by feeling different than the peer group (Fairburn, Welch & Doll, 1997).
3. *Temperament and personality traits*: a negative emotional condition, low self-esteem and an inward facing attitude increase the risk of developing depression (Landelijk Platform Preventie Depressie en Angst, 2004 in Rooijen, 2012b). Neurotic personality traits and avoidant behavior are features of temperament influencing the development of anxieties (Rooijen, 2012a). Eating disorders are significantly more common among shy and sub-assertive personalities (Noordenbos, 1988 in GGZ, 2006).

4. *Additional personality traits*: for example, disturbed cognition styles, coping strategies (Rooijen, 2012b) and the presence of other mental health ailments (Jacobi, Hayward & de Zwaan, 2004).

Environmental traits are contextual factors affecting risks of mental health ailments. Eating disorders for example, dominantly occur in societies or subcultures where slimness is an ideal and barely occur in societies where food is scarce (Nasser & Katzman, 1999 in GGZ, 2006). The strongest environmental trait predicting depression among adolescents are negative life events which are uncontrollable, reoccurring and stressful, e.g. being rejected or bullied (Rooijen, 2012b). Anxieties are most influenced by upbringing and adhesion processes (Verhulst, 2006). Anxious parents can model anxieties, way of coping and avoidant behavior.

Other environmental traits are family and peer-relationships. Good family relations, such as having a good relationship with at least one of the parents and/or parents whom mutually relate well decreases the development of depression (Rooijen, 2012b), anxiety (Verhulst, 2006) and eating disorders (Fairburn, Welch & Doll, 1997). Family relations are *good* when they provide a secure environment, which is absent of hassles and the adolescent feels safe, trusted and free (Helseth & Misvaer, 2010). Peer relations include close friends and the general peer group. First of all, having few friends, having little or no contact with others or lacking intimate relationships increases the probability of developing mental health ailments (Rooijen, 2012b; Helseth & Misvaer, 2010). Secondly, social acceptance by peers strongly affects mental health outcomes (McElhanay, Antonishak & Allan, 2008). Peer perceived social status is directly related to the potential development of eating disorders (Smink, 2016). Lacking social acceptance causes social exclusion and influences the emotional condition and avoidant behavior. In turn, it increases the risk of developing depression and anxiety symptoms (Landelijk Platform Preventie Depressie en Angst, 2004 in Rooijen, 2012b).

Thus, the deteriorating state of Dutch adolescents' mental health is caused by personal traits as genetic structure, physiological specifics or temperament and environmental traits such as the absence of good family relations, lack of friends and the level of social acceptance by the peer group. It is unlikely though for one risk factor alone to fully explain the development of mental health disorders. Whether mental health disorders develop depends on both individual traits and environmental traits (Cooper, 1995 in GGZ, 2006; Hankin, 2006).

1.3 Adolescence

Thus, the development of mental health disorders depends on individual and environmental traits. However, it remains unclear what triggers the development of mental health disorders specifically in adolescence. Why do the causes of mental health disorders described above lead to mental health ailments for adolescent in such greater number than for other life-stages?

Adolescence is featured by change, as significant physiological growth and transitions on individual, cognitive, social and contextual level (AACAP, 2011; Beemen, 2010; Noom, Dekovic & Meeus, 1999; Vonk, 2009). One crucial characteristic of adolescence is identity formation to become autonomous (Noom et al. 1999; Vonk, 2009). To do so, adolescents experiment, compare and adjust their behavior and opinions. Adolescents' thoughts are confiscated by questions such as *Who am I? What do I want?*

and *What do others think of me?* To answer these questions, adolescents depend on the interaction with others (Vonk, 2009). To become self-contained, adolescents increasingly develop evaluative skills (AACAP, 2011; Noom et al., 1999). Social comparison facilitates a critical evaluation of their own behavior and the behaviors, norms, values and ideas of others (Beemen, 2010). The identification-phase includes more self-consciousness and a higher tendency of self-reflection. This is associated with high rates of socially comparing oneself to others (Gibbons & Buunk, 1999). Adolescents gather information on their social world via social comparison, to develop a personal and social identity and to adjust to physical and mental changes (Kroger, 1996).

Thus, mental health ailments such as depression, anxiety and eating disorder occur in abundance among adolescents and are caused by a combination of individual and environmental factors. The causes of these ailments trigger mostly adolescents as they struggle to shape their identity and autonomy using social comparison.

1.4 Social comparison

Festinger introduced the term *social comparison* in 1954. People have the basic need for self-evaluation in order to assess their opinions and adjust their abilities. These opinions and abilities are referred to as objects of comparison. When an objective, non-social base for evaluation is applicable, for example average grades, CITO-scores or IQ-rates, people tend to compare themselves to these criteria. Absent of an objective base though, in case of comparing ones' level of popularity or attractiveness, people tend to socially compare themselves to the norms and values of others. The initial motivation for social comparison proposed by Festinger (1954) was the idea of a unidirectional drive upward, meaning the tendency of people to compare themselves to others who are slightly better off to improve oneself.

Social comparison entails more than solely an unidirectional drive upward, as it affects both negative and positive mental health outcomes (Cheng Fung & Chan, 2008; Wheeler, 2000; Weary, March & McCormick, 1994; Buunk, Groothof & Siero, 2007; Rinn, Jamieson, Gross, & McQueen, 2008; Tylka & Sabik, 2010). The theory of upward-downward comparison explains the relation between social comparison and mental health (Wills, 1981). *Downward social comparison* is comparing to someone delivering a poorer performance regarding the object of comparison. Perceiving oneself as better off, reduces anxiety and boosts the self-esteem. *Upward social comparison* is the comparison along a comparison-object with someone performing better. Comparing to someone more competent can deflate the ego and negatively affect mental health (Dijkstra, Kuyper, Van der Werf, Buunk & Van der Zee, 2008).

Social comparison is most prominent within adolescence compared to other stages of life (Kroger, 1996; Strahan & Cressman, 2006; Myers & Crowther, 2009). Peculiarly, only a limited amount of studies aim at adolescents since most social comparison research is directed at either children (Ruble, Feldman & Boggiano, 1976; Demo & Savin-Williams, 1983; Butler, 1998) or adults (Festinger, 1954; Callan, Kim & Matthews, 2015).

Thus, social comparison is a self-evaluation tool, mainly used by adolescents. Along comparison-objects they either compare upward, which can have a deteriorated influence, or downward, which can improve mental health.

1.5 Social comparison in relation to mental health

Several study results confirm the upward-downward comparison theory of Wills (1981). According to Cheng et al. (2008) downward comparison among 205 elderly people reduces depression rates. These findings were confirmed by Wheeler (2000) who added that low self-esteem results in a stronger negative effect to upward comparison. Buunk et al. (2007) reported upward comparison to result in a significant drop in life-satisfaction and downward comparison leading to an improved life-satisfaction. However, other scholars conclude the opposite. Mojtabai (2008) investigated the association of social comparison on mental health with help seeking behavior. People who compare their distress upward (I am more anxious, nervous or worried compared to others) more easily look for help. People who compare their distress downward (I have less distress compared to others) showed less help-seeking behavior which results in more mental health ailments. Another study presents similar results upward comparison results in more positive and less negative consequences regarding burnouts (Buunk, Ybema, Gibbons & Ipenburg, 2001). Thus, comparing to someone better off is expected to hinder mental health. Just as comparing to someone less fortunate is expected to boost mental health. Even though some studies confirm the expected results, other studies present exactly opposite results. The question rises if this inconsistency reveals possible influence of other mechanisms.

Gibbons and Buunk (1999) proposed the concept of social comparison orientation (SCO) which refers to individual differences in the tendency to compare oneself with others. Individual differences in the interest of social comparison explains mental health outcomes as a moderator in Buunk et al. (2007). Their study reports stronger effects of social comparison on life satisfaction for those with a high SCO. In other words: the life satisfaction of respondents who frequently compare themselves were affected stronger by upward or downward comparison on a specific object than for respondents who did not compare themselves frequently.

In summary, scholars relate upward and downward social comparison along a comparison-object to mental health ailments. However due to contradictory findings it is still unclear whether this relation is positive or negative. In addition, either a negative or positive relation might be stronger among people with a high SCO and weaker among people with a low SCO.

1.6 Comparison-object

To compare oneself upward or downward is solely possible along a *comparison-object*, as personality traits, opinions or abilities (Wood, 1989 in Jones, 2001). Some scholars indicate different comparison-objects to influence the effect of social comparison (Bryne, 1988; Wheeler, 2000; Schafer, 2012). People evaluate themselves along comparison-objects in many situations which differ from how often they score a goal in a friendly soccer game to their marriage situation. Thus, some comparison-objects are more relevant than others.

The effect of upward-downward comparisons on mental health relates highly to the importance of the object (Dijkstra et al., 2008). In a study of Jones (2001) adolescents with a mean age of 12.6 were asked to compare themselves along several comparison-objects regarding appearance. Social comparison on certain objects related stronger with body dissatisfaction than others. The result differed between gender: the comparison-object body shape affected girls' body dissatisfaction

stronger, while for boys, facial characteristics were most influential. For 12-year-old boys, body shape was less relevant, though they possibly have some concerns about facial hair. Facial characteristics were a more relevant comparison-object for boys and resulted therefore in stronger body dissatisfaction outcomes. For girls on the other hand, body shape was more relevant as it is more idealized in the media for them. Because body shape was a relevant comparison-object for girls, it affected body dissatisfaction stronger.

Summarized, the effect of upward-downward comparisons on mental health probably differs along different objects. The strength of the effect can be determined by the importance of the comparison-object. However, current literature investigating social comparison among adolescents only focused on appearance (Myers & Crowther, 2009; Jones, 2001), social class (Demo & Savin-Williams, 1983; Bannink, Pearce & Hope, 2016) and academic abilities (Marsh & Shavelson, 1985; Bryne, 1988). The effect on health outcomes compared to other comparison-objects was not taken into account, since these studies emphasized solely on one specific comparison-object.

1.7 Summary of current findings and limitations

With regard to the current findings, it is clear that the mental health status of Dutch adolescents calls for alarm. Dutch adolescents mainly deal with ailments such as depression, anxiety and eating disorders. Individual traits as genetics and physiological vulnerability and environmental factors as family, friends and peer-groups can not only affect the development, but also enhance these critical ailments. As adolescence is an intense period of transition towards more autonomy, adolescents are sensitive to self-evaluative information from their surroundings. Comparing themselves either upward or downward along various objects as skills, ideas, norms and behaviors, adolescents shape their identity and take their place in society.

However, current research on comparison among adolescents is not sufficient. An influential factor in predicting mental health outcomes among adolescents is the relevance of the object of comparison. Though except for appearance, social class and academic abilities, the effect of different comparison-objects remains ignorant. Thus far, it is still unclear which comparison-objects predict an effect on adolescents' mental health all together. How comparison-objects relate to each other regarding mental health outcomes is likewise unknown. Therefore, it is unclear if one comparison-object is more or less influential than another comparison-object. Additionally, it remains unexplored how comparison-objects differently affect the most common types of mental health ailments among adolescents, namely depression, anxiety and eating disorders.

1.8 Aim

Because of the problematic mental health condition of adolescents and the prominent social comparison behavior of adolescents, an elaborate understanding of which comparison-objects and how comparison-objects affect the three most common mental health ailments is a crucial addition to current scientific knowledge. It provides crucial information to limit the development of mental health disorders among Dutch adolescents.

Therefore, the aim of this study is to explore the effect of different comparison-objects on the general mental health of adolescents as well as their relation to depression, anxiety and eating disorders. And the effect of SCO. The study focuses on the following questions:

1. Which social comparison-objects are most relevant for Dutch adolescents' mental health?
2. How do upward and downward social comparison along various comparison-objects relate to the mental health outcomes of adolescents?
3. Does the relation between social comparison along various comparison-objects and mental health outcomes varies with different levels of SCO?

The following chapter substantiates theoretically which comparison-objects are taken into account. The research method and execution of the analysis are set out in chapter 3, followed by the explanation of the results in chapter 4. In chapter 5 the overall research results are concluded and discussed.

