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**“Likes” as KPI: An examination of teenage girls’ perspective on peer feedback on  
Instagram and its influence on coping response**

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## **Abstract**

Through a survey of 296 female students in Singapore aged 12 to 18 years regarding their selfie-posting behaviors on Instagram, this study explored teenage girls' perspectives on the importance of receiving peer feedback on selfies. The associations between peer feedback importance and self-esteem as well as depressed mood were also examined. Drawing on coping theory, this study further investigated how the importance of peer feedback and depressed mood influence girls' coping responses to the stress from lacking feedback. The results of structural equation modeling demonstrate that self-esteem exerts a negative effect on the importance of peer feedback and depressed mood, but the importance of peer feedback is positively associated with depressed mood. In addition, both the importance of peer feedback and depressed mood positively impact problem-focused and emotion-focused coping strategies. The results suggest that peer feedback has become a "KPI" of selfie-posting behaviors for teenage girls, and these girls handle the involved stress by a concomitant adoption of both types of coping.

*Keywords:* peer feedback, coping, depressed mood, self-esteem, teenager, social media

## Introduction

Through the convenience of social media and mobile applications, “selfies” have become a popular and common tool for presenting oneself on social media (Kim et al., 2016, Pounders et al., 2016, Qiu et al., 2015). A variety of features on these platforms allow users to obtain feedback on their selfies, such as from comments, “likes,” and their number of followers. Nowadays, the feedback on social media is visible, straightforward, and quantifiable (Sherman et al., 2016). It serves as a criterion by which users can judge their own posts, and so users, especially teenagers, constantly optimize their online profiles or selfies to seek positive feedback (Madden et al., 2013). In general, females are more likely than males to experience stress when endeavoring to meet unrealistic appearance goals (Bordo, 2004). Similarly, among adolescents and teenagers, females are more concerned with their appearance on social media (McAndrew and Jeong, 2012) and more vulnerable to experiencing negative feelings, such as depressed mood (Prinstein et al., 2005). Given these unique traits of teenage girls, this study has chosen to study this segment of the population.

Teenage girls, especially those aged 12 to 18, are transitioning to adulthood and experience both physical and emotional changes (Vandenbosch and Eggermont, 2012). They are sensitive to the self-presentation of their beauty and the perceptions that others have about them, and these concerns are of great importance to the development of their identities (Caspi, 2000). Thus, they consciously attend to the opinions of their peers (Steinberg, 2008). On social media, teenage girls are eager to earn peer feedback on their selfies (Chua and Chang, 2016; Frison and Eggermont, 2016), and they place great importance on it. A lack of feedback can be detrimental to the psychological well-being of users, causing sadness or depressed mood (Jong and Drummond, 2016). Therefore, it is essential to examine how the well-being of girls is affected by

the importance placed upon peer feedback. Since the period of adolescence is vital for self-development (Elkind and Bowen, 1979) and self-esteem has been identified as having an impact on teenage behaviors (Martyn-Nemeth et al., 2009; Steiner et al., 2002), this study thus has shed light on the influence that self-esteem has on the importance that girls place on peer feedback.

Teenagers face different types of stress in their daily lives, and the extant literature has contributed to the understanding of how teenagers cope with these stresses, particularly in the domains of academic or interpersonal interaction (Clarke, 2006; Mantzicopoulos, 1997). As social media now permeates daily teenage life and teenage girls also experience stress when there is a lack of feedback on their selfies, there is a need to investigate their coping efforts for handling such stress. The concept of coping involves an individual's psychological adjustment to stressors (Lazarus and Folkman, 1984) and has been researched extensively in studies of teenagers' efforts to cope with stressful events (Byrne, 2000; Lysaker et al., 2011; Sontag and Graber, 2010). This study thus employs coping theory as its theoretical framework. Preferences for coping strategies are impacted by social, emotional and motivational, resources (Lazarus, 1999), so this study takes into account the contributions made by both importance of peer feedback and depressed mood when investigating girls' coping responses.

The research context of this study was Instagram, which has more than 800 million active users who share more than 95 million photos per day (Statista, 2017). It has become one of the most popular social media sites among teenage girls in recent years (PiperJaffray, 2016). Compared to social media platforms such as Facebook, Instagram users focus more on photo sharing, image enhancement, and self-expression (Jang et al., 2015). Thus, this online context is relevant to our research focus on selfie-posting behaviors. Accordingly, this study sought to investigate active Instagram users among teenage girls. Integrating coping theory, this study also

explored the perspectives that girls had regarding peer feedback and attempted to construct a model that could reflect the relationships between the importance of peer feedback, self-esteem, depressed mood, and coping strategies.

## **1. Literature Review**

### **1.1. Peer Feedback on Social Media**

Social media provides an interactive venue for users to present themselves such that they can connect with each other and view the public or semi-public profiles of their friends (boyd and Ellison, 2007; Ellison et al., 2011). In general, individuals tend to engage in self-presentation strategically to make a favorable impression (Goffman, 1969). This practice is prevalent on social media, and users often present themselves through photographs (Rui and Stefanone, 2013). The term “selfie” itself vividly reflects this self-presentation behavior, referring to the self-portrait images taken with digital media (usually smartphones) posted on social media (Kim et al., 2016; Pounders et al., 2016; Qiu et al., 2015). Though users have different goals when presenting themselves, receiving immediate and positive feedback is of high priority in regards to their expectations when posting photos (Jang et al., 2015; Jong and Drummond, 2016; Sherman et al., 2016).

