Thinking About the Joneses? Decreasing Rumination About Social Comparison Increases Wellbeing

Silvana Weber[1] & York Hagmayer[2]

[1] *Human-Computer-Media Institute, Julius-Maximilians-University Würzburg, Germany*

[2] *Georg-Elias-Mueller Institute for Psychology, Georg-August University Göttingen, Germany*

Corresponding author:
Dr. Silvana Weber
Julius-Maximilians-University Würzburg
Oswald-Külpe-Weg 82, 97074 Würzburg, Germany
Phone: +49-0931-31-88366
Email: silvana.weber@uni-wuerzburg.de

Co-author:
Prof. Dr. York Hagmayer
Georg-August University Göttingen
Gosslerstrasse 14, 37073 Göttingen, Germany
Email: york.hagmayer@bio.uni-goettingen.de

Abstract

Social comparison and rumination are associated with lower levels of subjective wellbeing. We expected that an intervention to change the appraisal of social comparison situations would improve wellbeing among young adults ($n = 74$). A nine-week online training program was designed, combining elements of CBT and positive psychology. A pre-post assessment of subjective wellbeing, affect, social comparison orientation, rumination, and an appraisal of personal negatively perceived social situations served as dependent variables. Results indicate that the training led to an increase of subjective wellbeing and positive affect, and a decrease in negative affect and rumination. Initially unhappier individuals benefited slightly more from the training. The negative affective response towards personal social situations decreased, while positive affect increased. The overall level of social comparison orientation remained stable. Change in rumination was the strongest predictor of increased wellbeing, indicating that not social comparison per se, but ruminating about social comparison affects wellbeing.

Keywords: social comparison; rumination; wellbeing; online-training; cognitive restructuring

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Increases Wellbeing

"To be happy, we must not be too concerned with others." (Albert Camus)

Some persons are highly interested in their peers' lives. Their own wellbeing depends on being better off than others – the classic story of "keeping up with the Joneses". Other persons only seem to be focused on themselves, not being bothered with their peers at all. While social comparison appears to be an essential process for the former, it seems irrelevant to the latter.

Is it the frequency or the appraisal of social comparisons that affect individuals' wellbeing? On the one hand, research in positive psychology indicates that happy individuals are less interested in their peers' successes and failures than unhappy individuals, and less sensitive to comparison information (for a review, see Abbe, Tkach, & Lyubomirsky, 2003). On the other hand, the frequency of social comparison, no matter whether upward (compare to someone who is better off) or downward (compare to someone who is worse off), might not affect wellbeing per se. The cognitive interpretation and reaction to social comparison information (e.g., rumination, focus on and worry about implications) seem to be crucial for persons' wellbeing (Diener, Suh, Lucas, & Smith, 1999; Lyubomirsky, 2008; Lyubomirsky, Boehm, Kasri, & Zehm, 2011). Based on the assumption that the appraisal of social comparison information influences the association of social comparison and wellbeing, persons could become happier by learning how to change respective cognitions.

Individual Differences in Social Comparison and Wellbeing

Festinger (1954) suggested that the self-perception of persons is partially based on relative information. Yet, the cognitive process of social comparison and its outcomes are highly influenced by the situation and the persons involved. In contrast to Festinger's (1954) hypothesis that everyone has the urge to socially compare, Gibbons and Buunk (1999) suggested that the extent to which people engage in social comparison differs from one

individual to another (i.e., *social comparison orientation*). Individuals with low self-esteem, high uncertainty about their mood states, high in neuroticism, and with depression have been shown to be more likely to socially compare (e.g., Bäzner, Brömer, Hammelstein, & Meyer, 2006; Gilbert & Meyer, 2003). Further, high social comparison orientation is positively correlated with depression, negative affect, and social anxiety, yet negatively correlated with optimism. This is also true for online environments, which have become increasingly important in adolescents' and young adults' lives. In line with previous findings on offline social comparison, the relationship between social comparison on Facebook and negative self-evaluations was weaker among happier individuals (de Vries & Kühne, 2015). Persons who are high (vs. low) in social comparison orientation show higher social comparison frequency on Facebook (Lee, 2014) and increased Facebook use in general (Vogel, Rose, Okdie, Eckles, & Franz, 2015).

Research suggests that social comparison orientation is a fairly stable trait, although it might also reflect temporary influences (Gibbons & Buunk, 1999). Persons who are prone to occupational burnout symptoms generally experience less positive and more negative affect from social comparison, moderated by social comparison orientation (Buunk, Ybema, Gibbons, & Ipenburg, 2001). In line with the theory of downward comparison (Wills, 1981), persons with dysphoria also use social comparison as a source of appreciation and to attain self-congruent information (Giordano, Wood, & Michela, 2000). In online environments, high social comparison orientation predicted lower self-esteem and more negative affect after encountering a social comparison situation (Vogel et al., 2015). Further, social comparison (upward, downward, and non-directional) has been shown to mediate the effect between the amount of time spent on Facebook and depressive symptoms (Steers, Wickham, & Acitelli, 2014).

Taken together, these findings indicate that happy and unhappy individuals differ in their offline and online social comparison behavior, both in the amount and in their

interpretation of information that they encounter in their everyday life. However, there is a lack of research examining how the detrimental impact of social comparison could be reduced. The current research addresses this issue by trying to improve young persons' wellbeing by changing their social comparison processes.