Chapter 2. Theory

2.1 Recap social comparison

As explained in the first chapter, the current detrimental health outcomes of the Dutch adolescent might be explained by social comparison behavior. Social comparison essentially means to determine our social and personal worth on the basis of comparison with others. According to Festinger (1954) social comparison is a natural habit of human beings and mainly focuses on improving and adjusting abilities and opinions. Comparing to someone else always involves a comparison-object, which can be literally any characteristic of human life, e.g. behaviors, ideas, skills, mindset etc. Along these objects people compare themselves either upward or downward (Wheeler, 2000).

Upward comparison entails the comparison to more favorable others. E.g. when others have more desirable behavior, better ideas, are more competent or keep up a more preferable mindset. The information retrieved from upward social comparison can be used to perfect oneself on a specific competence. Observing a more competent other works motivational to set higher goals and reveal information on how to improve (Dijkstra et al., 2008). Besides this self-improvement mechanism, upward social comparison additionally highlights being worse off than the comparison-target, which can leave a negative mark on their self-worth. According to Dijkstra et al. (2008), adolescents prefer upward comparison to self-improve. Even though this led to better school performance, it additionally made adolescents feel worse about themselves. Downward comparison refers to the comparison of less favorable others. E.g. when others behave less desirably, have worse ideas or are less skilled. Downward comparison is used as a self-enhancement mechanism, to maintain positive views and to protect one's self-worth (Wills, 1981). Both upward and downward comparison provide evaluative information which is used to assess oneself. This self-evaluation mechanism emphasizes the adaptation to social norms and evaluation of meeting the demand of social expectations (Dijkstra et al., 2008).

Logically, upward comparison relates to negative mental health outcomes as it provides depreciating information about one's self-esteem. Downward comparison on the other hand provides reinforcing information on one's self-esteem and is therefore expected to increase mental health. These hypotheses were confirmed by Cheng et al. (2008), Buunk et al. (2007) and Wheeler (2000), though rejected by Buunk et al. (2001) and Mojtabai (2008). Besides the direction of comparison, upward versus downward, other social comparison characteristics are involved in predicting adolescents' mental health outcomes.

As elaborated before, objects of comparison can affect mental health depending on the level of relevance to the comparer. Therefore, this study focuses on a variety of comparison-objects which are assumed to be relevant to adolescents. Table 1 provides an overview of the utilized comparison-objects. Paragraph 2.2 explains the results of this study's pre-test and elaborates on the comparison-objects derived from it. Paragraph 2.3 presents extended knowledge on comparison-objects based on Kuypers' (2004) study. Followed by the elaboration of objects which are most important to adolescents' quality of life in paragraph 2.4. Paragraph 2.5 contains a theoretical framework of factors additionally exerting influence on the relation between the social comparison along a specific object

and mental health outcomes. Finally, paragraph 2.6 provides a concise summary of the theoretical findings.

Table 1. Comparison-objects

Origin	Relation to adolescents	Derived objects
Pre-test (April-2016)	Objects on which adolescents compare themselves with any given target.	Popularity Sense of humor Success Prioritizing Future vision Mature behavior Responsibility
Kuyper (2004)	Objects on which adolescents mainly compare themselves to classmates	School performance Appearance Sport performance Hobbies
Helseth and Misvaer (2010)	Objects are necessity for a good quality of life	Positive self-image Good family relations Good friend relations

2.2 Comparison-objects: Pre-test regarding comparison behavior

Dutch adolescents are their own experts regarding their interests and comparison behaviors. Therefore, a pretest among adolescents was part of the research. A short questionnaire was designed to determine on which objects high school pupils compare themselves to others. The questionnaire is added in appendix A.1.

The participants were approached via the personal network of the researcher using an explanatory e-mail laying out the request. Four adolescents completed the questionnaire: two boys and two girls with a mean age of 16 and three out of four respondents attaining higher education. This pre-test is not representative for the common Dutch adolescent. Though given the current state of scientific knowledge on comparison behavior among adolescent, the information derived from this pre-test provides a valuable starting point. The pre-test contained questions to gain a global understanding of their daily life and interest, as: *What is important to you in your life? How do you occupy your leisure time during the week and during the weekend? and If you could change one thing about yourself or your life, what would it be? and why?* Additionally, their comparison behavior was investigated by first listing several comparison-targets: friends, classmates, colleges, siblings, parents, unknown people and famous people like models or actors. Then the respondents were asked whether they compared themselves a lot to this specific target on a scale from 1 to 10. Last, the respondents answered along which comparison-objects they compare themselves per target. This research does not go into detail about the findings regarding leisure time activities of adolescents, as it is covered by other research.

The results of the pretest were as follows:

- The answers on what is most important in their lives were diffusive. Two respondents indicated friends and family to be most important and the other two respondents indicated fun and self-evaluation to be most important. Family and friends are discussed as a comparison-object in paragraph 2.4.
- Most respondents were satisfied with how they were, only one respondent said that he wanted to be less tired so he could make optimum use of his physical and mental capacity.
- The most common target to compare to were friends, siblings and classmates, the least used comparison-targets were colleagues and famous people.
- Regarding the comparison-object, the objects which all the respondents named were appearance and school grades. These comparison-objects are discussed in paragraph 2.3. Furthermore, they all reported different objects, though the few objects which arose repeatedly were: popularity, humor and success. Additional, the respondents reported comparison on: how to prioritize, having a future vision, how to behave maturely and making responsible choices.

The mentioned objects could be relevant indicators of mental health outcomes when used for comparison by adolescents. Therefore, the following comparison-objects are clarified below: popularity, humor, success, prioritizing, future vision, maturity, responsibility.

2.2.1 Popularity

Being popular is defined as being liked, enjoyed or supported by many people, in short, being socially accepted. It does not necessarily relate to a higher status as high-status peers are not always well-liked (Allan, Porter & McFarland, 2005). However, popularity is an important comparison-object as it is anxiously sought by many adolescents and there is no objective base of comparison (McElhanay et al., 2008). Understanding one's level of popularity is only possible via social comparison. Besides, being socially accepted demands a great deal of adaptive skills towards the group norms. Adolescents experience popular peers as more trustworthy and socially skilled (Allan et al., 2005). In a self-report research popularity was related to better academic performance and lower levels of depression (Diego, Field & Sanders, 2003 in Allan et al., 2005). McElhanay et al. (2008) performed a self-report and peer-report research to investigate the dual roles of adolescents' self-perception and peer-perception of popularity. They found popularity to be a key predictor for future social development. When adolescents are perceived as popular by their peers, experience themselves to be popular regardless of their peers' opinion and a combination of self-reported and peer-reported popularity, this results in less hostile behavior and less social isolation. Therefore, it is expected that when adolescents rate their popularity on the basis of less popular classmates, it will improve their mental health. However, Allan et al. (2005) suggested that popular adolescents are more exposed to socializing influences of their peers. The influence of peer socialization encourages the adolescent to adapt to group norms, which in adolescence does not necessarily relate to positive health outcomes.

Thus, popularity is an important aspect of adolescents' daily life and probably related to mental health outcomes via social skill development and adaptation to peer-norms. Therefore, a negative relation between defining oneself as more popular than classmates and mental health ailments is expected.

2.2.2 Sense of humor

A sense of humor entails the quality of being amusing or being funny, mainly expressed via jokes. An important aspect of humor is the act of making people laugh (Oxford dictionaries, 2017). The importance of humor is easily underestimated. A sense of humor increases positive attention, facilitates social acceptance, boosts creativity and reduces awkwardness in social situations (McGraw, 2011). Humor is probably significant to adolescents' mental health as a humoristic personality and the ability to enjoy life are protective competences which shield off depression (Rooijen, 2012b). Humor is associated with both physical and mental well-being (McGraw, 2011; Yerlikaya, 2007 in Karakus et al., 2014). Though humor can be destructive as well, as egos bruise and friendships break when humor fails (McGraw, 2011).

As humor preferences differ, it does not always affect mental health in the same direction. Though overall, a good sense of humor is a desirable social skill which provides support in handling difficult situations and buffers depression. Therefore, the conviction to be more humorous than classmates is expected to relate to better mental health outcomes.

2.2.3 Success

Being successful means to accomplish the aim or purpose of an undertaking (Oxford dictionaries, 2017). In a broader perspective success is defined as doing well or when things work out (Pickhardt, 2013). Pickhardt (2013) provided examples as developing a capacity, reaching a goal, overcoming a challenge or being recognized for an accomplishment. Achieving successes provides victorious emotions, feelings of competence and boosts the self-worth. Adolescents who feel socially competent and intelligent are less likely to develop depressive symptoms (Rooijen, 2012b). However, another common consequence is the feeling of failure when the expected success is not realized (Pickhardt, 2013).

Summarized, being successful generally relates to better mental health outcomes than being unsuccessful. Therefore, it is expected that downward comparison on success relates to better mental health outcomes than upward comparison on success.

2.2.4 Prioritizing

Prioritizing is the ability to evaluate and rank objectives in order of importance. Prioritizing is emphasized as it increases efficiency and productivity and reduces effects on stress (Johnson, 1999 in Dudy, 2002). Neuroplasticity is the key word regarding the importance of prioritizing among adolescents. During childhood the neural connections expand, meaning they become more streamlined and efficient. The less used neural pathways are pruned in adolescence. This is comparable to a forest where the main roads stay clear and are easy to walk, though the hardly used paths become narrow, overgrown and more difficult to reach. Prioritizing is one of the cognitive skills which is pruned in adolescence and therefore important to practice (AACAP, 2011).

It is unclear whether the ability to prioritize is a relevant comparison-object according to adolescents themselves. Social comparison on prioritizing is therefore expected to affect mental health outcomes to a lesser extent than other comparison-objects. In addition, it is possible that adolescents who compare to those better in prioritizing experience a better mental health, as the respondent can use this evaluative information to self-improve.

2.2.5 Future vision

Personal future vision is the ability to plan the future which someone imagines for oneself. It is defined as creating an image of the expected future and making choices based on reaching these future goals (Dieleman, 2000). Besides personal future vision, other types of future visions relate to local, national or global future images. Adolescents are mainly occupied with their personal future vision (Connell, Fien & Lee, 1999), which they shape between 3 to 5 years ahead. In general, their future vision is positively tinted including themes as career, work, education, family and relations (Poole & Cooney, 1987 in Dieleman, 2000). Adolescents are especially concerned about social and academic failures and how to handle possible setbacks. Additionally, their future vision concerns how to gain happiness and success (Connel, et al., 1999). Personal future visions differs by age, gender, social class and cultural differences. Adolescents from higher social classes for example, visualize their future around leisure time and traveling, while lower class adolescents emphasize career and financial security (Poole & Cooney, 1987 in Dieleman, 2000). Due to increasing prosperity, technology, educational development and the multiculturalism in the Netherlands, there is no standard lifecycle to base a future vision on. The increment of life choices increases the flexibility of future images. Therefore, adolescents are designated to socially compare the way they plan their future to the future vision of others.

Thus, social comparison on future vision is a necessity, though it is not clear if adolescents themselves find it a relevant comparison-object. Social comparison on future vision is not expected to have a stronger effect on mental health outcomes than other comparison-objects.

2.2.6 Maturity

A broad meaning of maturity is the saturation of a development. For adolescents, maturity is defined as feeling and acting as an adult or more mature than others of their peer-group. Mature adolescents are mentally and emotionally developed and behave in a responsible way (Cambridge dictionary, 2017). Mature behavior cannot always be predicted by age (Labermeier, 2015). Some young adolescents can behave mature while older peers act more childish. Mature behavior reflects being independent, considerate and taking responsibility. Likewise, forgiveness, compassion, flexibility, respect and being reasonable are characteristics of maturity (Labermeier, 2015). As adolescents balance between childhood and adulthood, they mainly behave both childish and mature. According to Elmore (2012), the expectation of mature behavior among adolescents is too high. Due to the technological and global developments, adolescents consume large bodies of information which their brain cannot yet handle. *"The adult part of their brain is still forming and isn't ready to apply all that our society throws at it. Their mind takes it in and files it, but their will and emotions are not prepared to act on it in a healthy way"* (Elmore, 2012 pp 86). Adolescents are likely to act immature, which places them in dangerous situations. For example, adolescents engage in risky or inappropriate behavior, involve in fights or accidents, act impulsive and not always consider potential consequences of their actions (AACAP, 2011). Thus, as adolescents are expected to behave immature, their brain development and surroundings lead them to act more mature over time. As no handbook provides a step by step maturity plan, understanding how to behave mature is mainly done via social comparison. Whether social comparison on maturity affects mental health is yet unknown.