A collection of features on social media has been developed for users to acquire feedback. A common feature is the “comment” area under each post, where users can gather opinions made by their friends about their posts. Another feature is “likes.” Users can click a heart-shaped (on Instagram) or thumbs-up (on Facebook) button under each post to indicate that they like a post. Obtaining followers is another feature for gathering feedback as it reflects the popularity of users (Chua and Chang, 2016; Jang et al., 2015). For instance, “follow/like” is one of the top mentioned topics among teenagers on Instagram (Jang et al., 2015). To popularize

their photos, users actively advertise their accounts by saying things such as “please follow me, and I follow you” in bio descriptions or by adding more tags to their photos (Jang et al., 2015). As Instagram is more of a self-promotion and self-expression platform (Jackson and Luchner, 2017; Marcus, 2015), these online interactions (e.g., comments, likes, and followers ) function as peer feedback to users’ posts (Pempek et al., 2009). Although all of these features can be considered as peer feedback, they still differ from one another. Positive comments on an selfie can provide qualifiable feedback to users, but the number of likes or followers can provide more quantifiable feedback (Sherman et al., 2016). Therefore, girls may place a different importance on certain features, and it is crucial to understand their views regarding the importance of different forms of feedback. Hence, we propose the following research question (RQ1):

RQ1: How do teenage girls assess the importance of different forms of peer feedback?

### **1.1.1. The Importance of Receiving Peer Feedback among Girls**

Peer feedback is influential among teenagers as they begin at their age to focus increasingly on the self (Elkind and Bowen, 1979; Orth and Robins, 2014) and devote a large portion of their time to earning peer approval (Steinberg, 2008). As a result, teenagers are sensitive to how they are perceived by their peers on social media (boyd, 2008, 2014). This is more so the case for girls (Chua and Chang, 2016; Jong and Drummond, 2016). Teenage girls experience physical changes in terms of transiting to womanhood (Vandenbosch and Eggermont, 2012) and are heavily influenced by media depictions of idealized beauty (Dittmar and Howard, 2004). Moreover, peers orient the internalization of ideal beauty for girls as built by media images (Kraye et al., 2008), and feedback on selfies indicates peer acceptance of a girl’s perception of beauty (Chua and Chang, 2016). Peer feedback, especially the quantifiable ones (e.g., likes and followers), is also a strong proxy for social status among teenagers, helping to

show off their uniqueness to the public. In other words, these forms of feedback can reflect teenage a girl's popularity (Jang et al., 2015, Madden et al., 2013; McElhaney et al., 2008).

For teenage girls, peer feedback on selfies therefore indicates peer approval (especially of their perception of beauty) and their popularity, so they may attach great importance to receiving feedback from peers (boyd, 2014; Steinberg, 2008). Although most adolescents or teenagers predominantly receive positive feedback on their profiles (Valkenburg et al., 2006), there are still occasions when they receive negative feedback or are unable to receive sufficient positive feedback (Chua and Chang, 2016; Koutamanis et al., 2015). Previous studies have suggested that girls usually expect a certain number of likes when posting selfies, and their well-being can be negatively affected if the final number of likes is far less than expected (Chua and Chang, 2016; Jong and Drummond, 2016). So it is essential to examine how the importance of receiving peer feedback influences the fluctuations in a girl's well-being when not acquiring sufficient feedback. Indeed, adolescence is a critical period for the development of self-concept, especially of self-esteem (Byrne, 2000; Orth and Robins, 2014), which plays an integral role in understanding users' online behaviors (Pounders et al., 2016). Therefore, in this study, we first shed light on how self-esteem influences a girl's desire for receiving peer feedback.

### **1.1.2. Self-esteem and Peer Feedback**

A huge body of research has studied the relationship between self-esteem and social media use, particularly among adolescents and teenagers (Neira et al., 2014; Pounders et al., 2016; Valkenburg et al., 2006; Valkenburg and Peter, 2011; Wilson et al., 2010). Self-esteem refers to one's subjective and overall evaluation of one's own worth (Rosenberg, 1965), and it is a stable trait and its impact persists in individual development (Orth and Robins, 2014). Meanwhile, as self-esteem signifies self-worth and individuals demand to constantly maintain



and increase self-esteem, they pursue self-worth in various domains and attempt to meet cultural standards of worth under different contingencies (Crocker et al., 2003). The contingencies of self-worth range from external to internal domains: approval from others, physical appearance, outperforming others, academics, family support, virtue, and God's love (Crocker et al., 2003).

Peer feedback on selfies indicates peer approval and a girl's popularity, and it is in external contingencies where girls pursue self-worth from the approval of others in regards to appearance and the competition for popularity. In this regard, the level of importance placed on receiving feedback can be considered as the magnitude to which girls stake their self-worth on the external contingencies. Individuals with high self-esteem usually believe that they are attractive, popular, and superior to others in various contingencies (Brown, 1986; Campbell, 1986). Those with low self-esteem are less confident, and they need to seek approval from external sources to establish confidence and are more sensitive to perceived rejections (Downey and Feldman, 1996). Consequently, as compared to girls with high self-esteem, girls with low self-esteem are more likely to pursue their self-worth via external contingencies, and so they may perceive greater importance of peer feedback for their selfies. Thus, we hypothesize that:

H1: Self-esteem is negatively associated with the perceived importance of peer feedback to teenage girls.