Cognitive Processes underlying Social Comparison

Individuals differ in their cognitive and affective responses to social comparisons (e.g., see Gerber, Wheeler, & Suls, 2017, for a review and meta-analysis of self-evaluative changes as a result of upward vs. downward comparisons). Research suggests that cognitive processes influence the relation between social comparison and wellbeing. Intrapersonal comparison (i.e., comparing oneself to oneself under different conditions) as well as social comparison (i.e., interpersonally comparing oneself to others) can lead to both, positive and negative affective responses, depending on the cognitive appraisal (Smith, Diener, & Wedell, 1989). Traits like self-esteem, attachment style, social comparison orientation, perceived control, and uncertainty moderate the affective response to comparisons (e.g., Gilbert & Meyer, 2003; Michinov, 2005; Thwaites & Dagnan, 2004). Yet, individuals can alter their comparison strategies depending on their current motivation. Festinger (1954) suggested that people prefer to socially compare to similar others, in order to gain most information and to make the most accurate judgements. Hereby, similarity tends to be based on broad social categories (e.g., gender, age, or experience). For instance, an amateur runner would not compare with a professional runner in the Olympics, but rather with somebody of the same age, gender, and skills. Some research suggests that persons tend to compare downwards to maintain a positive view of themselves, and thus, reduce their own negative affect by comparing with somebody who is worse off (Wills, 1981). Yet, for individuals who suffer from depression and who are high in social comparison orientation, a downward comparison may also lead to more negative affect. They tend to relate others' low performance to their own, and thus, are threatened by the perceived failure (Buunk et al., 2001).

In contrast, an upward comparison is generally suggested to diminish persons' positive view of themselves. The *self-evaluation maintenance model* suggests that we protect our self-esteem by distancing ourselves from others who are better in a relevant domain (Tesser, 1988). To improve in certain domains or to increase motivation, persons tend to compare to others who are similar to themselves but slightly better (Blanton, Buunk, Gibbons, & Kuyper, 1999). Thus, a runner who wants to evaluate her skills and who wants to improve would compare her performance to a runner who is slightly better than she is, in order to assimilate. The *selective accessibility model* (Mussweiler, 2003) explains these cognitive processes underlying social comparisons. Mussweiler (2003, 2007) suggests that social comparisons can lead to both contrast and assimilation effects, depending on the perceived similarity or dissimilarity of a comparison target (i.e., holistic judgment about other person based on salient features such as gender or age). The outcome of a social comparison process is suggested to be an assimilation effect if the comparison target is perceived to be similar, while contrast effects are expected if the other person is perceived to be dissimilar.

In sum, research suggests that thoughts that arise in a situation in which social comparisons may occur influence the associated affective consequences. A runner who encounters a better runner could be either positively motivated to become as fit, or could be unhappy, because of feelings of inferiority. Some persons might not even notice the other runner, as they may be focused on themselves and their personal improvement, and thus, generally low in social comparison orientation. By changing associated thoughts (e.g., ruminating) that may occur during social comparison situations, we expect that the affective responses also change.

Rumination and Wellbeing

Rumination has been defined by *response styles theory* as focusing the attention on one's distress, and repetitively and passively thinking about possible causes and consequences (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). It is an emotion-focused coping style that

includes a stable tendency to focus on negative thoughts and feelings about a stressor, and thus, is considered a rather counter-productive reaction to stressful situations (Broderick, 1998). Ruminating involves both automatic and controlled thought processes (for a more detailed description of the cognitive stages of rumination see Martin & Tesser, 1989). It is associated with depression, leads to more negative affect, and reduces persons' motivation and academic abilities (cf. Lyubomirsky & Tkach, 2003; for a review see also Nolen-Hoeksema et al., 2008). The dwelling about oneself has also been shown to happen in social situations (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998) and it can influence the interpretation of events and impair persons' interpersonal problem solving skills (Lyubomirsky & Nolen-Hoeksema, 1995). Research has shown that ruminating about social comparison negatively influences subjective wellbeing (Lyubomirsky, 2008; Lyubomirsky et al., 2011). Happier persons are not bothered by being outperformed by a peer, as they primarily look at their own success, while unhappier persons cannot value their own achievements, if they know that a peer has performed even better than they did (e.g., Lyubomirsky et al., 2011; Lyubomirsky & Ross, 1997). Unhappier persons might be less certain about the absolute or relative level of their abilities, and therefore, be more concerned with their peers' outcomes. Consequently, they ruminate more on social comparisons, a strategy that diminishes their self-esteem and negatively affects their mood (Lyubomirsky & Ross, 1997). Similarly, social comparison on social network sites can increase depressive symptoms, mediated by rumination (Feinstein et al., 2013).

In sum, these findings suggest that rumination is an important cognitive mechanism to consider when looking at the relationship between social comparison and wellbeing. Altering the tendency to engage in social comparison and the way to think about it seem promising ways to enhance the wellbeing of initially unhappier individuals. The goal of the present research was to investigate whether an intervention that targets cognitive and affective reactions to comparison situations would improve the overall level of subjective wellbeing.

Cognitive restructuring is an effective interventional technique, originating from cognitive-behavioral therapy (CBT), which enables persons to change their cognitive appraisal of situations (Seligman, Schulman, DeRubeis, & Hollon, 1999; Wilken, 2003). Rumination can also be reduced through self-instruction to engage in pleasant distraction and the learning of more functional coping styles (Nolen-Hoeksema et al., 2008). Positive psychology interventions have been shown to improve wellbeing and to support persons to focus on positive aspects of (social) situations (Bolier et al., 2013; see also Lyubomirsky, 2008). Thus, these approaches might be suitable to change individuals' social comparison processes.