Thus, social comparison on maturity is a necessity to self-improve. As adolescents still develop their mature behavior it is not expected to influence mental health more than other comparison-objects.

2.2.7 Responsibility

Responsibility is defined as being required to fulfill a duty (Cambridge dictionary, 2017). One must behave neat, decently and wise in order to be responsible (Kestin, 2014). Similar to maturity, adolescents' sense of responsibility is underdeveloped compared to adults, as this characteristic is still in process of development (AACAP, 2011). The ability to act responsible varies between situations (Noom, Dekovic & Meeus, 1999). Adolescents want and need responsibility for matters that are important to them. Taking responsibilities are preparations to become capable adults. The importance of autonomy increases as adolescents learn to make good and responsible decisions on their own (Kestin 2014; Noom et al., 1999). The experience to contribute to a bigger picture reinforces self-assurance and confidence (Kerstin, 2014). There is no objective base on which adolescents can measure how responsible they are or should be. Responsibility as well as maturity mainly develop during adolescence. Due to brain developmental factors, adolescents constantly consider to act responsible or irresponsible, mature and or immature. The only way to measure whether they are on the right track, is to socially compare themselves to others.

Thus, adolescents are expected to frequently compare their level of responsibility to improve it. As adolescents still develop their level of responsibility it is not expected to influence mental health more than other comparison-objects.

2.3 Comparison-objects: In a classroom context

The VOCL'99 cohort research, commissioned by Centraal Bureau voor de Statistiek (CBS) and the Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NOW) investigated 19.391 Dutch high school pupils starting from their first year in secondary education until they left fulltime education. The aim of this study was to gain understanding in the following four aspects:

1. What is the total obtained knowledge and skills in Dutch high-schools?
2. How efficient is Dutch high-school education in terms of follow-up study, success rate and chances in the labor market?
3. To what extend does educational gain connect to individual differences of high-school pupils?
4. What is the status of adolescents' personal well-being and development into adulthood? (Kuyper & Van der Werf, 2007).

Kuyper (2004) examined a sub topic of this research, namely comparison-objects. Respondents were asked to rank objects by importance of social comparison. On a list of given comparison-objects the respondents graded three objects by entered a 1, 2 or 3. Many respondents did not fill in any number, meaning they either skipped the question or they did not make these kinds of comparisons. Of the 2000 adolescents ranking the comparison-objects, 19,5% indicated school grades to be the most important object of comparison. Another common comparison-object among the Dutch adolescents was appearance, which was mentioned as most important in 15,6% of the cases. Followed by sport performance 9,5%, clothes 8,4% and hobbies 8,2%. Other comparison-objects were mentioned less frequent as most important, like friends, popularity, parents and intelligence. The importance and relation to mental health for respectively school performance, appearance, sport performance and hobbies is elaborated below.

2.3.1 School performance

School performance is defined as accomplishing school related tasks in an efficient and effective manner. School grades are a widely-used indicator, although grades are not all that school performance entails. All academic achievements relate to school performance, such as motivation, learning capacity, pro-active work attitude and acquisition of knowledge and skills (Maslowski, 2001). School is the fulltime occupation of adolescents, therefore it entails more than just gaining knowledge for most of the pupils. School achievements are inseparable from working independently, homework and social contact (CBS, 2003). School performance is additionally important to adolescents for it determines their academic future and job opportunities (Crede, Wirthwein, Elvany & Steinmayr, 2015). A study among Dutch adolescents shows they spend approximately 1.5 hour per day on homework. 12% stated their classes were too difficult versus 46% who stated they were easy (CBS, 2003). School achievements reflect in all areas of their lives, as the way adolescents perceive their own school performance influences their life satisfaction directly. Positive experiences in school context as well as intelligence diminishes the development of mental health ailments as depression (Smit, Bohlmeijer & Cuijpers, 2003; Crede et al., 2015).

Thus, school performance is a broad concept entailing the achievement of all school related issues. Probably adolescents who believe to perform better in school than their classmates are more comfortable in other parts of their lives as well. School performance is expected to be a relevant comparison-objects. Therefore, it is expected to relate stronger to mental health outcomes than most other comparison-objects.

2.3.2 Appearance

Appearance is how adolescents present their looks. This relates to the overall physical beauty, fashionable clothing or weight interpretation. Appearance plays a significant part in adolescents' life, as much is changing. Starting with a growth spurt around the age of 11, followed by gender specific developments as female curves or bodily hair growth (Manna, 2014). According to Beuningen and de Witt (2016), being satisfied with one's appearance was one of the most relevant subjects in adolescence life. Their results showed that 80% of the Dutch adolescents was satisfied with their appearance and 2,5% was unsatisfied. Overall, girls were less satisfied with their appearance than boys (Beuningen & de Witt, 2016). According to some adolescents, the pretty ones are most popular among peers (Helseth & Misvaer, 2010). A study by Oliver and Thelen (1996) confirmed these findings and added that adolescents were more accepted by peers when they meet the expectations on appearance. When respondents were presented with pictures of skinny models, it revealed a detrimental self-confidence and negative body experience in a study of Murray, Touyz and Beumont (1996 in GGZ, 2006). Other studies stated that eating disorders are caused by negative body experience and low self-esteem (GGZ, 2006).

Thus, appearance is relevant to adolescents and the frequent comparison along appearance is expected to influence mental health outcomes. It is expected that adolescents who believe to have a better appearance than their classmates have better mental health outcomes.

2.3.3 Sport performance

Sport performance means achieving sport related objectives, levels or results and the quantity of practicing sports. More than 8 out of 10 adolescents spend at least one hour per week on sport exercise (CBS, 2003) and additionally follow gym class in school. Practicing sports benefits physical and

mental well-being (Harter, 1993). Besides the improvement of physical fitness and endurance, doing sports likewise improves the blood flow and brain functions. Most sports performed by adolescents promote responsible and social behavior (Dagkas & Burrows, 2016). Practicing sports additionally provides more energy, better sleep and stimulates the production of endorphin which creates the feeling of happiness and satisfaction. Therefore, sport has a buffering effect on depression. Practicing no sport or lacking body movement in general increases the risk of both mental and physical health outcomes. However, there are downsides to practicing sports. Some sports demand more than the adolescent has to offer. When failing to meet the requirements, doing sports is a humiliating endeavor. Being forced to perform sport related tasks, like in gym class, might be tough for those who do not comply.

Overall, practicing sports is important to both physical and mental health and according to Kuyper (2004) one of the most relevant comparison-object among adolescents. Therefore, social comparison on sport performance is expected to be a strong predictor for mental health outcomes. Adolescents who believe to be better in sports are expected to have better mental health outcomes.

2.3.4 Hobbies

A hobby is performing an activity in leisure time because it is liked to do (Oxford dictionaries, 2017). A data collection from Centraal Bureau voor de Statistiek (CBS, 2003) showed that Dutch adolescents have approximately 6 hours of leisure time per day. The most common hobby among adolescents is doing sports. Then, two third of the Dutch adolescents actively participates in associations, a quarter plays a music instrument or sings and 29% has creative hobbies as drawing, painting and crafting. Cognition, experience and competence are gained from performing hobbies, though the aim is mostly satisfaction and pleasure. Another motivation for adolescents to perform a specific hobby is to fit in to the peer-group, e.g. when most boys in class play in the same soccer team. Besides trying to fit in, hobbies provide an excellent framework to interact with others who have similar interests outside of the main peer-group. Performing a hobby increases the chance of being socially accepted within a smaller group of friends (McElhanay et al., 2008). Social acceptance, as described before, is emphasized by adolescents. Belonging to an association outside of school therefore, could relate positively to mental health as it raises self-esteem and mental competence.

All taken together, hobbies are practiced on a frequent basis by Dutch adolescents and support social interaction and acceptance among peers. It can be stated that adolescents socially compare themselves along their hobbies. Whether this affects their mental health outcomes more or less than other comparison-objects is yet unknown. Adolescents who compare themselves downward on hobbies are expected to have better mental health.

2.4 Comparison-objects: Necessities for a good mental health

To identify relevant factors for adolescents' mental health Helseth and Misvaer (2010) investigated what is important to obtain a good quality of life according to adolescents themselves. They interviewed 31 healthy adolescents (14-15) from three different schools and different classes in depth. Helseth and Misvaer (2010) asked the adolescents open questions such as: *Tell me about yourself, family, friends, school, leisure time activities and how you are doing? What does quality of life means to you?* and *What do you think promotes or deteriorates quality of life?* Three levels of quality of life were distinguished;

- Feeling on the top: this is characterized by having many friends, being popular, having a positive self-image and having a good social life at school.
- Feeling fine: this is characterized by having a few, yet close friends and a fairly good self-image. This group explained that they cannot stand out and they have to accept their social position. Some indicated that a too high self-esteem works out negative as it might have a repulsive effect on others.
- Feeling lousy: this is characterized by a poor self-image and little or no friends at school. They perceived a strong power of hierarchy and spend more time at home with their family. Some compensated their misery by fully focusing on school performance and hobbies, others kept trying to fit in.

Adolescents define their overall quality of life as being satisfied with oneself and having an overall positive attitude. To do so it is crucial to have a positive self-image, good family relations and close friends. In addition, adolescents reported a threat to their quality of life when the latter indications were negative. Dew and Huebner (1994) found similar results regarding the important factors of quality of life. They describe eleven self-concepts and their correlation to self-reported quality of life of 13 to 18 year olds. The relation with the parents related strongest to quality of life, followed by self-esteem. The association between peer-relations and quality of life was less strong yet significant for both opposite-sex and same-sex peer relations.

Adolescents mentioned self-image, family and friend relations as most relevant for a good quality of life (Helseth & Misvaer, 2010; Dew & Huebner, 1994). As there is no golden standard to evaluate one's self-image, friends and family relations, it is inevitable to socially compare along these topics. Therefore, the topics are elaborated below as comparison-objects.

2.4.1 Self-image

Self-image means to evaluate our own characteristics. Personal traits as skills, appearance or talents can be evaluated separately and all have their own importance in the overall evaluation of our identity. It is possible to have an overall positive self-image, even though a person is unsatisfied with some components (Solomon, Bamossy, Askegaard & Hogg, 2013). Self-image is self-esteem and self-confidence combined and is closely connected to appearance (Helseth & Misvaer, 2010). A positive self-image means respecting the person you are, daring to be yourself and being friends with oneself. Being seen, being popular, feeling wanted and getting compliments and support, positively affects the self-image (Helseth & Misvaer, 2010). Furthermore, self-evaluation affects how we feel in daily life and a positive self-image protects mental health (Rooijen, 2012b; Landelijk Preventive Platform, 2004). McElhanay et al. (2008) suggested that self-image becomes more important in adolescence as it supports a person to find their way in their social world.

Thus, the relevance of social comparison along self-image is yet unknown, though it is clearly important for adolescents' quality of life and mental health. Therefore, it is expected that adolescents who have a better self-image than their classmates, have better mental health.

2.4.2 Family relations

Family relations are defined as child-parent and child-sibling relations and the reciprocal relation between parents or siblings (Helseth & Misvaer, 2010). The family and especially the parents are a

secure base in adolescence (Noom et al., 1999). A good relationship with at least one of the parents, a proper family climate and a good relation between the parents can protect adolescents from getting a depression (Smit et al., 2003). Helseth and Misvaer (2010) emphasized the importance of a socially healthy family, where parents created a safe and secure environment. Adolescents hardly mention family relations when these are seen as stable and fulfilling. The presence of hassles, a lack of trust or a lack of freedom impact adolescents' quality of life negatively (Helseth & Misvaer, 2010). Without an objective basis, adolescents evaluate their family relations via social comparison (Kuyper, 2004).

All in all, family relations are relevant to the adolescents irrespectively to their growing independence. Social comparison on family relations is expected to affect mental health outcomes. Adolescents who perceive their family relations as better than their classmates are expected to have better mental health outcomes.