### **1.1.3. Peer Feedback and Depressed Mood**

To examine the subjective well-being of teenaged girls, this study looks at depressed mood, which is frequently present during the stage of adolescence and manifests itself through various negative emotional reactions, such as fear, disgust, anger, and others (Watson and Kendall, 1989). Additionally, girls are more vulnerable to having a depressed mood than boys (Angold et al., 2002). Depressed mood refers to a low affective state or a feeling of hopelessness

or discouragement (Kandel and Davies, 1982) and can negatively affect an individual's thinking and social behavior (Forgas, 1995). Long-term depressed mood in adolescence can lead to clinical depression in adults (Copeland et al., 2009) or bring about risky behaviors, such as substance use or attempting suicide (Vander Stoep et al., 2011). Worth noting is that depressed mood is different from depression or depressive disorder, which is a mental disorder defined as a clinical syndrome (Weissman and Klerman, 1977), but depressed mood is usually grouped together with depressive symptoms to predict the clinical diagnosis of depression (Frojd et al., 2008).

Prior work has concluded that the passive use of social media is positively associated with decreased short-term subjective well-being and depressive symptoms (Frison and Eggermont, 2016; Kross et al., 2013; van den Eijnden et al., 2008). As online feedback to a user's post is generated by others and out of user control (Walther et al., 2009), receiving feedback is mainly a passive process, so we expect a similar association between the importance of receiving peer feedback and depressed mood. Moreover, when individuals face a loss of approval, contingencies of self-worth serve as a liability for the development of depression (Crocker, 2002). Acquiring peer feedback on selfies, as a reflection of pursuing self-worth from external contingencies, can thus lead to depressed mood for girls. For example, peer rejection brings about depressive symptoms in adolescence (Prinstein and Aikins, 2004), and unpopularity among peers is associated with depressed mood (Jacobsen et al., 1983). Hence, we propose that:

H2: When not obtaining sufficient feedback, girls who perceive greater importance on peer feedback are more likely to develop depressed mood than those who perceive less importance.

The well-being of teenagers is normally under the impact of their self-esteem (Valkenburg et al., 2006). The impact of self-esteem on depressed mood or depressive symptoms has been studied extensively in teenagers (Orth et al., 2009; Plunkett et al., 2007; Sowislo and Orth, 2013), and this research has concluded that self-esteem accounts significantly for whether teenagers have a depressed mood (Craighead and Green, 1988). Particularly, teenagers with low self-esteem are inclined to hold a deprecating view of their own competence, so they are more susceptible to depressed mood when facing failures (Rosenberg, 1979; Taylor and Brown, 1988); in contrast, those with high self-esteem believe that life events are manageable and that they are competent to deal with tough situations, so they are less vulnerable to depressed mood (Baumeister, 1993; Dumont and Provost, 1999). Therefore, we hypothesize that:

H3: When not obtaining sufficient feedback, girls with low self-esteem are more likely to develop depressed mood than those with high self-esteem.

## **1.2. Coping with the Stress**

Teenagers have to cope with various forms of stress in their daily lives, such as academic failures or interpersonal stresses (Clarke, 2006; Compas et al., 2001; Hampel and Petermann, 2006; Mantzicopoulos, 1997). Using social media brings them additional stress, such as from the leakage of personal information or comparisons with others on social media (Lim and Choi, 2017). Stress manifests itself when the demands of individuals exceed their control or their expectations are not met (Folkman, 2013), for example, peer rejection or negative feedback can cause individuals to feel stressful or insecure (Vonk et al., 2017). Consequently, when not receiving sufficient feedback, girls may perceive the situation as a loss of approval or rejection and experience stress. Extant evidence also proposes that a lack of peer feedback can cause teenagers to become involved in negative feelings (Jong and Drummond, 2016) or even risky

behaviors, such as self-harm (Chua and Chang, 2016). So it is reasonable to argue that girls perceive a deficiency of feedback as stressful and draw upon different strategies to cope with the stress and negative feelings.

Coping refers to the cognitive and behavioral efforts that individuals consciously exert to solve problems or diminish stress (Lazarus and Folkman, 1984). Further, coping is a transactional phenomenon. Individuals make efforts to cope with psychological stressors, and in turn, their well-being improves or deteriorates based upon the impact of coping (Penley et al., 2002). Given the complexity of the coping process, some research has evaluated coping responses as antecedents of psychological outcomes or psychological health (for a review, see Carver and Connor-Smith, 2010). This line of research has mainly focused upon the long-term effects of coping and its effects on psychopathology (Seiffge-Krenke and Klessinger, 2000; Wadsworth et al., 2005). However, in this study, we were interested in the instant coping responses to perceived stress that teenage girls use rather than the long-term effects of coping on psychopathology. Therefore, coping strategies were investigated as dependent variables.

### **1.2.1. Peer Feedback and Coping**

When encountering stress, individuals normally adopt two broad categories for coping strategies: problem-focused and emotion-focused coping (Lazarus and Folkman, 1984). Problem-focused coping involves taking direct measures to remove or eliminate the impact of stressors (Lazarus and Folkman, 1984). For example, social media platforms have provided ample features for users to obtain peer feedback (Valkenburg and Peter, 2011), so girls can immediately remove selfies with fewer likes, utilize filters for a better selfie next time (Agosto et al., 2012), or look for advice from friends on making improvements (Frison and Eggermont, 2015). These examples of problem-focused coping demonstrate the strategies of active coping,

planning, and instrumental support. Emotion-focused coping includes minimizing the impact of negative feelings rather than directly solving a problem (Lazarus and Folkman, 1984). When bothered about not gaining sufficient feedback, girls may turn their attention to other activities (i.e., self-distraction), attempt to distance themselves from the distressed feelings (i.e., disengagement), or passively accept the situation (i.e., acceptance).