The Current Study

The current study is a first step towards this idea. We investigated whether changing persons' cognitions about situations involving social comparison might affect subjective wellbeing. Our online training aimed at altering the cognitive appraisal of social situations, which could occur either online or offline. By combining three approaches into an online training program (see *Training Concept*), we expected to change participants' reactions to social comparison situations, that is, reduce their rumination on social comparison and increase their overall wellbeing. Based on the theoretical and empirical background outlined above, we suggest that in particular initially unhappier persons would benefit from the training. Last, we intended to test the assumption whether the amount of social comparisons (i.e., the tendency to socially compare) or associated cognitions affect wellbeing. Therefore, concerning the mechanism of change, we hypothesize that positive changes in wellbeing and affect will be due to engaging less in social comparisons and reduced rumination about it.

Method

A pre-post measurement study design was used. Participants' baseline measures were assessed in the first week of the study. Then, they participated in a six week online training program, had one week of summarizing the training content, and were finally re-assessed in the last week (for an overview, see Table 1).

Participants and Inclusion Criteria

Under the assumption of an effect size of $\eta^2 = 0.04$ (small effect), a power of $1-\beta =$ .80, and an estimated correlation among repeated measures of $r = 0.50$, the optimal sample size would be a total number of $n = 50$ participants (power analysis using G*Power, Faul, Erdfelder, Lang, & Buchner, 2007). Due to the longitudinal design of the study, however, we expected a substantial dropout rate, and thus, intended to oversample by around 50%.

Eighty-seven undergraduate students ($n = 76$ female) voluntarily signed up and took part in the study. Participants could drop out at any time without giving reasons. Participation was anonymous, which was ensured by participants creating their own personal codes, which they had to enter on the landing page of each training session. Beyond participants' anonymity, all individual responses within the training sessions were treated confidentially, in case there might be revealing personal information. All participants gave their informed consent and received course credit for their participation.

To be included in our final sample, participants were required to complete at least six out of seven sessions, as indicated by the careful completion of the writing assignments during each session (for a detailed description of writing assignments, please see the *Training Concept* section). Intervention integrity (i.e., whether participants had followed the instructions of each training session and implemented the given tasks) was ensured by analyzing participants' written responses to the tasks within each session and their written reviews of homework assignments. Participants who either had missed more than one session or did not conscientiously complete their weekly tasks were excluded from data analyses. Conscientious task completion was assessed by analyzing time stamps from the online system and checking written reviews of assignments and responses to questions during the sessions. The first author screened all written answers for completeness, content coherence and applicability, and adherence to task implementation instructions. Homework evaluations asked participants to review and reflect their personal experiences while working on the

practical implementation task. Participants who reported in their review that they had had difficulties implementing the task remained in the sample, as they had tried to apply the content to their life. Non-complying participants (i.e., participants who did not meet the criteria for conscientious task completion) and dropouts were excluded from further analyses ($n = 13$; 14.9% of the initial sample). The final sample consisted of 74 undergraduate students, all studying psychology (age in years: $M = 22.00$; $SD = 4.10$; Range: 18-45 years; $n = 65$ female).

Training Concept

We combined elements of three approaches into the online training, namely cognitive restructuring, pleasant distraction, and positive psychology. The first author of the current research developed the training concept and designed all sessions. A team of six experts from health and cognitive psychology reviewed the concept and the training sessions. Experts' feedback was implemented into the program.

All sessions were structured identically and presented on four consecutive pages: (1) review, (2) psychoeducation, (3) exercise/ personal reflection, and (4) practical implementation task/ homework. The training was designed as an interactive tool. Methods included coaching questions with open answer formats and multiple choice answers, mind games, examples, and visualizations. Reflective questions were utilized to focus attention and elicit new ideas, while instructions for practical exercises and real world implementation were formulated to encourage exploration and foster commitment. The aim was to increase participants' resources to deal with negatively perceived social situations in which dysfunctional social comparisons might occur, in both online and offline environments.

First, in the beginning of all sessions, a review of the previous week's content was given and participants were asked to narrate their experiences with the respective task of the previous week. They could provide an account of their accomplishments in a written form, guided by reflective questions. Second, new content was introduced and substantiated with

examples (i.e., psychoeducation). Third, to personalize the training, coaching questions with writing space for individual thoughts were provided, which allowed participants to immediately apply the new input (i.e., exercise/ personal reflection). Last, at the end of each session, they received their homework for the following week to implement the new learnings. Conceptualizations of all components of the training program and the sequence of sessions are described in the next sections. An overview of the study (including training elements, rationales, and sources of the applied methods) is given in Table 1.

> Table 1 about here <

Session 1. First, an explanation of the "cognitive model", a simplified version of Ellis' (1991) *ABC-model* (A = activating event; B = belief system; C = consequences) was given. Explanation and instructions were modified to situations in which social comparisons might occur. An example of a typical situation that students regularly experience (i.e., oral examination with the fear of performing worse in comparison to fellow students) was given to illustrate the model. Participants were asked to apply the model to a current personal negative social situation. Based on the ABC-model, they were instructed to identify their personal overthinking triggers (Lyubomirsky, 2008) and their dysfunctional thoughts in the situation, and to consider the relationship of their thoughts and affective responses. Gaining an understanding of the relationship between cognitions and emotions was regarded to be essential for the following parts of the training.

Session 2. After reviewing the ABC model and its applicability to a personal situation during the past week (homework of Session 1), a detailed goal analysis was conducted. Following guidelines of cognitive restructuring methods, specific instructions were given of how goals should be formulated: clear, precise, positive, and realistic (Wilken, 2003). Ambivalent situations were described, in which social comparisons could occur, but do not necessarily need to and examples of such goals were given as orientation aid (e.g., running skills). Participants were asked to relate their goals to similar social situations in which they

would like to change their cognitions and associated emotions (stepwise guidance, open answer format: 1 - describe problematic situation, 2 - how would you like to feel in the future?, 3 - how would you like to behave in the future?). Then they formulated their personal goals, which were also supposed to enhance persons' motivation to change.