2.4.3 Friendship

Friendship is defined as the quantity and quality of friends relations (Helseth & Misvaer, 2010). Adolescence is characterized by spending less time with family and more time with friends, making these relationships more intimate (McElhanay, et al., 2008). Adolescents distinguish best friends, friends to hang out with and friends at school (Helseth & Misvaer, 2010). Best friends are most emphasized and described as close related friends whom can be trusted and respect the adolescent for who he or she is. Adolescents state that without the presence of best friends it is almost impossible to be happy. Peer relationships are necessary to develop interpersonal skills (McElhanay et al., 2008). In a study of Beuningen and de Witt (2016), over 4.000 Dutch adolescents and young adults were questioned on their overall welfare. Of the adolescent respondents (12-18 year) 95% was satisfied with their friends compared to 89% of the 18-plus group. Social support, and good friends prevent or mitigate mental health disorders (Rooijen, 2012b; Smit et al., 2003). Feeling excluded from the peer-group or feeling alone is inseparably connected to poor quality of life experience (Helseth & Misvaer, 2010). One central concern is to feel accepted and supported by friends and peers. The undesirable feeling of deviance from others is a main feature of depression (Rooijen, 2012b). Via social comparison, the difference and similarities between the comparer and others are clearly established (Festinger, 1954). Social comparison in adolescence on any comparison-object can trigger feelings of abnormality and loneliness. According to Kuyper (2004) adolescents mention having friends as a comparison-object itself.

Concluding, peer relations and having friends is necessary for good mental health and is therefore expected to predict health outcomes. Adolescents who believe to have more or better friend relationships than their classmates, probably have a better mental health.

2.5 Framework for situational factors

Besides the comparison-object and its relevance there are several situational factors which presumably influence comparison behavior and its effect on mental health. The comparison setting, the comparison-target and the adolescent's age affects comparison behavior differently. Likewise, the general intent to compare oneself differs among individuals. Some evaluate their characteristics via social comparison abundantly, others are less interested in comparison information. Therefore, the situational factors: context, comparison-target, age and SCO, are explored in the following paragraphs.

2.5.1 Context

Secondary schools are well integrated in terms of context, as attending secondary school is the main occupation of adolescents. Since adolescents spend most of their time in school, the school environment and peers are important in their lives (Bryne, 1988). According to the results of Festinger (1954) which are confirmed by Kraye, Ingledew and Iphofen (2008), the pressure of meeting group norms and values increases when a group is important to the individual. It strengthens social comparison as the adolescents aim to conform to and reduce the deviance to similar others. Schools have an evaluative atmosphere, where adolescents are constantly confronted with comparative information of peers. The interest in social comparing oneself increases in an evaluative setting, like a classroom (Dijkstra et al., 2008).

2.5.2 Target

The person or group with whom adolescents compare, the comparison-target, needs to be as similar as possible to obtain relevant information (Festinger, 1954; Kraye et al., 2008). Kraye et al. (2008) performed 20 in-depth interviews among adolescents, where they studied the choice patterns regarding the comparison-target. Results indicated that adolescents chose comparison-targets which were similar in age, experience and personality traits. In addition, adolescents chose comparison-targets facing similar situations and decisions as themselves. A more similar comparison-target strengthens the effect of social comparison on mental health (Festinger, 1954; Dijkstra et al., 2008). A classmate's opinion on drug use for example, has more evaluative power on an adolescent than a teacher's opinion on that matter, as the classmate is more similar to the adolescent than the teacher. Kuiper (2004) results confirmed that high school pupils compared themselves regularly with classmates. Jones (2001) added that especially for the comparison-objects height, weight, personality, intelligence and popularity, peers were the most frequent comparison-targets among adolescents.

2.5.3 Age

There is a non-linear relation between being interested in social comparison and age. Social comparison occurs more frequently among adolescents than other age groups (Kroger, 1996; Strahan & Cressman, 2006; Myers & Crowther, 2009). The interest in social comparison information increases from the age of 5 (Ruble et al., 1976), peaks in adolescence, weakens across adulthood and decreases from middle age to older age (Callan et al., 2015). Yet, little is known about social comparison within the adolescence life phase. In early adolescence, adolescents transfer from primary education to secondary schools. Educational transition involves increased social comparison as adolescents re-evaluate their academic abilities and arrive to a new social comparison group (Dijkstra et al., 2008). Logically, pupils who just start secondary school, socially compare themselves more frequently than older adolescents.

2.5.4 Social Comparison Orientation (SCO)

SCO is the overall tendency to compare oneself with others (Buunk et al., 2007). There are individual differences in SCO as some people do not care about how they perform in comparison to others, while other people emphasize evaluating their performance in comparison to others. SCO is the level of social comparison used in daily life regardless of the comparison-object. The effect of social

comparison on mental health outcomes can be affected by someone's personal level of SCO. Studies that measured SCO, thus rated social comparison on a single dimension (low-high), confirm the negative relation between SCO and mental health (Rinn et al., 2008; Tylka & Sabik, 2010). A high rate of SCO seems to relate to a poorer mental health, which implies a direct effect. Other studies however, explained SCO as a moderator when respondents were asked to compare on a specific comparison-object. Buunk et al. (2007) investigated the effect of SCO on upward-downward comparison of individuals' social life in respect to their satisfaction with their relations. The respondents were randomly assigned to either the upward or downward comparison condition via a bogus interview. The respondents were asked how they perceived the social life of the target in comparison to their own. Then, the SCO was measured. The results showed a stronger effect on the satisfaction with one's social life for both upward and downward comparison when respondents scored high on SCO. This implies a moderating effect, as the relation between upward or downward social comparison and satisfaction differs among different levels of SCO. Summarized, ample studies agree on the existence of a relation between SCO and mental health outcomes. SCO is therefore expected to negatively relate to mental health outcomes. Additionally, the relation of upward-downward comparison to mental health is expected to be stronger for adolescents with high SCO-levels.

2.6 Summary

To explain the relation between social comparison and mental health outcomes, fourteen comparison-objects were explored in this chapter. All comparison-objects could be relevant for adolescents in some way or another. Though from a theoretical perspective it remains yet unclear which comparison-objects affect mental health outcomes. Besides the comparison-object itself, it remains still unclear how these comparison-objects affect mental health. The current theoretical framework provides no clear answers on whether downward comparison leads to better mental health and whether this applies to all comparison-objects similarly. Every comparison-object could influence mental health outcomes differently.

Overall it is expected that most comparison-objects relate positively to mental health. Thus, adolescents who believe to be better off than classmates, are expected to have better mental health than those who believe to be worse off. However, this prediction cannot be confirmed by the theory alone. Therefore, the effect of all comparison-objects described above, was empirically tested on mental health outcomes among Dutch adolescents. The next chapter elaborates on how this empirical study was conducted.

Chapter 3. Method

This study investigated the possible effect on mental health outcomes by social comparison on different objects among young adolescents. Data was collected from 156 Dutch high school pupils via a self-reported questionnaire. The general procedure is discussed in paragraph 3.1. Paragraph 3.2 explores the demographic characteristics of the sample. In paragraph 3.3 the construction of the questionnaire and the operationalization of variables are discussed. Finally, the used analysis is explained in paragraph 3.4.

3.1 Procedure

For the data collection, Dutch high schools were contacted via an explanatory letter which is presented in appendix A.2. One school agreed to conduct the questionnaire after a meeting with the health care teacher responsible for all 7th graders (1st year of high school in The Netherlands). An informative letter was sent to the parents to ask permission to question their child. The letter is presented in appendix A.3. The letter takes up the form of passive consent, meaning that the parents gave permission by not responding. If parents did not want their child to participate, they handed in the provided strip at the health care teacher, or send her an e-mail. Two adolescents withdrew due to parental disagreement.

The data was obtained in January 2017 during health care class using paper and pencils. A 10-minute introduction was given to introduce the subject and terminology, e.g. the meaning of social comparison. Furthermore, the introduction explained the implications of anonymity and how to answer the questions. Both the health care teacher and the researcher were present in the classroom to answer questions. In some classes, the adolescents had no questions; in other classes, many questions arose. A repeated question was, how to answer the following item from the INCOM-questionnaire; *I am not the type of person who compares often to others*, 1) *disagree strongly*, 2) *disagree*, 3) *disagree/agree*, 4) *agree*, 5) *agree strongly*. When the respondents finished the questionnaire, they stayed in class silently until everyone was finished. The average completion time was approximately 20 minutes.

The questionnaire consisted of four components:

1. Questions regarding demographic characteristics.
2. Questions regarding SCO.
3. Questions regarding upward downward social comparison on objects.
4. Questions regarding mental health outcomes.
- 5.

The ordering of the questionnaire was motivated by two ideas. First, the placement of SCO, which should be asked before the other comparison questions to reduce biased answers. Asking pupils to compare themselves on approximately 50 questions might influence the answers on how much they think they compare themselves in general. Second is the idea of building-up the degree of sensitivity. Thus, starting with general questions, as demographics, followed by SCO, upward downward social comparison on objects and ending with more sensitive questions about mental health outcomes. Starting with questions as *Do you think about dying?* or *Did you ever had an eating disorder?* might be overwhelming. The respondents might quit the questionnaire preliminary, not answering the most

important questions about mental health outcomes. Though, as they were in class under supervision, most respondents were expected to finish the questionnaire.

3.2 Sample and demographics

The data was collected from Dutch vmbo high school pupils (N=156). The respondents were all in their first year of high school, therefore the age only varies from 12 to 14 ($M=12.41$ $SD=.543$). Age was not equally distributed as most respondents were 12 and 13. Merely four respondents were 14 years old, this must be taken into account when interpreting the results. Further frequencies are presented in the additional codebook. All demographic items had one missing due to one respondent who did not answer any demographic questions. Gender was equally distributed with 84 boys and 71 girls. Educational level was fairly equally distributed as well. It was a vmbo-school which literally translates to "Preparatory middle-level vocational education". A total of seven classes were questioned, of which all were vmbo-educational level. Four classes followed the vmbo theoretical learning path (N=88); three classes followed a stricter program in which students are prepared to transfer to a higher education level, havo (N=68). Havo is translated to "Higher general continued education" and provides access to a tertiary program in which a Bachelor degree can be obtained. Thus, even though all respondents follow vmbo, a distinction was made between the regular vmbo classes and havo-transfer classes to explore possible differences. The last demographic characteristic was ethnicity. The respondents were asked three questions; 1) *Are you born in the Netherlands?* 2) *Is your father born in the Netherlands?* and 3) *Is your mother born in the Netherlands?* These questions were recoded into one variable ethnicity. If the respondent answered *Yes* on all three questions it was categorized as autochthonous, the respondents answering *No* on any of the three questions were categorized as foreigner.

3.3 Measurement

To conduct the data a questionnaire was constructed using existing (sub)scales and own generated scales based on an existing questionnaire. Table 2 provides an overview of the used scales, their origin and the studies in which they were used before. The questionnaire provided information on several mental health outcomes, the dependent variables. Thereafter, the questionnaire provided information on how the respondents compared themselves to their classmates on several comparison-objects, the independent variables. The questions regarding comparison-objects were based on the existing semantic differential approach of Allan and Gilbert (1995), see table 2. Additionally, the questionnaire provided data on the respondents' SCO and demographic characteristics.

First, the measurement of the dependent variables, the mental health outcomes are explained in paragraph 3.3.1. Then in paragraph 3.3.2, the establishment, operationalization and reliability of the independent variables, the social comparison-objects are explained. Subsequently, the SCO-scale is explored in paragraph 3.3.3.

Table 2. Overview of the origin of the measurement scales

Measurement object	Questionnaire	Designed by	Applied in
Depression	RCADS -Major depression disorder subscale	Chorpita et al. (2000)	Ross et al. (2002), Mathyssek et al. (2014)
Anxiety	RCADS -Generalized anxiety disorder subscale	Chorpita et al. (2000)	Ross et al. (2002), Mathyssek et al. (2014)
Eating disorder	ESP -Eating Disorder Screening for primary care	Cotton et al. (2003)	Bernstein et al. (2013)
General mental health	MHI-5 -Mental Health Inventory - 5	Ware et al. (1992)	Rumpf et al. (2001), Hoeymans et al. (2004) Beljouw, and Verhaak, 2010 Ruiz-Aranda et al. (2012)
Social comparison Orientation (SCO)	INCOM -Iowa- Netherlands Comparison Orientation Measurement	Gibbons and Buunk, (1999)	Gibbons and Buunk (1999)
Up/down comparison on specific comparison-objects.	SCS -Social comparison scale	Allan and Gilbert, (1995)	Bannink et al. (2016), Birchwood et al. (2007)

3.3.1 Mental health

Mental health exists of both mental well-being and the absence of mental health issues (WHO, 2014). Mental health was measured by symptoms of depression, anxieties, eating disorders and a score on mental wellbeing in general. The inclusion of more health outcomes than solely general mental well-being scale was motivated by the idea that comparison on a specific comparison-object might relate to a more specific health outcome. E.g. comparison on appearance might relate stronger to disordered eating habit than to other mental health ailments. Though, social comparison on school performance possibly relates less to eating disorders and more to anxiety. Note that these examples are pure speculations based on general logic. To ensure the feasibility of this study, other possible mental health issues were excluded.