The adoption of coping strategies depends on one's motivations because, without any motivation at stake, there is little possibility of experiencing stress let alone having a willingness to exert a coping effort (Lazarus, 1999). Since individuals are driven by the motivation to succeed in the contingencies on which they base their self-worth (Crocker et al., 2003), the importance of receiving peer feedback can reflect a girl's motivation toward earning the online approval of others of her appearance. In particular, contingencies of self-worth can directly regulate individual behavior (Crocker et al., 2003). For example, students who stake their self-worth on academics bear the motivation for achievement and expend great effort to succeed in this domain.

As such, the importance of receiving peer feedback can relate to teenage girls' coping preferences, as girls who perceive greater importance of receiving peer feedback are more motivated to solve the problem directly (not obtaining enough feedback). For example, if post does not obtain enough likes in a short time, they will delete it (Sherman et al., 2016). In other words, they have a strong tendency to adopt problem-focused coping. On the contrary, emotion-focused coping aims at dealing with the elicited feelings rather than the problem *per se*, and girls who place greater importance on peer feedback may be less likely to appeal to these strategies. This is because acceptance of or distracting from the negative feelings and situation (i.e.,

emotion-focused coping) cannot actually satisfy a girl's motivation for gaining sufficient feedback. Thus, we propose that:

- H4: Importance of peer feedback is a) positively associated with problem-focused coping  
b) but negatively associated with emotion-focused coping.

### **1.2.2. Depressed Mood and Coping**

Depressed mood can also influence how teenage girls use coping strategies because the adoption of coping strategies is impacted by one's emotional resources (Lazarus, 1999).

Problem-focused coping demands congruent skills along with the related resources to conduct actions (Lazarus and Folkman, 1984), so when individuals believe that a situation can be changed, problem-focused coping is more likely to be employed. Meanwhile, depressed mood indicates a state of "demoralization" for individuals (Dohrenwend et al., 1980; Kandel and Davies, 1982), and individuals in such a mood tend to behave in ways that retain their current status (Hammen and Zupan, 1984). This is to suggest that depressed mood may hinder a girl's motivation to take direct actions (i.e., problem-focused coping).

Emotion-focused coping is preferred when individuals perceive a situation as uncontrollable or unchangeable (Carver et al., 1989), and the adoption of emotion-focused coping (e.g., disengagement) can increase when the perceived level of stress increases (Wadsworth and Compas, 2002). With a depressed mood, teenage girls are vulnerable to stress, and perceived stress levels are also higher, so emotion-focused coping strategies (e.g., disengagement, self-distraction, or acceptance) may appear preferable. Taken together, we propose that depressed mood demotivates girls from using problem-focused coping strategies and motivates them to adopt emotion-focused coping strategies instead, and we hypothesize that:

H5: Depressed mood in teenaged girls is a) negatively associated with problem-focused coping b) but positively associated with emotion-focused coping.

In sum, this study has concentrated on the importance of receiving peer feedback and attempts to examine its possible antecedent (i.e., self-esteem) and psychological outcome (i.e., depressed mood) among teenage girls. Further, this study has also aimed to unveil how distinct strategies are utilized to cope with the stress of lacking feedback, especially when influenced by the perceived importance of peer feedback and depressed mood. The conceptual framework is shown in Figure 1.

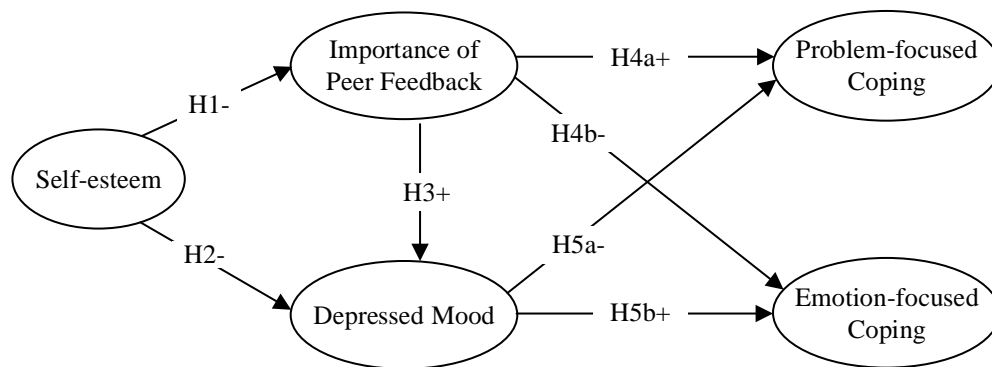


Figure 1. Conceptual Model

## 2. Method

### 2.1. Participants

The data for the current research were collected through an offline survey conducted from October 2016 to March 2017 in Singapore. Singapore is a multi-ethnic and multicultural nation with Chinese as the largest ethnic group (approximately 76%), and, according to World Economic Forum (Baller et al., 2016), it is one of the most digitally savvy countries in the world. Smartphone and social media penetration in Singapore are 82% and 77%, respectively, and on average, Singaporeans spend about 2 hours per day on social media use (We Are Social

Singapore, 2017). More than two million Singaporeans (about 5.6 million in total) use Instagram, of whom 55% are female and 29% are aged 13 to 24 (NapoleonCat, 2017).