Session 3. As a first step towards cognitively appraising social comparisons differently, one has to identify and avoid negative cognitions. This session was based on Lyubomirsky's (2008) happiness activities to avoid overthinking and social comparison. After reviewing their personal goals (homework of Session 2), participants were instructed to free themselves from rumination, especially ruminating on negative social comparison. A situation after taking an exam including dysfunctional upward comparisons served as an example. Two strategies, based on cognitive restructuring methods (Wilken, 2003), were introduced to stop ruminating: using pleasant distraction, or writing down dysfunctional thoughts. Again, participants could first describe a personal situation, and could then envision how they would apply both strategies (open answer format). As their homework, participants were instructed to implement these strategies in at least one situation during the following week.

Session 4. After reviewing their experiences with the two strategies of breaking free from rumination in situations of social comparison (homework of Session 3), participants were asked to describe a personal situation based on the ABC-Model, including the activating event with its consequences, and their associated cognitions and emotions (open answer format). Then, participants were guided via reflective questions to analyze their original stream of thoughts and to develop new, positive views, which made them feel better. To continue the learning process of altering negative cognitions, participants were instructed to focus on the development of functional and goal-oriented cognitions to actively replace dysfunctional thoughts. This was achieved by searching for alternative interpretations of previously negatively judged social situations (Wilken, 2003). Examples were given to

illustrate potentially new ways of thinking about a certain situation. Participants were asked to find a different perspective for at least one situation during the following week.

Session 5. Interventions of positive psychology aim at supporting persons to focus on their strengths and resources rather than their troubles. Therefore, the fifth part of the training program promoted participants' positive personal development. After a stepwise review of their experiences with finding a new perspective for previously negatively perceived situations (homework of Session 4), they were instructed to concentrate on problem-solving abilities, and – additionally or alternatively – to take action towards something that they had always wanted to do (Lyubomirsky, 2008). Examples of typical situations that students regularly experience were given (e.g., "If you think that other students are more diligent than you are, but your self-concept is that you are good student, take action now. Do your readings today – and you will feel pleased with yourself."). In the practical exercise, participants should focus on their positive personal development by taking the first step towards a previously defined goal, or by learning or experiencing something new. They first described a personal challenge, and then explored – guided by reflective questions – how they wanted to approach it. Their task for the following week was to try putting the plan into action. By using this resource-oriented approach, persons focused on their personal strengths and goals, which they had already defined in the second part of the training.

Session 6. The last part of the training focused on the enjoyment of positive social situations (Lutz, 2005). After a review of their personal growth experiences (homework of Session 5), participants were instructed to analyze factors that generally made them feel good in social situations, for example, certain persons, activities, or places. Looking particularly at social situations, they visualized a concrete positive and enjoyable social experience. Participants were instructed to prepare a detailed plan of when and where they wanted to have their happy social experience during the following week. As their homework, they should put the plan into action and be mindful while having this positive social experience. Social

comparison thoughts were not directly addressed in this session, as it was assumed that participants had already learnt how to think differently about social situations. Because unhappier persons tend to concentrate and ruminate on negative aspects (Lyubomirsky & Tkach, 2003), this last exercise was meant to increase mindfulness and to shift the attention towards positive aspects in social situations.

Session 7. The last week consisted of a summary of the entire training, without giving any new input. It gave participants the opportunity to reflect on their learnings and personal development over the course of the training in a structured written reflection process. This ensured that the post-test measurement reflected the effect of the entire training program, instead of a recency effect of the training content of the last week.

Measures

All instructions, tasks, and questionnaires were given in German. If not available, measures were translated using the committee scale translation method (Van de Vijver & Leung, 1997), and pretested to ensure comprehensibility.

Oxford Happiness Questionnaire (OHQ; Hills & Argyle, 2002). As a measure of subjective wellbeing, it includes 29 items, which are rated on a six-point Likert Scale. The OHQ has high internal consistency (Cronbach's $\alpha = .91$), as well as high construct validity (e.g., it correlates strongly with life satisfaction, r = .77). Its retest-reliability is high ($r_{tt} = .78$; Argyle, Martin, & Crossland, 1989; Hadinezhad & Zareei, 2009). The internal consistency in the current study was good, $\alpha_{\text{pre-test}} = .92$, $\alpha_{\text{post-test}} = .91$.

Positive and Negative Affect Schedule (PANAS, German Version; Krohne, Egloff, Kohlmann, & Tausch, 1996). The scale assesses positive (PA) and negative (NA) affect, and consists of 20 items rated on a five-point Likert Scale. The two subscales have ten items each and are largely uncorrelated. The two-factor solution was confirmed for the German version; its internal consistency can be considered as high, with Cronbach's $\alpha \geq .84$. The retest-reliability is moderate with respect to the time interval asked for in this study (PA $r_{tt} = .58$,

NA r_{tt} = .48). According to the manual, the PANAS is sensitive to fluctuations in mood when short-term instructions (e.g., "in this situation") are given, whereas trait-like stability is found when long-term instructions are used (e.g., "past twelve months"). In this study, participants were instructed to either focus on the past four weeks (i.e., general assessment at baseline and after the training), or on a specific situation (i.e., assessment of the individual positive and negative situations). Cronbach's α in the current study was good (PA – general assessment: $\alpha_{\text{pre-test}}$ = .82, $\alpha_{\text{post-test}}$ = .91; NA – general assessment: $\alpha_{\text{pre-test}}$ = .86, $\alpha_{\text{post-test}}$ = .86; PA – situational assessment: .70 $\leq \alpha \leq$ .90; NA - situational assessment: .74 $\leq \alpha \leq$ .89).

Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999). Individual differences in social comparison orientation are measured with 11 items rated on a five-point Likert Scale. The INCOM has satisfactory construct validity and shows good internal consistency (Cronbach's α = .83). It has been shown to be reasonably stable over eight months (r_{tt} = .72). Internal consistency in the current study was satisfactory, $\alpha_{\text{pre-test}}$ = .76; $\alpha_{\text{post-test}}$ = .82.

Ruminative Thought Style Questionnaire (RTS; Brinker & Dozois, 2009). The scale measures the tendency for rumination, that is, positive, negative, and neutral thoughts, beyond thoughts related to depressed mood. The questionnaire includes 20 items, rated on a seven-point Likert Scale, and is highly internally consistent (Cronbach's α = .92). The RTS shows good test-retest reliability (r_{tt} = .80, $p <$ .01). Internal consistency in this study was good, $\alpha_{\text{pre-test}}$ = .88; $\alpha_{\text{post-test}}$ = .93.

Social Situations. In addition to the standardized quantitative questionnaires, participants completed a structured writing assignment. They had to narrate two positive and two negative recent social situations. A "social situation" was defined as a situation in which other persons are involved, no matter if off- or online. For each situation, participants were asked to rate the meaningfulness of the described situation, their positive and negative affect (PANAS), and their level of social comparison (*Social Comparison Scale;* SCS; based on

Dubé, Jodoin, & Kairouz, 1998). The SCS assesses the extent of social comparison and the relative relevance of the various possible dimensions of comparison. It differentiates between upward and downward comparison with distant and close others (i.e., social comparison), as well as comparison with past, future, and ideal self (i.e., intrapersonal comparison). Nine items were rated on a five-point scale. In the current study, the scale showed satisfactory to good internal consistency (Positive Situations: $.70 \leq \alpha \leq .83$; Negative Situations: $.79 \leq \alpha \leq .88$). Additional writing space was provided for individual thoughts. As part of the post-test, participants re-evaluated their individual situations from the first week, using the same measures (i.e., PANAS and SCS).

Procedure

The study was conducted online using the survey software *Qualtrics* (Qualtrics Labs, 2011). Participants received weekly emails with a link that directed them to the respective session, and a reminder towards the end of the week. They had six days to complete each session. The first week started with an introduction to the training, followed by the informed consent. Age, gender, major, and semester were assessed as demographical data. During the pre-test, the questionnaires were presented in the following order: OHQ, PANAS, RTS, and INCOM. Thereafter, participants were asked to narrate two positive and two negative social situations of the past two weeks, and to rate each of them on the PANAS and the SCS. Finally, participants received their homework for the next week. From week two to seven, the training was conducted as described above. In week nine, the post-test was administered, which included the same self-report questionnaires as the pre-test: OHQ, PANAS, RTS and INCOM. Then, participants' positive and negative social situations they had described in the first week were presented and they were asked to re-rate each one on the PANAS and the SCS, with the instruction to imagine that the respective situation would happen now. To identify potential confounding variables, they were asked whether any significant life event had happened during the study, which could have changed their mood in a very positive or

very negative way. Finally, participants were thanked, debriefed, and provided with contact information for further inquiries about the research project.

Hypotheses and Data Analyses

We expected that the overall level of subjective wellbeing (OHQ) would be higher after the training than before (Hypothesis 1). Positive affect (PANAS-PA, general assessment) was expected to increase after the training (Hypothesis 2a), while negative affect (PANAS-NA, general assessment) would decrease (Hypothesis 2b). The amount of rumination (RTS) should be lower after the training than before (Hypothesis 3). Further, affective responses to concrete negative social situations were expected to change after the training, as positive affect (PANAS-PA, situational assessment) should increase (Hypothesis 4a), and negative affect (PANAS-NA, situational assessment) should decrease (Hypothesis 4b). Additionally, the amount of social comparison thoughts (SCS) in negative social situations should decrease after the training (Hypothesis 5). As the focus was on the improvement of initially negatively evaluated situations, positive situations were not further analyzed. As outlined above, we expected our training to have a larger effect on initially unhappier individuals, who are more likely to engage in rumination and use social comparison in a dysfunctional way than happier persons (Hypothesis 6). Concerning the mechanism of change underlying positive changes in wellbeing and affect, we hypothesized that changes in cognitions about social situations, especially less comparisons and reduced rumination, are relevant drivers (Hypothesis 7).

As statistical analyses, we conducted two separate repeated measures MANOVAs, one for Hypotheses 1-3 to account for general effects of the training (rMANOVA 1: wellbeing, general assessment of affect, and rumination), and one for Hypotheses 4 and 5 to analyze effects on the appraisal of specific situations (rMANOVA 2: situational assessments of affect and social comparison thoughts). Pre and post measurements of the respective dependent variables were included as within-subjects factor. Assessments of the two negative social situations were combined into the same analyses to increase reliability of the measurement

and to reduce alpha inflation. As a further indicator for a statistically reliable and clinical significant change, the *Reliable Change Index* (RCR, Jacobson & Truax, 1991) was computed. The reliable change index allows us to determine which individual changes from pre- to post-measurement were that large that they could not be due to measurement unreliability. If changes were merely random, only 2.5% of participants would show a significant reliable change. Additionally, we ran two repeated measures MANCOVAs, in which we used the initial level of wellbeing (OHQ, z-standardized) as a covariate. Based on Hypothesis 6, we expected to see an interaction of the OHQ and the repeated measurements of the criteria. To test Hypothesis 7, stepwise linear multiple regression analyses were performed.[1] Initial scores of the OHQ, INCOM, and RTS, as well as change scores of RTS and INCOM were used as predictors of changes in subjective wellbeing (OHQ), positive and negative affect (PANAS, general assessment), and situational social comparison thoughts (SCS). We expected changes in rumination (RTS) and social comparison orientation (INCOM) to be the main predictors of changes in wellbeing, affect, and appraisal of social situations.