This study did not require a full psychiatric supported diagnosis as it would overreach the aim of this study. The studies aim is to indicate possible differences on symptomatic level in health outcomes due to social comparison along different objects. Thus, there was no need for psychiatric diagnoses, since

a symptomatic indication and an indication of the probability is sufficient. Below, the measurement per health outcome is elaborated.

3.3.1.1 *The Revised Children's Anxiety and Depression Scale*

Anxiety and depression are closely related. Children with anxieties have an increased risk to develop a depressive disorder. Childhood depression, likewise, increases the risk of developing anxieties (Birmaher, Arbelaez & Brent, 2002 In Kusters, Chinapaw, Zwaanswijk, Van der Wal & Koot, 2015). The Revised Child Anxiety and Depression Scale (RCADS) is designed to assess clinical syndromes in youth (Chorpita et al., 2000). The RCADS is self-reported and suitable for screening depression and anxiety symptoms among 8 to 17-year-olds. The RCADS is a revision of the Spence Children's Anxiety Scale (SCAS; Spence, 1997, 1998), adapted to correspond more closely to selected DSM-IV anxiety disorders (Chorpita, Morfitt & Gray, 2005; Mathyssek, Olino, Hartman, Ormel, Verhulst, & Van Oort, 2014). To measure depression and anxiety, two subscales of the RCADS were used: the generalized anxiety subscale and the major depression subscale. Appendix B.1 provides an overview of the operationalization and discusses both measurements in succession.

RCADS Major depression subscale

The major depression subscale includes ten items, as *I do not really like anything anymore*. The respondents could answer: 1 *Never*, 2 *Sometimes*, 3 *Often* and 4 *Always*. Two items deviated from the total scale and were deleted. The items *I have trouble sleeping* and *I don't feel like eating* probably tapped into a somewhat distinctive concept. Depression is associated with an abundant need to sleep and eat as well as it is associated with a reduced need to eat and sleep. Without the two items the internal consistency was .78. The Cronbach's alpha is shown in appendix C.2 together with the factor scores. The descriptive per item are presented in the codebook.

For the regression analysis, a sum-scale was computed with a minimum score of 8 and a maximum score of 32. A higher score relates to more depression. A second scale indicating the clinical threshold and used to check for robustness was computed. The items were recoded into 0 to 3 and added together into a sum-score reaching from 0 to 24., which is later computed to a 0-100 scale.

The original RCADS clinical threshold line is at 30%, which is a raw sum-score of 9 as the original scale goes from 0 to 30. Because two items were removed, the maximum score dropped to 24 which caused the conforming threshold line to drop to 7.2. Respondents with a depression sum score in the lowest 30% were categorized as *No depression disorder*. The respondents scoring in the top 70% were categorized as *Probably depressive disorder*.

RCADS generalized anxiety subscale

The generalized anxiety subscale consists of six items including, *I am worried that something bad will happen to one of my family members* with the possible answer categories 1 *Never*, 2 *Sometimes*, 3 *Often* and 4 *Always*. The anxiety scale in this study had an internal consistency of .85, which corresponds to the Cronbach's alpha of .84 in a study among 3890 Dutch children (Kusters, Chinapaw, Zwaanswijk, Van der Wal & Koot, 2015). Appendix C.2 contains a presentation of the factor loadings and the reliability.

Proceeding the analysis, two scales were computed. The first scale consists of the sum-scores of all items. A higher score indicates more anxiety with a maximum score of 24 and a minimum score of 6, which is later transformed to 0-100 scale. This first scale was used for the main analysis. A second scale was computed indicating the clinical threshold and for robustness checks. At first, the items were recoded in answer values of 0 to 3 instead of 1 to 4. The second scale was computed using the sum-score, with a minimum score of 0 and maximum 18. Again, a higher score suggests more anxiety. The clinical threshold cut-off is at 50%, raw sum-score of 9, which is in line with RCADS given threshold (Chorpita, Moffitt & Gray, 2005).

Thus, respondents which scored in the lowest 50% were categorized as *No anxiety disorder*. The respondents which scored in the top 50%, were labelled as *Probably anxiety disorder*. Appendix D.2 shows the mean scores of anxieties along the demographic characteristics.

3.3.1.2 Eating Disorder Screen for Primary Care

The Eating Disorder Screen for Primary Care (ESP) was used to indicate symptoms of an eating disorder. The 4-item questionnaire was designed to rule out eating disorders and is presented in appendix B.1. Compared to other similar questionnaires, the ESP was less confronting, better accepted and led to less avoidant answers (Cotton, Ball & Robinson, 2003). The ESP was originally designed to screen for disordered eating behaviors of adults in primary care settings. However, it was frequently used to screen for eating disorders in adolescents as well (Bernstein, Stockwell, Gallagher, Rosenthal & Soren, 2013). The ESP consists of 4 items like *Do you ever eat in secret* on which the respondent can give a confirmative answer 1 *Yes* or negative response 2 *No*. All items were recoded into scores of 0 and 1. The minimum score was 0, the maximum score was 4, later the scale was recomputed to a 0-100 score. Three items were reversed recoded, so a higher score implies more disordered eating habits.

The first scale was computed for the main analysis using the sum-score with an internal consistency of .37. The probability of having an eating disorder increases 90% when the respondent answered confirmative on at least two items (GGZ, 2006). Therefore, a second scale was computed indicating the clinical threshold. The second scale existed of; less than two confirmative answers *No eating disorder* and two or more confirmative answers *Probably eating disorder*. The second scale was solely used to indicate probable eating disorders along demographic characteristics and the robustness check. Appendix D.2 shows the mean score of disordered eating habits along the demographic characteristics.

3.3.1.3 Mental Health Inventory

The Mental Health Inventory (MHI-5) is a 5-item subscale of the Dutch SF-36 and the SF-20 which measures general mental well-being (Driessen, 2011). The scale was designed to measure the mental well-being in the general population and to indicate differences within a population. However, the MHI-5 was additionally used as a screening tool for depression and several anxiety disorders (Beljouw, & Verhaak, 2010). Even though the scale was not specifically designed for adolescents, it was frequently used for this target group in previous research (Ruiz-Aranda, Castillo, Salguero, Cabello, Fernandez-Berrocal & Balluerka, 2012; Marques, Pais-Ribeiro & Lopez, 2011). The items presented in appendix B.1 asked about the general mental health, e.g. *How often in the last 4 weeks did you feel calm and quiet?* There were six answer categories: 1 *Constant*, 2 *Usually*, 3 *Often*, 4 *Sometimes*, 5

Rarely and 6 *Never*. All items were recoded into a score of 0 to 5 and one item was recoded backwards, hence a higher score indicated a better general mental wellbeing. According to Beljouw and Verhaak (2010) the MHI-5 had a high internal consistency with a Cronbach's alpha between .82 and .90. However, in this study the internal consistency was increased to .46 by removing the question *How often in the last four weeks where you so down, nothing could cheer you up?* Appendix C.2 provides an overview of the factor scores of the final scale.

Two types of scales were computed. The first was computed by a sum-score, for differences on symptomatic level to be noticed. The minimum score was 0, the maximum score 15 and transformed into a 0-100 scale. The sum-scale was used throughout the main analysis in which a high score indicated a better mental wellbeing than a low score. The second scale however, was an indicator for the clinical threshold and solely used to explore the mental health along demographic characteristics. To divide the mental health scores, the sum-scores were multiplied by four and recoded into two variables, mentally healthy and mentally unhealthy. The clinical threshold cut-off is at 75%, meaning that the top 25% were labelled as *Mentally healthy* and respondents scoring below the clinical threshold were labelled as *Mentally unhealthy*. The clinical threshold is in line with previously used thresholds (Perenboom et al, 2000; Hoeymans et al, 2004; Yamazaki et al, 2005; Kelly et al, 2008 in Driessen, 2011).

3.3.2 Comparison-objects

The utilized method to measure upward-downward comparison along comparison-objects was based on *the Social Comparison Scale*. The social comparison-objects were derived from the theoretical framework. The measurement method and comparison-objects are elaborated consecutively below.

3.3.2.1 The Social Comparison Scale

The Social Comparison Scale (SCS) was originally designed to determine the perceived social status of depressed respondents (Allan & Gilbert, 1995). The scale was used to assess people's comparison on social attractiveness and social acceptance (Allan & Gilbert, 1995). To fit this particular study, the SCS was used as a structural base of the questionnaire, yet the content was modified. The purpose of the modified SCS was to measure the degree to which the respondents compare themselves upward or downward with their classmates on several comparison-objects. First, the respondents were presented with the following unfinished sentence: *Compared to my classmates...* (in Dutch: *Vergeleken met mijn klasgenoten...*). The respondents were then presented with a set of bipolar constructs (*I am smarter- I am less smart*) on which they rated themselves on a 1 to 10 scale. A score of 1 indicated being much smarter than his or her classmates, indicating very strong downward comparison. When scoring a 10, the respondent stated to be way less smart compared to his or her classmates, indicating very strong upward comparison. The remaining answers indicate a more moderate variation of upward or downward comparison e.g. being slightly smarter. A lower score thus pointed to more downward comparison and adversely a higher score indicated more upward comparison.

The degree of upward or downward comparison was interpreted as followed:

- | | |
|--|--|
| 1 <i>Very strong downward comparison</i> | 6 <i>Slight upward comparison</i> |
| 2 <i>Strong downward comparison</i> | 7 <i>Moderate upward comparison</i> |
| 3 <i>Downward comparison</i> | 8 <i>Upward comparison</i> |
| 4 <i>Moderate downward comparison</i> | 9 <i>Strong upward comparison</i> |
| 5 <i>Slight downward comparison</i> | 10 <i>Very strong upward comparison.</i> |

3.3.2.2. *The comparison-objects*

The original items of the SCS did not fit the aim of this study and were therefore replaced by comparison-objects best suited for adolescents. As described in the theoretical section of this study, the comparison-objects must be important to the respondent to trigger an effect on mental health. The important subjects in adolescence life were derived from the theory.

A brief recap: adolescents found a positive self-image and good family and friends-relationships most important to maintain their quality of life (Helseth & Misvaer, 2010). School performance, appearance, friends, sport performance and hobbies were the most common comparison-object of the target group (Kuyper, 2004). Subtracted from a small-scale pre-test it was added that adolescents additionally compare themselves on: popularity, sense of humor, success, prioritizing, future vision, mature behavior and responsibility. From all of the latter objects one or more indicators were derived and translated into question items. Appendix B.2 presents the procedure in a schematic overview.

The rational and internal method were combined to construct the questionnaire (Oosterveld, 1996). The first steps conformed to the rational method as the measurement topics, or comparison-objects, were of theoretical descent. Then, the matching indicators were conceived in absence of theory, using rational reasoning. For example, to think of yourself as funny, the amount of jokes you make and whether other people generally find your jokes funny, were logical indicators for the topic *Humor*. Secondly, processing the questionnaire leaned towards the internal method. The topics were specific; thus, indicators automatically became homogenous. E.g. appearance was measured with *My clothes are fashionable*, *My clothes are beautiful*, *I am hip*, *I look good*, *I am handsome*, *I am beautiful*. As it suits the internal method, the scale was constructed and validated using factor analysis.

At first, all indicators were collected and analyzed using a principal component analysis with oblique rotation. The items loaded on 10 different components, as is shown in table 1 in appendix C.1. 10 of the 47 items loaded on more than one component. Therefore, a principal component analysis was performed per component including and excluding the double loaded items to increase the validity and internal consistency. Four items did not fit in any component, these were marked in italic. Three of those were removed from the analysis. However, during the entry of the data it appeared that more extreme answers were given on the item *Ik ben dun 1-10 Ik ben dik*, therefore this item was included individually as the scale *Weight interpretation*. An additional nine separate scales were conducted from the components, of which the factor loadings, eigenvalue, explained variance and Cronbach's alpha are presented in appendix C.1. The total of nine scales - appearance, responsibility, sport performance, social relations, school performance, popularity, hobbies, maturity and success - were computed using a mean score.