We obtained approval from a university's institutional review board and the Ministry of Education Singapore before conducting this survey, after which, we contacted local secondary schools to recruit participants. The sampling criteria of participants were: (1) female students in secondary schools in Singapore, (2) aged 12 to 18 years, and (3) Instagram users who have posted selfies. There are two types of secondary schools in Singapore: co-educational and single-sex, and so, to maintain the balance in our sample, we finally collaborated with two co-educational schools and one single-sex school. Parental permission and participant consent were obtained before distributing the questionnaires.

A total of 303 female students completed the survey with a response rate of 52%. After eliminating seven invalid cases, 296 responses were included in the final data analysis. Among them, 50.7% were from the two co-educational schools and the rest were from the single-sex school. The average age of the participants was 14.22 ( $SD = .82$ ) and mainly ranged from 12 to 16. In terms of the ethnic distribution, 72% of the participants were Chinese, 14% were Malay, 8% were Indian, 1% Eurasian, and the rest 5% selected "other."

## 2.2. Measures

Pre-validated scales and five-point Likert-type scales were used for most measurements, and negative items were reversed when analyzing.

**Importance of peer feedback.** As illustrated in the literature review, we focused on three forms of peer feedback, including receiving positive comments, likes, and obtaining more followers. Hence, participants were asked to indicate the importance of "getting a lot of likes,"



“getting likes as quickly as possible,” “receiving positive comments on my selfies,” and “having a lot of Instagram followers.” The composite reliability was 0.88 ( $M = 2.53$ ,  $SD = .93$ ).

**Self-esteem.** Following van den Berg et al. (2007), a shortened version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965) was employed, and three items were selected, such as “I feel that I have a number of good qualities.” The composite reliability was 0.77 ( $M = 3.50$ ,  $SD = .70$ ).

**Depressed mood.** Three items were selected from the Kandel Depressed Mood Scale for adolescents (Kandel and Davies, 1982). Respondents were asked to indicate how often they have certain feelings (e.g., unhappy, sad, or depressed) or “have trouble going to sleep” when they did not receive positive feedback from peers on Instagram. The composite reliability for this scale was 0.85 ( $M = 2.00$ ,  $SD = .91$ ).

**Coping strategies.** Participants were asked to report how they cope with the negative feelings when not receiving enough feedback. The measure for coping strategies was modified from the Brief COPE Inventory (Carver, 1997) as some items (e.g., substance use or religious thinking) were not suitable for the context of this research. Thus, six items in total were selected based on previous literature (Chua and Chang, 2016; Lim and Choi, 2017).

*Problem-focused coping* ( $M = 2.00$ ,  $SD = .70$ ) was measured by three items representing active coping, planning, and instrumental support, and composite reliability was 0.71. Active coping was rephrased as “I would try to control the negative feeling by deleting my selfies;” planning was rephrased as “I would come up with new plans and post more attractive selfies on Instagram the next time;” and instrumental support was rephrased as “I would seek advice and help from my friends to improve my selfies.”

*Emotion-focused coping* ( $M = 2.84$ ,  $SD = .96$ ) was measured by another three items indicating disengagement, self-distraction, and acceptance, and the composite reliability was 0.69. The three items were: “I would give up trying to deal with it,” “I would turn to other activities to take my mind off of it,” and “I would try to accept the negative feeling and live with it.”

**Demographic information.** Participants were asked to report demographic information, including age, ethnic background, and school type.

**Instagram use.** A seven-point item was adopted to measure the frequency of Instagram use, and participants were asked to indicate the frequency of checking their Instagram account in minutes. Through an open-ended question, they were also asked to report the number of selfies they post in a typical week.

The measures for all latent variables were reliable, ranging from .69 to .88, and had adequate discriminant validity as the square root of average variance extracted (AVE) was higher than the factor correlations. The correlation matrix of all relevant variables is shown in Table 1. The factor loading estimates for the latent variables were all above .50, indicating acceptable measures. The items and factor loading estimates are attached in the Appendix A.

Table 1.

Correlation Matrix of Demographic, Instagram Use, and Theoretical Variables.

	1	2	3	4	5	6	7	8	9	10
1.Age	–	-.104	-.238***	-.084	-.021	-.025	.145*	-.175**	-.108	-.098
2.Race (Chinese)		–	-.283***	-.309***	-.320***	.001	.041	-.177**	-.150*	-.119
3.School (Co-Educational)			–	-.102	.055	-.142*	-.069	.134*	-.007	.054
4.Frequency of Use				–	.102	.296***	-.105	.147*	.337***	.150*
5.Selfie Posting					–	.083	.162**	.074	.200**	.045

6.Feedback Importance	.833	-.103	.225***	.444***	.177*
7. Self-esteem		.717	-.276***	-.142*	-.032
8.Depressed Mood			.810	.330***	.218**
9.Problem Coping				.702	.428***
10.Emotion Coping					.641

*Notes:* \* $p < .05$ , \*\*  $p < .01$ . \*\*\* $p < .001$ ; Race and School type are dummy coded for correlation analysis; the square root of the AVEs for latent variables are shown as the diagonal.