In the analyses, we controlled for severe life events. Eight participants reported life events that could be classified among the top ten life changing events, such as death of a close family member or severe illness (cf. Scully, Tosi, & Banning, 2000). Results remained largely unchanged if these participants were excluded from the analyses; therefore, results are reported based on the full sample.

Results

Wellbeing, Affect, and Rumination

Descriptive results pre- and post-training are presented in Table 2. It was hypothesized that levels of subjective wellbeing (H1) and positive affect (H2a) should increase after the

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[1] All underlying assumptions of multiple linear regressions were checked (i.e., linearity, homoscedasticity, normal distribution of residuals, no autocorrelation, no multicollinearity, no biasing outliers).

training, while negative affect (H2b) and rumination (H3) should decrease. Overall, the hypothesis test revealed a significant multivariate main effect regarding the pre-post measurement, $F(4, 70) = 5.67$, $p = .001$, $\eta^2 = .25$. An inspection of the univariate results showed that the within-subjects main effect was significant for wellbeing, $F(1, 73) = 8.83$, $p = .004$, $\eta^2 = .11$, positive affect, $F(1, 73) = 4.18$, $p = .04$, $\eta^2 = .05$, negative affect, $F(1, 73) = 5.17$, $p = .02$, $\eta^2 = .07$, and rumination, $F(1, 73) = 22.20$, $p < .001$, $\eta^2 = .23$. The Reliable Change Indices (RCI; Jacobson & Truax, 1991) corroborate these findings on the individual level. More than 20% of participants experienced a clinically significant and statistically reliable decrease of rumination. Percentages were considerably smaller for the other dependent variables (OHQ: 6.8%; PA: 6.8%; NA: 4.1%), but higher than the 2.5% expected from chance. Thus, Hypotheses 1-3 were supported by the data.

> Table 2 about here <

Situational Assessments

Concerning the evaluation of personally experienced negative social situations, we expected positive affect to increase (H4a), and negative affect (H4b) as well as social comparison thoughts (H5) to decrease after the training (see Table 3 for descriptive results). Overall, the hypothesis test revealed a significant multivariate main effect regarding the pre-post measurement, $F(3, 71) = 12.69$, $p < .001$, $\eta^2 = .35$. An inspection of the univariate results showed that the within-subjects main effect was significant for situational positive affect, $F(1, 73) = 23.15$, $p < .001$, $\eta^2 = .24$, and situational negative affect, $F(1, 73) = 27.40$, $p < .001$, $\eta^2 = .27$, but not for social comparison thoughts, $F(1, 73) = 3.74$, $p = .057$, $\eta^2 = .05$, yet descriptively the means were as expected. When participants who had experienced significant life changing events were excluded, the univariate results of social comparison thoughts also revealed a significant decrease, $F(1, 65) = 5.12$, $p = .02$, $\eta^2 = .07$. Taken together, Hypothesis 4 was supported by the data, while Hypothesis 5 was only partially supported.

> Table 3 about here <

Initial Level of Wellbeing as a Predictor of Training Effects

Concerning Hypothesis 6 (larger effect of training for initially unhappier individuals), the rMANCOVA with the general assessments of positive and negative affect and rumination as the criterion revealed a significant multivariate main effect regarding the pre-post measurement, $F(3, 70) = 7.19$, $p < .001$, $\eta^2 = .24$, as well as a significant interaction of pre-post measurement and initial levels of wellbeing, $F(3, 70) = 5.10$, $p = .003$, $\eta^2 = .18$. People who were initially unhappier showed a larger improvement. A similar pattern emerged regarding the rMANCOVA with the situational assessments of positive and negative affect and social comparison thoughts as the criterion, with a significant main effect, $F(3, 70) = 13.14$, $p < .001$, $\eta^2 = .36$, and a significant interaction of pre-post measurement and the initial OHQ score, $F(3, 70) = 2.87$, $p = .04$, $\eta^2 = .11$. These findings support Hypothesis 6.

Mechanism of change

Results of the stepwise linear multiple regression analyses are presented in Table 4. Change in rumination turned out to be the best predictor of all changes. Participants who ruminated less experienced a stronger increase in wellbeing and general positive affect and a stronger decrease in general negative affect than participants who ruminated the same or more. The same pattern emerged for situational positive and negative affect. Further, change in rumination predicted a decrease in situational social comparison thoughts. This finding lends support to Hypothesis 7. Changes in social comparison orientation did not turn out to be predictive for observed changes. This is counter to our expectation, as the training had a small effect on social comparison orientation (see Table 2). Note that the initial OHQ score was a good predictor for change in subjective wellbeing and change in negative affect, but not for change in positive affect or change in social comparison thoughts, which provides further evidence for Hypothesis 6.

> Table 4 about here <

Discussion

The results revealed a training effect on participants' wellbeing. As expected, the general level of subjective wellbeing and positive affect increased, whereas negative affect and the tendency to ruminate decreased. Further, situational affective responses to negative social situations improved as predicted. The pre-post assessment of social comparison thoughts revealed only a trend-significant change. Our results also provide some support for the assumption that the training would have a stronger effect on initially unhappier participants. Taken together, Hypotheses 1, 2, 3, 4 and 6 were supported by the data, while hypothesis 5 was only partially supported. Effects were small to moderate in size (Cohen, 1988) and the percentage of participants with a significant reliable change index was higher than chance, especially for rumination with one in five participants experiencing a significant decrease in rumination. These findings indicate that the observed changes were meaningful, and therefore, seem to be practically relevant (see below). Change in rumination was the strongest and only predictor of the training effects. This finding supports Hypothesis 7 and suggests that the training had an impact on participants' cognitions and changed their level of rumination, which in turn resulted in changes of wellbeing, affect, and situational social comparison thoughts.