3.3.3 Social comparison orientation (SCO)

To measure the tendency of social comparison Gibbons and Buunk (1999) developed the Iowa Netherlands Social Comparison Orientation Measurement (INCOM). The 11-item INCOM was widely tested and showed strong validity (Gibbons & Buunk, 1999). People with higher scores have more comparison orientation behaviors. The INCOM was not tested on children or adolescents, though it was used by various scholars to measure the SCO among adolescents. Piko (2008) used the INCOM among 560 high school pupils between the age 14-19. Gibbons, Pomery and Gerrard (2008) used the scale among 1200 adolescents between the ages of 10 to 14. It was used for 14 to 17-year-olds among 326 undergraduates in turkey (Civitci & Civitci, 2015) and for a sample of 189 adolescents between the age of 13-15 (Litt, Stock & Gibbons, 2015). The internal consistency of the original sample was 0.83 and in other samples ranging from 0.78 to 0.85 (Gibbons & Buunk, 1999). However, this study has a Cronbach's alpha of .62, appendix C.3. The short version of the INCOM used in this study consisted of six items which are shown in appendix B.1. An example item is; *I often compare myself with others with respect to what I have accomplished in life*. The respondent could answer 1 *I disagree strongly*, 2 *I disagree*, 3 *I neither agree nor disagree*, 4 *I agree* and 5 *I agree strongly*. The questions were simplified for a better understanding by the respondents. The SCO-scale was computed by a sum-score and transformed to a 0-20 scale. A low score means the respondent does not generally compare himself or herself with others, a high score indicates more intensive social comparison behavior.

3.4 Analysis

After the factor analysis, the reliability checks and scale constructions were analyzed to indicate significant mean difference. The mean health outcomes by gender, ethnicity and educational level were conducted using an independent t-test. The results are presented in appendix D.1. A Kruskal-Wallis test was used to explore different health outcomes by age, which is likewise presented in appendix D.1. The Kruskal-Wallis test ranks the different health outcomes per age and tests whether these differences are significant.

Then each mental health outcome was regressed separately on the social comparison scales, as shown in appendix E.1. First the comparison-object scales were recoded backwards, which means that a high score indicates a more positive self-evaluation compared to classmates, hence: downward comparison. A low score indicates upward comparison, thus a more negative self-evaluation compared to classmates. E.g. a high score on school performance suggest that the respondents evaluate their school performance as better than the school performance of their classmates. The regression coefficients can be interpreted as the percentage change in mental health outcome by every unit increase towards a more favorable self-evaluation. The results were checked for robustness by a logistic regression including all comparison-objects. The robustness check results are reported in appendix E.2

Exploring the relation of upward-downward comparison and mental health outcomes along comparison-objects, dummy regressions were performed. First, all comparison-objects were divided into upward and downward comparison by creating dummies with upward comparison as the reference category. Then regression analysis' were conducted for every health outcome. The regression coefficients can be interpreted as the percentage change in mental health caused by the difference between upward comparison and downward comparison. The results are shown in

appendix F.1. As a robustness check, t-tests were conducted. The mean difference in health outcomes by either upward or downward comparison are shown in appendix F.2.

The interaction effect of SCO was tested by adding the interaction variables to the regression. The results are presented in appendix G.2. The following chapter provides an elaborate explanation of the most important results.

Chapter 4. Results

The latter chapters explained how social comparison-objects could affect the mental health of Dutch adolescents and how this study was set up to examine their relation. Several comparison-objects were combined to a total of 10 comparison-objects scales using a factor analysis. The distribution of health outcomes by demographic characteristics was explored via an independent sample t-test and a Kruskal-Wallis tests. Then, it was examined which social comparison-objects were most relevant for mental health outcomes via multiple regression analysis. The robustness of these results was examined via logistic regressions. Following, a regression analysis was performed including upward comparison as dummies to investigate the relation of upward versus downward comparison on mental health outcomes. Additional t-tests provided the mean score of each health outcome by upward-downward comparison along the different comparison-objects as a robustness check. At last, a regression analysis was conducted to examine the interaction effect of SCO on social comparison and mental health outcomes. This chapter presents the results and interpretation of all noteworthy findings. The results were set out on the basis of the four mental health outcomes of the study. Paragraph 4.1 elaborates on the effect of comparison-objects on depression, paragraph 4.2 on anxieties, paragraph 4.3 is directed at eating disorder and paragraph 4.4 on general mental health. Paragraph 4.5 entails the exploration of SCO as a moderator. Finally, paragraph 4.6 iterates the most important results.

4.1 Depression

The depression scale ranged from 0 to 100, indicating an increase in depression on symptomatic level with every unit accession. The mean score on depression was 16.34(SD=12.91). Still, 11.7% of the respondents exceed the clinical threshold, which means they suffered from depressive symptoms. 88.3% scored below the clinical threshold and did not have a depression. An independent-sample t-test was conducted to estimate the distribution of depression over gender, ethnicity and educational level. The results indicated no significant difference in depression between boys and girls, autochthonous respondents and foreign respondents or vmbo educational level and havo-transfer educational level. A Kruskal-Wallis test was conducted to rank the depression scores for different age levels. There was no significant difference in depression by age. The detailed distributional results are presented in appendix D.

4.1.1 Regression analysis depression

To estimate the explained variance of depression by comparison-objects, linear regressions were conducted. The results are presented in table 1 appendix E.1. The first model included merely the demographic characteristics of the respondents. None of the results predicted depressive symptoms significantly.

Then, in the following models the social comparison-objects were entered singly. Six social comparison-objects significantly predicted depression on symptomatic level, namely appearance, sport performance, school performance, popularity, success and weight interpretation. Social comparison on appearance negatively related to depressive symptoms as expected ($b=-1.35$ $t(152)=-2.252$, $p<.05$). This means that when adolescents believed they look better than their classmates, they experienced less depressive symptoms. Even though comparison on appearance significantly related to depression, it did not significantly explain the variance of depression within this model. Sport

performance significantly explained 9,5% of the variance in depression scores. Social comparison on sport performance predicted depression with $b=-1.92$, $t(152)=-3.379$, $p<.01$. The experience of being worse in sport compared to their classmates related to more depressive symptoms. In line with the expectations, downward comparison, thus believing to be more sportive, related to better mental health outcomes. Social comparison on school performance predicted depression significantly as well with $b=-2.67$, $t(153)=-3.574$, $p<.001$. The negative relation indicated the expected relation between downward comparison on school performance and better mental health outcomes. Thus, believing to perform better in school compared to classmates, related to less depressive symptoms. School performance explained significantly 10,2% of variance in depression scores. The comparison-object popularity significantly explained 8,9% of the variance in depression scores. Social comparison on popularity predicted depression with $b=-2.19$, $t(153)=-3.227$, $p<.01$. When adolescents compared themselves downward on popularity, the depressive symptoms were 2.19% less. These results are in line with the prediction that when someone believes to be more popular, it relates to less depression, as well as the relation to more depressive symptoms when someone experiences to be less popular. Likewise, to compare on weight interpretation significantly predicted depression with $b=-1.33$, $t(153)=-2.898$, $p<.01$, explaining 7,7% of the variation for depression. This result indicates that respondents who perceived themselves to be heavier than their classmates experienced more depressive symptoms than respondents who believed themselves to be skinnier. The strongest significant predictor of depression was social comparison on success with $b=-3.73$, $t(153)=-6.427$, $p<.001$. Thus, believing to be one unit less successful than classmates on a 1 to 10 scale, increases depression symptoms with almost 4%. In line with the expectations, when someone experienced to be more successful than classmates, they had better mental health outcomes. 23,8% of the variance of depression was explained by the social comparison-object success.

To estimate the total explained variance in depression, a multiple linear regression analysis was conducted, entering all comparison-objects at once. This model explained 31,8% of the total variance of depression. When all comparison-objects were included, solely comparison on school performance and success predicted depression significantly. The results remain negative, meaning that the believe to perform better in school or being more successful related to less depression. Besides the comparison-objects, educational level became a significant predictor for depression with $b=4.75$, $t(152)=2.436$, $p<.05$. This indicates that havo-transfer pupils have approximately 5% more depressive symptoms than vmbo-pupils.

The robustness of the latter results was examined using a logistic regression. The results are reported in appendix E.2. Merely social comparison on success significantly predicted the chance of getting a depression. The odds ratio of .361 indicates that the more adolescents experienced themselves as successful compared to their classmates, the smaller the chance was to get a depression. Social comparison on school performance did not have any significant predictive value regarding the chance to get a depression.

Summarized, the results showed:

- Social comparison on success, explained more variance in depression than other comparison-objects in both the singular model as the multiple model. Comparing on success provided a stronger percentage difference in depression than other comparison-objects. Success was the only comparison-object which remained significant in the prediction of the chance of

getting a depression. Therefore, social comparison on success is the most important comparison-object related to depression.

- Additionally, social comparison on weight interpretation, appearance, sport performance, school performance and popularity predicted depression significantly on symptomatic level.

4.1.2 Distribution depression by upward and downward comparison

To evaluate how different comparison-objects affect depression via upward-downward social comparison, a regression analysis with dummies was conducted. First of all, every social comparison-object was divided in downward comparison dummies with upward comparison as the reference category. Then depression was regressed one by one by the comparison-object dummies. The results are presented in table 1 in appendix F.1. Finally, an independent sample t-test was performed per comparison-object to check the robustness of the results. The findings of the t-tests are shown in appendix F.2.

Only the comparison-objects responsibility and maturity did not differ significantly regarding upward or downward comparison. The respondents who compared downward on appearance, sport, social relations, school performance, popularity, hobbies, success and weight interpretation had significantly less depressive symptoms than respondents who compared themselves upward on these objects. Thus, believing to look better, be more popular, have better social relations or be better in school or sports than classmates, relates to less symptoms of depression. The effect of upward or downward comparison was especially strong for the comparison-objects hobbies and success. Respondents who compare downward on hobbies or success have approximately 10% less depression symptoms than their upward comparing counterparts. The t-tests in appendix F.2 shows similar results, all significant higher mean scores in depression were scored by upward comparing respondents. There was no comparison-object which had a higher mean depression when compared downward.

Summarized:

- All significant results in both the regression and the t-tests showed a relation between upward comparison and more depression or the other way around, downward comparison and less depression. Except for the non-significant results, all comparison-objects comply to this relation.
- Comparing upward on responsibility and maturity did not affect depression. Upward social comparison led to more depression for the other comparison-objects.

4.2 Anxiety

The level of anxiety was rated from 0 to 100, where a higher score stands for more symptoms of anxieties. The mean score was 25.04 (SD=18.95) and 87% of the respondents, did not have an anxiety disorder. The other 13% exceeded the clinical threshold and probably struggled with anxieties. An independent-samples t-test was conducted to compare the mean level of anxiety for different demographic characteristics. Levels of anxiety did not differ significantly among ethnicity, gender or educational level. To rank the mean scores of anxieties among different age-groups a Kruskal-Wallis test was conducted. Likewise, there was no significant difference in levels of anxiety by 12-year-olds, 13-year-olds, or 14-year-olds. Appendix D provides an overview off all distributional results regarding anxiety.

4.2.1 Regression analysis anxiety

A standard linear regression analysis was performed to estimate the proportion of variance in anxiety accounted for by comparison-objects. The first model in table 2 appendix E.1 regressed anxiety merely on demographic characteristics. Gender, ethnicity, educational level and age could not significantly explain the variance in anxiety. In every following model one comparison-object was added to estimate its predictive value regarding anxiety. No comparison-object significantly affected anxiety. Thus, anxiety symptoms could not be predicted from social comparison behavior along the comparison-objects provided in this study.

To examine the robustness of the results, a logistic regression was conducted. The results are presented in table 5 appendix E.2. These confirm the previous findings: the chance to get an anxiety disorder could not be predicted by any of the given comparison-objects or demographic characteristic.

Summarized:

- Social comparison does not affect anxiety regardless of the social comparison-object.