### 3. Results

SPSS 24.0 was used to run the descriptive analysis for relevant variables and to answer the research question (RQ1). R with statistical package lavaan (version 0.5-22) was used for further analysis. We first conducted an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to examine the measurement model, and then we utilized structural equation modeling (SEM) to test the research model and the proposed hypotheses.

#### 3.1. Descriptive Statistics

Regarding frequency of Instagram use, the mean was 3.84 ( $SD = 1.38$ ; 3 refers to “every few hours” and 4 refers to “every hour”), and the majority of participants (93.4%) reported checking Instagram at least once per day. On average, participants posted less than one selfie per week ( $M = .58$ ,  $SD = 1.33$ ). The descriptive statistics of Instagram use and theoretical variables are presented in Table 2.

Regarding our RQ1, participants rated 2.53 ( $SD = .93$ ) on average for the “Importance of Peer Feedback” scale. We then ran a descriptive analysis separately for the four items in this scale. Participants rated the importance of the number of likes with the highest score ( $M = 2.64$ ,  $SD = 1.07$ ; “Importance of likes - Amount” in Table 2), and the importance of positive comments with the second highest score ( $M = 2.61$ ,  $SD = 1.09$ ). Participants gave relatively low

scores to the importance of the number of followers ( $M = 2.44$ ,  $SD = 1.05$ ) and the importance of getting likes immediately ( $M = 2.44$ ,  $SD = 1.04$ ; “Importance of likes - Immediacy” in Table 2).

Table 2.

Descriptive Statistics of Observed and Latent Variables.

Observed Variables	<i>M</i>	<i>SD</i>	Latent Variables	<i>M</i>	<i>SD</i>
Selfie Positing	.58	1.33	Importance of Peer Feedback	2.53	.93
Frequency of Daily Use	3.43	1.38	Self-esteem	3.50	.70
Importance of like-Amount	2.64	1.07	Depressed Mood	2.00	.91
Importance of likes-Immediacy	2.44	1.04	Problem-focused Coping	2.00	.84
Importance of Followers	2.44	1.05	Emotion-focused Coping	2.84	.96
Importance of Positive Comments	2.61	1.09			

### 3.2. Measurement Model

Because previous studies have suggested that the ways of classifying coping strategies are diverse (Skinner et al., 2003), an EFA was employed to explore the dimensionality of coping items. The results of a principal component analysis using varimax rotation showed that the six coping items merged into two groups (as shown in the previous section), namely problem-focused and emotion-focused coping, consistent with the conventional categorization (Lazarus and Folkman, 1984).

We further integrated all factors into the measurement model. The results of the model fit test (Model 1, see Table 3) showed that the Chi-square test was significant ( $\chi^2(94) = 156.092$ ,  $p < .001$ ), which was predictable as the Chi-square test is sensitive to large sample sizes (Bollen and Long, 1993). However, model fit indices measured by CFI (= .967), TLI (= .957), SRMR (= .053), and RMSEA (= .047, 90% C. I. = .034, .060) were within a good range. Additionally, as previously presented, factor loadings for the indicators of the latent variables were all above .5

and the measures had acceptable discriminant validity (see Appendix A), so we employed this measurement model for further analysis.

Table 3.

Model Fits for Measurement Models and Research Model.

	Measurement Model (Model 1)	Research Model (Model 2)
Chi-square ( <i>df</i> )	156.092 (94)***	157.478 (96)***
CFI	.967	.967
TLI	.957	.959
SRMR	.053	.053
RMSEA	.047 (90% C. I. = .034, .060)	.047 (90% C. I. = .033, .060)

*Note:* \* $p < .05$ , \*\*  $p < .01$ . \*\*\* $p < .001$ .

### 3.3. Structural Model

The structure of the research model (Model 2) and each hypothesized path were tested using an SEM approach. As shown in Table 3, model fit indices for Model 2 were similar to Model 1, all in an appropriate range, as CFI (= .967), TLI (= .959), SRMR (= .053) and RMSEA (= .047, 90% C. I. = .033, .060), though Chi-square test was significant ( $\chi^2(96) = 157.478, p < .001$ ).

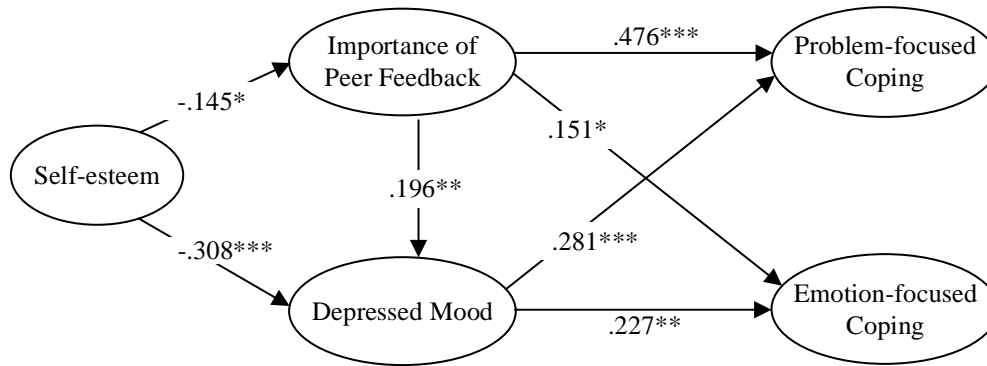
The hypotheses were examined by observing the model estimation of each path (shown in Figure 2). H1 and H2 predicted that self-esteem negatively influenced the importance of peer feedback (H1) and depressed mood (H2). The results demonstrated that both hypotheses were supported (H1,  $\beta = -.145, p < .05$ ; H2,  $\beta = -.308, p < .001$ ).