The training only had a small effect on the general tendency to engage in social comparison. This is, however, what researchers who consider social comparison orientation to be a fairly stable trait would expect (cf. Gibbons & Buunk, 1999). Our findings support the idea that not social comparison per se, but the associated cognitions can be detrimental to persons' wellbeing. The current findings are in line with Lyubomirsky's (2008) suggestion that dysfunctional thoughts related to social comparison are a form of rumination. In contrast to Giordano et al. (2000), who assumed that the amount of social comparisons is relevant for persons' wellbeing, our results suggest that it might not be the amount that makes persons unhappier, but the cognitive appraisal of them. As a reduction in ruminating about social

situations was associated with higher levels of happiness, it may be concluded that changing persons' thinking towards a more positive appraisal of social situations in which comparisons might occur increases their overall level of wellbeing.

Limitations and Future Directions

No inferences can be made on long-term effects of our training, as no follow-up was assessed. Yet, there was a delay of measurement of one week after the last training content. Future studies on social comparison interventions with longitudinal designs are needed that allow persons to develop new cognitive schemata over a longer period of time, in order to explore to what extent persons' subjective wellbeing can be influenced on a long term basis. Moreover, it cannot be identified whether the employed combination and ordering of interventions was ideal, or which parts of the training were most effective. Potentially, only some of the elements would have been sufficient. Separate analyses of all training elements and combinations would be the best approach to gain more insight and could lead to a more efficient intervention. However, the number of participants needed for such an empirical analysis would be prohibitively large and uneconomic. Also, the question remains what exactly in the long process of a social comparison process was altered. Based on the current study, we cannot provide a detailed answer to this question; however, our findings suggest that the training changed ruminative thought styles in general. Future research is encouraged to explore the cognitive processes underlying social comparison in more depth to gain a deeper understanding of how they contribute to higher wellbeing. Yet, social comparison is not the sole factor contributing to persons' wellbeing. Therefore, the current training should only be regarded as a collection of interventions that also targets this aspect contributing to wellbeing – it should not be interpreted as a "magic bullet" that leads all people to higher levels of wellbeing. Seligman, Steen, Park, and Peterson (2005) state that a battery of interventions might be more powerful than an isolated happiness intervention, which speaks for the strength of our training concept. Furthermore, in the current study the training was

delivered online. If delivered by an experienced therapist or coach, it could potentially be even more effective (cf. Seligman et al., 2005). However, these explanations are speculative and require future research.

On a methodological note, participants' self-reports could have been biased, for example, due to social desirability. Yet, no ceiling effects were apparent and participants scored significantly different on the used measures. It is important to mention that there was no assessment of the actual affect in social situations; instead, recalled (pre-test) and expected (post-test) affect was measured. Therefore, deviations from actually experienced emotions cannot be ruled out. It would also be advisable to conduct a study in which actual comparisons and their consequences were assessed rather that hypothetical or recalled episodes. This would provide further insight into the drivers of change in the complex cognitive process of comparing oneself to other persons. Last, even though the study had sufficient power to detect small effects, the sample in the current study was rather small in comparison to other interventional studies, predominantly female, and consisted of students only. Therefore, we need to be cautious with generalizations of the current findings.

We took a theory-driven approach to design our training; all training elements have previously been shown to be causally effective, using control-group designs. In the current study, there was no separate control group and no alternative intervention. An important question is whether the methodology used in this study still allows a causal interpretation of the data. We think it does – at least to a certain extent. The regression analyses controlled for the correlations among factors and initial differences between participants. Still, a significant effect of change in rumination upon an increase in subjective wellbeing was found. The changes in rumination – in turn – are very likely to be due to the online training, although no direct experimental evidence was provided in this study. Replicating the study with a larger and more representative sample and employing a randomized controlled study design would be advisable.

Conclusion and Practical Relevance

Social comparison and self-reflection are highly prevalent in today's Western culture, and they are often considered crucial for self-advancement. The current study shows that this also comes with a risk: reflecting on social comparison and ruminating on negative social situations can decrease happiness. The high prevalence of dysfunctional social comparison and its potentially detrimental influence has also been shown in online environments (Appel, Gerlach, & Crusius, 2016). This study supports the idea that not social comparison itself influences persons' wellbeing (cf. Diener et al., 1999); instead, ruminating about comparisons seems to make persons unhappy (Lyubomirsky, 2008; Lyubomirsky et al., 2011). The training aimed at reducing rumination on social comparisons, and had a positive effect on participants' wellbeing. The combination of breaking free of dysfunctional thoughts and developing more functional cognitions, focusing on individual goals and problem-solving abilities, and consciously enjoying positive situations increased persons' subjective wellbeing.

The current research bears high practical relevance for health prevention programs, for example, supporting at-risk persons before becoming severely depressed or suffering from occupational burnout (e.g., Seligman et al., 1999; Seligman et al., 2005). Psychotherapy usually focuses on the treatment of problems that cause acute suffering and impairment. The intervention that was introduced in the current study would not be suitable to replace psychotherapy, and is thus not recommended for persons with depressive symptoms or disorders. Yet, a program similar to the training developed for this study may enhance persons' wellbeing before more serious mental health problems occur, also making use of new technological solutions. Delivering an intervention via Information and Communication Technologies (e.g., online or via smartphone applications) offers users the chance to participate in the program whenever and wherever they want to. Further, by employing new technologies, interactive elements and personalization can enhance the user experience, and thus, contribute to improved outcomes. Online interventions have been shown to be equally

effective as face-to-face trainings, with the advantages of lower costs and easier access for everyone (e.g., Barak, Hen, Boniel-Nissim, & Shapira, 2008). The current training could be implemented as a prevention program among young adults, who might be prone to dysfunctional comparison behavior, especially in highly performance-oriented environments (e.g., universities), to enhance their capability and happiness at school, work, and in other social situations.