4.2.2 Distribution anxiety by upward and downward comparison

With a regression analysis in table 2 in appendix F.1 and t-tests in appendix F.2 as robustness check, this study explored how social comparison-objects relate to anxiety via upward and downward comparison. Adolescents who compare themselves upward along appearance, believe to have a subordinate appearance compared to their classmates. Downward comparers on the other hand believe to have a superior appearance compared to their classmates. However, comparing either upward or downward on any given comparison-object did not make a significant difference in anxiety symptoms.

Summarized:

- Anxiety cannot be predicted from upward or downward comparison along the tested comparison-objects.

4.3 Eating disorder

Disordered eating habits were rated from 0 to 100 with an average score of 19.16 (SD=22.10). A total of 82,5% scored under the clinical threshold, which means they did not have an eating disorder. The other 17,5% exceeded the clinical threshold and suffered from disordered eating habits. To explore the distribution of disordered eating habits along demographic characteristics, an independent sample t-test was conducted. The results show no significant difference in eating disorders by gender, educational level or ethnicity. To test for significant differences in eating disorders by age, a Kruskal-Wallis test was conducted. Adolescents of the age of 12, 13 and 14 differed significantly in their scores on eating disorder ($H(2)=10.908, p<.01$). 14-year-olds scored higher on eating disorder than 13-year-olds who in turn scored higher than the 12-year-old group. Thus, the older adolescents generally cope with disordered eating habits more often than younger adolescents. However, it must be taken into account that age was unequally distributed, thus these results cannot be generalized. The distributional results regarding eating disorder are shown in appendix D.

4.3.1 Regression analysis eating disorder

To estimate the variance of eating disorders predicted by comparison-objects, a linear regression analysis was conducted. The first model, presented in table 3 in appendix E.1, only included the demographic characteristics as control variables. Age was a significant predictor for an eating disorder, yet should be interpreted with caution. When age moved up one year, eating disorder on symptomatic level increased with approximately 10% ($b=9.77$, $t(152)=2.955$, $p<.01$). Thus, the few older adolescents struggled more with disordered eating habits than the younger adolescents. The effect of age remained fairly stable when the comparison-objects were entered in the regression. The other demographic characteristics, gender, educational level and ethnicity, did not have any predictive value regarding eating disorders.

Besides the demographic characteristics there were two comparison-objects which significantly affected disordered eating habits among the respondents, namely, success and weight interpretation. Social comparison on success predicted disordered eating habits with $b=-2.67$, $t(152)=-2.484$, $p<.05$. The negative relation indicated that the experience to have one unit less success than classmates on a scale from 1 to 10, increased disordered eating habits with 2.67%. In line with the predictions, downward comparison on success, thus expecting to be more successful, related to less disordered eating habits. Social comparison on success in combination with age explained 11% of variance in eating disorder ($F(5,148)=3.662$, $p<.01$). When success was replaced by weight interpretation, the explained variance of disordered eating habits increased to 14,6% ($F(5,148)=5.041$, $p<.001$). Social comparison on weight interpretation affected eating disorders significantly with $b=-2.76$, $t(152)=-3.544$, $p<.01$. This means that adolescents who believe to be heavier than their classmates have more disordered eating habits than adolescents who believe to be skinnier than classmates.

To estimate the proportion of explained variance in eating disorders by all comparison-objects, a multiple linear regression analysis was conducted. The demographic characteristics and comparison-objects combined explained 19.6% of the total variance of eating disorder with $F(5,148)=2.417$, $p<.01$. When other comparison-objects were added, the effect of success became insignificant. However, the effect of weight interpretation remained fairly strong and significant in affecting eating disorders. According to the results of the multiple regression analysis, comparison on weight interpretation affected eating disorders the most.

To examine the robustness, a logistic regression analysis was performed. The results are presented in appendix E.2. The latter results were confirmed: weight interpretation significantly predicted the chance to get an eating disorder. When respondents experienced themselves to be skinnier than their classmates, the chance to develop an eating disorder decreased. Thus, results of the logistic regression analysis corresponded to the results of the former multiple regression analysis.

Summarized:

- Weight interpretation was the most relevant comparison-objects to predict disordered eating habits. Weight interpretation remained significant when other comparison-objects were entered and was the only comparison-objects to predict the chance of getting an eating disorder.
- Social comparison on success additionally predicted disordered eating habits, yet to a lesser extent.

4.3.2 Distribution of eating disorder by upward downward comparison

A regression analysis with dummies was conducted, in order to examine how different comparison-objects affect eating disorders via upward-downward social comparison. The results are shown in table 3 in appendix F.1. Additionally, an independent sample t-test was conducted to examine the robustness of the results. This is presented in appendix F.2. Upward comparison on success and weight interpretation increased disordered eating habits. Thus, the respondents who believed to be less successful or heavier than their classmates experienced more disordered eating habits than the respondents who believed to be more successful or skinnier. The difference in disordered eating habits between upward and downward comparers on success and weight interpretation was about 12%.

Summarized:

- The results in both the regression and the t-tests showed a relation between upward comparison and more disordered eating habits and downward comparison relating to less disordered eating habits. Except for the non-significant results, all comparison-objects comply to this relation.
- Upward social comparison on success and weight interpretation significantly affected disordered eating habits.

4.4 General mental health

The general mental health scale ranges from 0 to 100. Every unit increase indicated an increase in general mental health on symptomatic level. The respondents scored 73.12 (SD=16.48) on average. Of all respondents 45.5% scored above the clinical threshold, which means they were mentally healthy. Another 54.5% of the respondents scored below the clinical threshold and thus suffered from low mental health. An independent sample t-test was performed to examine differences in general mental health scores among gender, ethnicity and educational level. No significant difference was found among the latter demographic characteristics. The results of a Kruskal-Wallis test presented an insignificant difference among different age-groups. All distributional results are presented in appendix D.

4.4.1 Regression analysis general mental health

To estimate the explained variance of general mental health by social comparison-objects, linear regressions were conducted. The results are presented in table 4 appendix E.1. The first model merely included the demographic characteristics of the respondents. Of the demographic characteristics solely age significantly predicted general mental health with $b = -5.19$, $t(152) = -2.070$, $p < .05$. The negative relation indicated that younger adolescents were mentally healthier than older adolescents. Between the age 12 to 14, general mental health decreased with about 5% for one year of age increase. However, the unequal distribution of age must be taken into account when the results are interpreted.

In the remaining models, all comparison-objects were entered one by one. Social comparison related significantly to general mental health on the comparison-objects success and weight interpretation. Success explained about 8% of variance in general mental health scores ($F(5,148) = 2.607$, $p < .05$) and significantly predicted general mental health with $b = 2.12$, $t(152) = 2.588$, $p < .05$. Thus, when the

respondent believed to be one unit less successful than classmates on a 1 to 10 scale, the general health decreased with 2.12%. In line with the expectations, downward comparison related to better mental health in general. Social comparison on weight interpretation significantly predicted general mental health outcomes as well with $b=1.30$, $t(153)=2.207$, $p<.05$. This means that adolescents who believed to be heavier than their classmates, have a lower general mental health than those who believed to be skinnier than their classmates.

In model 12, all comparison-objects were entered to estimate their proportion of explained variance in general mental health. When all objects were included, weight interpretation became insignificant. Social comparison on success remained a significant predictor for general mental health ($b=2.73$, $t(152)=2.273$, $p<.05$) explaining 13,7% of the total variance with $F(14,139)=1.574$, $p=.094$. Thus, the experience to be more successful than classmates related to better mental health.

To examine the latter results for robustness, a logistic regression analysis was conducted. The results are presented in table 5 appendix E.2. The results of the former multiple regression analysis on general mental health did not hold with the robustness check. Thus, the chance to be either mentally healthy or mentally unhealthy cannot be predicted by any of the comparison-objects or demographic characteristics according to the logistic regression results.

Summarized:

- Social comparison on success predicted general health outcomes more strongly than other comparison objects.
- Social comparison on weight interpretation additionally predicted general mental health, yet to a lesser extent.

4.4.2 Distribution general mental health by up-down comparison

To test the mental health differences among upward and downward comparison on comparison-objects a regression with dummies was performed. The results are presented in table 4 appendix F.1. The former regression showed that more downward comparison or less upward comparison on success and weight interpretation related significantly to better general mental health. Surprisingly, the difference between the upward comparers and downward comparers on the same comparison-object did not significantly affect the general mental health scores. The results of the dummy regression analysis were interpreted as follows: the difference in general mental health between comparing upward or downward on any given objects is not significantly different from zero. This means that success and weight interpretation did not predict general mental health through upward or downward comparison, neither did comparison along any other object. The t-test in appendix F.2 however, showed a significant difference in general mental health scores between respondents who believed to be heavier or skinnier than classmates.

Summarized:

- General mental health was significantly predicted by social comparison on success and weight interpretation, though this could not be explained by the respondents upward or downward comparison behavior on these objects.

4.5 Social comparison orientation (SCO)

SCO was taken into account as an interaction variable. All detailed results regarding SCO are shown in appendix G. The SCO-scale ranges from 0 to 20, 0 meaning that the respondents had no interest in comparative information, 20 indicating that respondents compared themselves frequently. The mean score on SCO-scale was 8.25 (SD= 3.43). To explore demographic differences on SCO, an independent sample t-test was performed. No significant difference in gender, ethnicity or educational level was found. A Kruskal-Wallis test indicated that there was likewise no significant difference between the SCO-scores of 12, 13 or 14-year-olds.

4.5.1 Regression analysis SCO

To examine whether the effect of a comparison-object on mental health outcomes was affected by SCO a regression analysis was conducted including SCO as an interaction variable. The moderation effect was explored for depression in table 1, anxiety in table 2 and eating disorder in table 3 in appendix G.2. SCO did not significantly affect the relation with comparison-objects for any of the latter health outcomes. Thus, whether respondents had a high or low SCO, did not affect the effect of social comparison along the given objects.

However, when the moderation effect was explored for general mental health, two comparison-objects were significantly affected by SCO. The results are presented in table 4, appendix G.2. The positive relation of both school performance and success differed along different scores of SCO. Social comparison on school performance significantly predicted general mental health, as did the respondents level of SCO. Perceiving to be better in school than classmates and generally comparing oneself a lot, related to better general mental health. Though, for respondents with a high SCO, the positive effect of social comparison on school performance was significantly weaker than respondents with less SCO ($b = -.72$, $t(152) = -2.476$, $p < .05$). Thus, believing to be better in school relates significantly to better mental health in general. This was stronger for those hardly compare themselves than for respondents who compare themselves a lot.

Besides school performance, the relationship between success and general mental health was affected by SCO as well. Believing to be more successful and a higher rate of SCO both related to better mental health. Though the positive effect of success was significantly weakened by increasing levels of SCO with $b = -.43$, $t(152) = -2.253$, $p < .05$. Thus, the general mental health of respondents with a low SCO increased stronger when they perceived themselves to be more successful than their classmates. The general mental health of respondents with a high SCO was less affected by being more successful. These findings are opposed to the predicted effect of SCO. As social comparison was expected to have a stronger effect for those eager to collect comparison information. However, the results indicated that adolescents who generally comparing themselves a lot were less affected by the comparison information they received than their peers who did not frequently compare themselves.

4.6 Chapter summery

In this chapter, the results of how social comparison-objects relate to four mental health outcomes were presented and interpreted. Summarizing, the results are as follows:

- Depression: depression symptoms can be predicted by social comparison on various comparison-objects as, appearance, sport performance, popularity, weight interpretation, school performance and success. Merely downward comparison on school performance and

success remained significant predictors for less depressive symptoms when comparison on all other objects was stable. Though, to predict the chance of actually getting a depression, only social comparison on success holds its significant value.

- Anxiety: the relation between social comparison-objects and anxiety symptoms can be summarized as none existent. The chance to cope with anxieties or suffer from anxiety symptoms was not caused by neither upward or downward comparison on either of the analyzed comparison-objects.
- Eating disorder: to predict disordered eating habits, social comparison on both success and weight interpretation were observed. Both comparison-objects related to more disordered eating habits when the respondents compared themselves upward, thus believed to have less success or to be heavier than their classmates. Though to prophesy the chance of developing an actual eating disorder, only weight interpretation remained a significant predictor. Besides the social comparison-objects, age predicted both disordered eating habits as well as the chance of getting an actual eating disorder. The older the respondent, the more likely it is to develop an eating disorder.
- General mental health: general mental health could likewise be predicted by downward social comparison on success and weight interpretation. Merely success remained a significant predictor when social comparison on all other objects were stable. Besides the comparison-objects, age likewise affected the general well-being of the respondents. Younger respondents were mentally healthier than older respondents. The chance of being categorized as being mentally unhealthy though, could not be predicted by any comparison-object or demographic characteristics.