H3 predicted a positive association between the importance of peer feedback and depressed mood, which was also supported ( $\beta = .196, p < .01$ ).

H4a predicted a positive association between the importance of peer feedback and problem-focused coping, which was supported ( $\beta = .476, p < .001$ ). However, H4b was rejected

( $\beta = .151, p < .05$ ), as we hypothesized a negative association between importance of peer feedback and emotion-focused coping.

H5a predicted depressed mood negatively influenced problem-focused coping, which was rejected ( $\beta = .281, p < .001$ ). H5b was supported ( $\beta = .227, p < .01$ ) because we predicted that depressed mood was positively associated with emotion-focused coping.



Note: \* $p < .05$ . \*\*  $p < .01$ . \*\*\* $p < .001$ .

Figure 2. Final Model with Hypotheses Test Results

#### 4. Discussion

The aim of this study was to explore our understanding of the importance of receiving feedback on selfies among teenage girls and the coping strategies that girls employ in response to the stress caused by a lack of feedback. The results have unveiled that girls place high importance on both the number of likes and positive comments they receive. The findings also indicate that teenage girls with low self-esteem attach higher importance to peer feedback, and the level of such importance is positively associated with depressed mood. In addition, both the importance of peer feedback and depressed mood are positively associated with coping strategies (i.e., problem-focused and emotion-focused coping). Here it can be concluded that teenage girls may treat peer feedback as an indicator of their performance on selfie-posting and that both types

of coping are collaterally employed by girls to address effectively the stress activated by lacking feedback.

#### **4.1. Peer Feedback as KPI**

As shown by the descriptive analysis, the relatively high mean for the importance of peer feedback demonstrates that teenage girls take a serious perspective on online peer feedback. Particularly, girls value likes and positive comments highly, indicating that they desire both qualifiable and quantifiable feedback for their selfies. This finding is not surprising because social media has been specifically designed to provoke positive feedback for users' posts, especially via likes and comments (Koutamanis et al., 2015). The positive relation between the importance of peer feedback and depressed mood aligns with our expectations and is consistent with existing evidence (Jang et al., 2015; Jong and Drummond, 2016; Sherman et al., 2016), and the potent influence that peer feedback has on the fluctuations in the psychological well-being of teenaged girls further demonstrates their enthusiasm for peer feedback.

Noticeably, teenage girls place the highest importance on likes, reflecting the power of quantifiable feedback. The prevalence of the like button in social media in recent years may intensify a girl's concentration on obtaining quantifiable feedback because the number of likes is more easily assessable. Quantifiable feedback (likes and followers) are demonstrated by pure numbers semi-publicly or publicly on social media (e.g., Instagram), so they are easily observed or noticed by others. The visibility of this feedback may lead to comparisons and even competition with peers. For example, girls expect a certain amount of likes before posting. Although they may not have an exact number in mind, observing their peers' numbers and interacting with their peers will lead them to set a baseline for themselves (Chua and Chang, 2016). It has been noted that teenagers use the reactions of others to assess their performance on

social media (boyd, 2008), and the importance of getting large amounts of quantifiable and positive feedback means that girls desire to earn a strong peer endorsement for their profile/performance on social media.

Given that the main goal of posting selfies is to present a preferable image, girls are cautious about their selfie-posting on one hand (as shown in our descriptive analysis, girls post on average less than one selfie per week). On the other hand, they are eager to receive likes as well as positive comments as reflections of their performance in presenting themselves. Hence, we argue that peer feedback is becoming a key performance indicator (KPI) for teenage girls when posting selfies as the feedback is assessable, visible, and comparable, and girls internalize the feedback earnestly. In other words, the selfie-posting behavior of teenage girls is KPI-oriented, and this KPI-oriented behavior in turn drives girls to desire more feedback as they need to constantly display their highly endorsed performance in public. Moreover, the results of this study suggest that the enthusiasm for this KPI can make teenage girls vulnerable to depressed mood when lacking sufficient feedback.

To mitigate the depressed mood due to working toward this type of KPI, self-esteem should be considered as the results reveal a negative association between self-esteem and both depressed mood and the importance of peer feedback. The negative effect of self-esteem on depressed mood has been presented repeatedly in the extant literature (Beck and Alford, 2009; Orth and Robins, 2013), and this study again confirms that high self-esteem can serve a buffer role for preventing girls from being depressed. Moreover, the current findings show that self-esteem exerts a similar negative impact on the importance of gaining feedback. That is to say, teenage girls with high self-esteem are confident about their performance (McFarlin and Blascovich, 1981), so they do not need the aforementioned KPI to validate their worth. However,



girls with low self-esteem may feel uncertain about the accuracy of their self-evaluation (Baumeister, 1982), so they rely more on peer feedback to evaluate their performance, especially considering that the feedback is quantifiable and visible.