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Table 1

Overview of the study, including training elements and measures

Week	Measures	Input	Task	Homework
1	OHQ, PANAS, RTS, INCOM, Evaluation of pos. & neg. social situations (PANAS, SCS)			Identification & analysis of negative social situations
2		ABC-model (Lyubomirsky, 2008; Wilken, 2003)	Application of the ABC Model to past negatitve social situation	Implementation of the ABC Model to real life situations
3		Personal goals (Wilken, 2003)	Individual goal analysis in past negative social situation	Identification & definition of personal goals in real life situations
4		Break free of dysfunctional thoughts: two alternative techniques (Lyubomirsky, 2008)	Plan to apply the techniques to break free of dysfunctional thoughts	Realization of the techniques to break free of dysfunctional thoughts in real life
5		Develop alternative thoughts & new interpretations for negative situations (Wilken, 2003)	Question dysfunctional thoughts in negative social situation & develop alternative thoughts	Apply alternative thoughts in negative social situations in real life
6		Personal positive development (Lyubomirsky, 2008)	Plan to take action (e.g., do something you have always wanted to do, learn something new)	Put plan for personal positive development into action
7		Enjoy positive social situations (Lutz, 2005)	Analysis of positive social situations & plan enjoyable social situation	Put plan into action & increase awareness for enjoyable moments
8		Summary of the training	Reflection of personal experiences & development during the training	
9	OHQ, PANAS, RTS, INCOM, Reevaluation of social situations (PANAS, SCS)		Evaluation of the training	

Notes. OHQ: Oxford Happiness Questionnaire; PANAS: Positive and Negative Affect Schedule; RTS: Ruminative Thought Style Questionnaire; INCOM: Iowa-Netherlands Comparison Orientation Measure; SCS: Social Comparison Scale

Table 2

Descriptive statistics: OHQ, PANAS, RTS and INCOM

	Pre-test *M* (*SD*)	Post-test *M* (*SD*)	Correlation of pre-post measurement *r*	Change Pre-Post *M* (*SD*)
Subjective Well-being (OHQ)	4.06 (.64)	4.22 (.62)	.74 ***	0.15 (.46) **
Positive affect (PANAS)	3.23 (.61)	3.38 (.74)	.60 ***	0.15 (.61) *
Negative affect (PANAS)	2.47 (.77)	2.29 (.71)	.58 ***	-0.18 (.69) *
Ruminating (RTS)	4.62 (.89)	4.16 (1.10)	.68 ***	-0.45 (.82) ***
Social Comparison Orientation (INCOM)	3.67 (.58)	3.47 (.67)	.63 ***	-0.20 (.54) **

Notes. *N* = 74. OHQ: Oxford Happiness Questionnaire; PANAS: Positive and Negative Affect Schedule – general assessment; RTS: Ruminative Thought Style Questionnaire; INCOM: Iowa-Netherlands Comparison Orientation Measure. *$p < .05$; **$p < .01$; *** $p < .001$

Table 3

Descriptive statistics of negative social situations (PANAS and SCS)

	Pre-test M (SD)	Post-test M (SD)	Correlation of pre-post measurement r	Change Pre-Post M (SD)
Situational Positive Affect (PANAS)	2.00 (.48)	2.31 (.65)	.55 ***	0.31 (.56) ***
Situational Negative Affect (PANAS)	3.13 (.70)	2.73 (.81)	.65 ***	-0.39 (.65) ***
Situational Social Comparison (SCS)	2.90 (.82)	2.74 (.90)	.64 ***	-0.17 (.73)

Notes. *N* = 74. PANAS: Positive and Negative Affect Schedule – situational assessment; SCS: Social Comparison Scale. *** *p* < .001

Table 4

Stepwise regression analyses of potential predictors of change in subjective wellbeing, positive and negative affect: standardized regression coefficients and statistics of resulting regression model

	Change in Subjective Wellbeing (OHQ Post-Pre) *Beta*	Change in General Positive Affect (PANAS Post-Pre) *Beta*	Change in General Negative Affect (PANAS Post-Pre) *Beta*	Change in Situational Social Comparison Thoughts (SCS Post-Pre) *Beta*
Initial Subjective Wellbeing (OHQ Pre)	-.388*** [s]	-.167	.364** [s]	-161
Initial Rumination (RTS Pre)	-.256*	.052	.143	.115
Initial Social Comparison Orientation (INCOM Pre)	-.030	.012	.082	.188
Change Rumination (RTS Post-Pre)	-.423*** [s]	-.463*** [s]	.393*** [s]	.371** [s]
Change Social Comparison Orientation (INCOM Post-Pre)	-.051	-.047	-.002	.136
Final Model	$F(2,73) =$ 17.9*** $R^2 = .34$	$F(1,73) =$ 19.7*** $R^2 = .22$	$F(2,73) = 14.6**$ $R^2 = .29$	$F(1,73) = 11.5**$ $R^2 = .14$

Notes. $N = 74$; *$p < .05$; **$p < .01$; *** $p < .001$; [s] predictor was included in final model; OHQ: Oxford Happiness Questionnaire; PANAS: Positive and Negative Affect Schedule; RTS: Ruminative Thought Style Questionnaire; INCOM: Iowa-Netherlands Comparison Orientation Measure