As a last step, it was examined whether SCO had a moderator effect on the relations between comparison-objects and mental health outcomes. Hardly any relation was moderated by SCO. In two specific cases SCO did moderate the relations, the effect was in the opposite direction than expected: the mental health of the respondents who were eager to absorb comparison information was less affected than the mental health of the respondents who did not really care too much about comparison information. In the following chapter the implications of the former results are discussed.

Chapter 5. Conclusion

This study investigated how social comparison affects mental health outcomes of Dutch adolescents. More specifically, the relation between different comparison-objects and depression, anxiety, eating disorders and general mental health was studied. Several comparison-objects were theoretically substantiated to be relevant for the comparison behaviour of adolescents and plotted against mental health outcomes. The aim of this study was to answer three main research questions, which will be discussed successively in paragraph 5.1, 5.2 and 5.3. The limitations of this study and recommendations for further research are discussed in paragraph 5.4.

5.1 Which social comparison-objects are most relevant for Dutch adolescents' mental health?

It was theoretically suggested that comparison-objects influence the effect of social comparison on mental health. This study empirically confirmed that comparison on different objects influenced the strength of upward-downward comparison on mental health differently. Receiving comparison information on success and weight interpretation influenced multiple health outcomes, while social comparison on maturity and responsibility did not affect any health outcomes. These results bear witness to the importance of being more successful and skinnier among young adolescents in the Netherlands. Besides, the results showed that being less mature or less responsible did not affect the mental state of adolescents.

5.1.1 Relevant comparison-objects

The most prominent comparison-object affecting mental health outcomes among Dutch adolescents was success. When adolescents believed to be more successful than others they were less bothered by depression and eating disorders and were in general better mental health. Success provides general evaluative information about being on the right track. As Beemen (2010) and Vonk (2009) mentioned, in multiple areas of life adolescents go through a phase of change. This phase of development increases uncertainty and self-consciousness (Gibbons & Buunk, 1999). Believing to be more competent, more intelligent or believing things work out better for oneself than for others, reinforces the self-image. The mechanism can revolve as well as self-confidence and self-esteem can easily be endangered when adolescents experience to be a failure or less competent compared to others.

Compared to other comparison-objects in this study, success has a more general character and applicable in many situations for the adolescent. The level of experienced success compared to classmates could imply any success or failure the adolescent imagines. Theoretically it signifies the importance of adolescents believe to generally do better than classmates for mental health outcomes. A practical application could focus on the empowerment of feeling successful and reducing the incidence of incompetence and failure.

Besides the more general comparison-object success, a very specific object of comparison additionally affected multiple health outcomes: the mental experience of being heavier than others predicts the chance of getting an eating disorder, relates to more depressive symptoms and less mental well-being in general.

The researcher met all of the respondents in person and on the surface, none of the respondents seemed over or underweight. The mental health outcomes thus seem not affected by actual differences in weight, though by social comparison on weight interpretation. The influence of weight interpretation on mental health outcomes indicates the slimness norm among adolescents. In a context where slimness is the ideal, people are more focused to meet this norm (Nasser & Katzman, 1999 in GGZ, 2006).

The influence of social comparison on weight interpretation is curious as there is hardly any influence of social comparison on appearance. Previous research emphasized how appearance comparison was associated with low self-esteem, depression and eating disorders (Hamel et al., 2012) and that appearance comparison is related to lower levels of emotional well-being and lower perceived physical attractiveness (Rinn et al., 2008). However, according to this research, looking beautiful, modern and favorable according to the group norms of appearance is less relevant than the idea of a deviating weight. A possible explanation is that improving appearance characteristics is easier than adapting to the weight norm. For example, when others have better clothes or a different hairstyle, it is possible to use the comparative information to improve oneself (Festinger, 1954). However, for this assumption to be accepted further research is required.

This study empirically proves that social comparison on weight interpretation stronger affects multiple mental health outcomes than most other comparison-objects. It theoretically indicates the emphasis on weight interpretation among Dutch adolescents. Practically the mental health of adolescents could be improved by adjusting the unrealistic interpretation of their weight. The realization of being less deviant from the group-norm weakens the effect on mental health outcomes.

5.1.2 less relevant comparison-objects

Conforming the expectations social comparison on merely responsibility and maturity did not affect any mental health outcome. These abilities develop during adolescence and are yet underdeveloped among first-year-pupils of secondary education (AACAP, 2011). Why being less mature or less responsible than classmates does not influence adolescents mentally, is probably because it does not interest them. Considering brain development, adolescents are likely to act immature and irresponsible as well as mature and responsible (AACAP, 2011). Regarding meeting the group-norms, being slightly less responsible or less mature in early adolescents is considered normal.

There are a number of comparison-object which influenced depression in particular. Social comparison on appearance sport performance, school performance, popularity, social relations and hobbies only affect depression symptoms, though they do not affect any other health outcome. Thus, this study provides empirical evidence that social comparison on most comparison-objects influences adolescents' depression level. Anxiety symptoms, on the other hand are not at all affected by social comparison on any object. Concluding, that social comparison partly explains depression among adolescents, though it does not explain anxieties.

5.2 How do upward and downward social comparison along various comparison-objects relate to the mental health outcomes of adolescents?

Regarding the relation between upward and downward comparisons and mental health outcomes, the theory provided inconsistent results. Downward comparison, being better off than others, relates

to better mental health and upward comparison, being worse off than others relates to less mental health in some studies (Wheeler, 2000; Checng et.al., 2008; Buunk et.al., 2007). Though other studies reported opposite results (Mojtabai, 2008; Buunk et al. 2001). This study investigated whether the inconsistent results could be explained by comparison along different comparison-objects.

All significant results of this study indicate the same mechanism: upward comparison relates to less mental health, while downward comparison relates to improved mental health. This effect remains unchanged by comparing along different objects. The theoretical inconsistencies regarding

Downward comparison's relation to better health confirms the theory of downward comparison. "*The favorable comparison between the self and the less fortunate other enables a person to feel better about his or her own situation*" (Wills, 1981 p.245). Using downward comparison to maintain positive views and protect one's self-worth describes the self-enhancement mechanism. Thus, perceiving to be better off on any given comparison-object motivates adolescents to praise themselves. In some cases, like success or weight interpretation the effect of self-enhancement becomes strong enough to affect multiple mental health outcomes.

Festinger's (1954) original proposition of social comparison was the *unidirectional drive upward*. In respect to abilities, people have the intrinsic motivation to improve oneself. To do so, people tend to compare themselves upward followed by the drive to reach the same level (Festinger, 1954). Following Festinger's theory, upward comparison is expected to relate to better mental health outcomes. Dijkstra et al. (2008) performed a meta-analysis in which he found pupils preferred upward comparison to increase their school performance. However, it made pupils feel worse about themselves. The adolescents motive to compare upward remains unclear in this study, though the result of upward comparison is clear. Upward comparison relates to worse mental health outcomes on all significant comparison-objects. Perceiving to perform less in school or in sports for example emasculates adolescents' self-worth. The effect of upward comparison is strong enough to raise the odds of getting a mental health disorder.

5.3 Does the relation between social comparison along various comparison-objects and mental health outcomes varies along different levels of SCO?

Of all forty relations between comparison-objects and mental health outcomes, merely two indicated SCO as a moderator. Downward social comparison on school performance and success relate to an improved mental health and this effect is weaker for respondents with a high SCO. Thus, the mental health of adolescents who tend to compare themselves a lot, is less affected by comparison information than for adolescents who hardly compare themselves. These findings are exactly opposite to the findings of Buunk et al. (2007). Additionally, this study does not confirm a direct relation between SCO and mental health outcomes, while previous studies found a significant negative relation between SCO and life satisfaction (Buunk et al, 2007; Civitci & Civitci, 2015) or emotional stability (Rinn et al., 2008).

These curious results are possibly caused by the INCOM-scale validity. During the survey, several questions arose regarding the INCOM-scale, indicating possible misinterpretation. The INCOM questions were simplified for better understanding, however, this possibly endangered the validation

as well. INCOM's validity is widely tested on adults, though is not ensured for 12-14-year-old adolescents.

However, Civitci and Civitci (2015) used the INCOM-scale among 14-17-year-olds and reported high SCO relating significantly to lower life satisfaction. Litt, Stock and Gibbons (2015) tested SCO as moderator for drinking behavior among 13-15 year olds. They found a significant reinforcing effect on norm conformation for respondents comparing themselves more frequently.

Assuming that more social comparison behavior relates to more norm confirmation, would partly support this study's findings. Adolescents who frequently socially compare emphasize norm confirmation more than their low SCO counterparts. Surpassing classmates in success or school performance is divergent regarding the class' average. For high SCO adolescents, the mental health increase caused by success and better school performance, is restrained by the effect of norm deviation. In other words, succeeding more than classmates evokes feeling different for adolescents comparing themselves a lot. Adolescents who hardly compare themselves, feel less different when they excel in school or success and therefore experience better mental health outcomes. These assumptions, however, are recommended to be empirically substantiated by future research.

5.4 Limitations and recommendations

The limitations of this study and recommendations for further research are illustrated below:

- First of all, this study implied the mechanism of self-esteem to be in line with mental health outcomes. A self-esteem boost implied to result in better health outcomes. A deflated ego implied poor mental health. However, the role of self-esteem is probably more complex than theoretically assumed in this study. Some studies suggest a link between the level of self-esteem and a preference to seek favorable comparison information. People with low self-esteem, for example, would seek more information to self-enhance than people with high self-esteem (Michela & Gaus, 1994; Wood et.al. 1994 in Allan & Gilbert, 1995). A few of the non-significant results might be explained by a spurious relation of self-esteem, as self-esteem influences both mental health outcomes and comparison behavior. Respondents with high self-esteem seek more self-improvement information, thus compare themselves more upward. Upward comparison decreases mental health, though a high self-esteem relates to better mental health. Future research can explore the role of self-esteem regarding both comparison behavior and the relation between social comparison and mental health outcomes.
- A second limitation concerns a causality issue regarding the expected mechanism. This study confirms a relation between upward comparison and mental health outcomes. Though no empirical statements could be made regarding the causal relation. Upward comparison could emphasis being worse off than others, resulting in negative feelings about the self and mental health issues, as theoretically stated in this study. However, coping with psychological difficulties, or low self-worth could likewise cause unfavorable comparison behavior. To make proper statements regarding the causal relation between social comparison and mental health outcomes a longitudinal research with data collections in at least two points of time is recommended.
- A third limitation regarding the method is that the comparison-objects were enforced. Asking the adolescents to compare themselves along the given comparison-objects might provide

different results than the examination of spontaneous, day-to-day comparison (Dijkstra et al., 2008). As a result, the external validation must be interpreted with caution. A recommendation to tackle this issue is to collect data via interviews or open question surveys.

- A fourth limitation regards the analysis. There is no multicollinearity between comparison-objects, though they are interrelated. The mutual cohesion complicates distinguishing the effect per comparison-object. However, it additionally indicates a tendency to compare in a certain direction. Some adolescents compare themselves generally favorable, while others compare themselves more pessimistically. Future research could empirically engage in the existence and mechanism of this inclination. For example, by including personality traits as optimism, neuroticism, temperament or assertiveness.
- The last limitation regards the individual level measurement and lack of contextual influence. Comparing upward to self-improve for example is expectedly due to the desirability of western culture to do better and better (Festinger, 1954). Moreover, peer socialization encourages adaptation of adolescents to the group norm (Allan et al, 2005). Thus, instead of continuing on individual level future research can perform a multilevel study, including some of the group norms. For example, between classes.

Besides the latter recommendations, numerous interesting questions regarding social comparison mechanisms arise. For example, does the presence of siblings affect social comparison behavior from a socialization point of view? Would the same results hold for different educational levels and different age groups? Or which type of relevant comparison-objects are connected to different stages in life regarding the influence of mental health outcomes? These questions are similarly interesting for further research.

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