The path from self-esteem to depressed mood is noteworthy. Though peer feedback may help teenage girls—especially those with low-esteem—validate their self-worth, the process engenders negative psychological outcomes (e.g., involving in a depressed mood). Thus, the results here support the previous literature, positing that the pursuit of self-esteem in certain contingencies is costly and that the psychological health of individuals can be hurt during the process (Crocker and Park, 2004). As previously illustrated, placing importance on feedback on selfies actually means staking self-worth on external contingencies (e.g., earning the approval of others based upon one’s physical appearance). Empirical evidence demonstrates that physical appearance is the most superficial and the least healthy domain out of the seven domains that individuals tend to stake their self-worth upon (Crocker et al., 1994). However, pursuing self-esteem in a virtuous, compassionate, or altruistic manner can expend a lower cost (Crocker et al., 2003). Therefore, to prevent teenage girls from being depressed, it is crucial to encourage them to enhance their self-esteem or stake their self-worth on proper or valuable domains and guide them to healthy perspectives regarding online peer feedback rather than treating feedback as a KPI for their selfies.

#### **4.2. Concomitant Adoption of Coping Strategies**

According to the results of the EFA and CFA, the conventional categorization of coping (problem-focused and emotion-focused coping) is applicable when examining teenage girls’ coping responses on social media (Lazarus and Folkman, 1984). The results further indicate that the two types of coping are concomitantly utilized by teenage girls either under the impact of the

importance of peer feedback or depressed mood. Although the negative relation between the importance of peer feedback and emotion-focused coping and the positive relation between depressed mood and problem-focused coping were out of our predictions, these findings of the study are plausible because coping strategies are not mutually exclusive of one another, and most stressors activate both types of coping (Lazarus, 1991). These findings are helpful for further research considering different types of coping as complementary functions rather than independent ones.

Specifically, problem-focused coping takes aim directly at stressors, so it is typically used as the primary control of a stressful situation, whereas emotion-focused coping is a secondary control because it is an indirect effort to diminish the feelings generated by the stressors (Hampel and Petermann, 2006). In other words, these two types of coping are not fully independent but are complementary to each other to help individuals handle stressful events (Lazarus, 1991; Lazarus and Folkman, 1984). The interrelatedness between problem-focused and emotion-focused coping ( $\beta = .428$ , shown in Table 2) also reflects that the two types of coping can facilitate each other in assisting girls to address the activated stress due to a shortage of feedback.

Teenage girls are familiar with the various features offered by social media platforms that promote their selfies and help them obtain feedback (Agosto et al., 2012; Madden et al., 2013). Indeed, the features on social media are easy for users to operate, such as easily removing selfies with fewer likes (i.e., active coping) or messaging their friends to seek advice on how to make improvements (i.e., instrumental support). Hence, familiarity with social media and the ease of use of various features on social media (Davis, 1989) encourage users to use problem-focused coping as the primary control in response to the stress of lacking feedback. The ease of using the features on social media require only limited resources from teenage girls. Consequently, even

when they experience a depressed mood or are in a low state, girls will perceive this situation as changeable and readily take direct measures (i.e., problem-focused coping).

As effective coping should assist individuals in resolving problems and mitigating stress (Brown et al., 2005), the current findings imply that only using direct and instant measures (problem-focused coping) in response to the situation is insufficient or ineffective. Even though girls can easily undertake a variety of instant measures to solve the encountered problem (e.g., a lack of feedback), they need to adjust their feelings to an adaptive status, for example distracting themselves from the lack of peer feedback on their selfies. As a result, though problem-focused strategies can help girls to cope directly, they still need to make use of emotion-focused strategies as a secondary control to ease the negative feelings.

Although both the importance of peer feedback and depressed mood are positively related with coping strategies, the sizes of the effect are different as shown in Figure 2. In particular, the importance of peer feedback exerts greater impact on problem-focused coping than emotion-focused coping ( $\beta = .476$  vs  $.151$ ), whereas this discrepancy largely decreases under the impact of depressed mood ( $\beta = .281$  vs  $.227$ ). This finding implies that the coping process is dynamic and the preference of adopting different strategies is contextual and relies on emotional resources (Lazarus, 1999; Schoenmakers et al., 2015). The relatively high effect size of the importance of peer feedback on problem-focused coping is in line with our prediction (H4a), reflecting that importance of peer feedback strongly motivates girls to take direct measures to address the stress. In contrast, depressed mood immerses girls in a demoralized state. Thus, compared with the impact of impact of peer feedback, it may make girls less likely to take instant measures and direct effort in dealing with the maladaptive feelings.

## 5. Conclusions

In addition to the salient findings mentioned, several limitations should be noted. The findings of this study are based on a survey approach and cross-sectional correlational analyses, which makes it difficult to establish causal relationships. However, this is a common and inevitable limitation for most survey studies, and our predictions were grounded by sufficient investigation of theories and previous studies, and so this limitation should not detract much from our contribution. Moreover, we employed a parsimonious version of the coping scale that cannot cover all coping strategies and may have thus omitted some effective ones. Last but not least, we only included one item to represent each strategy and grouped them together into two factors, so a high level of reliability was not guaranteed (the composite reliability of emotion-focused coping is slightly lower than 0.7). This is because our study attempted to explore how coping strategies are involved in the investigated context, and we attempted to cover as many strategies as possible with the employed scale. Future research should adopt a comprehensive scale with sufficient items in order to uncover other effective coping strategies and to construct more reliable factors.

In conclusion, through the analysis of survey data from 296 girls in Singapore, this study proposed a research model to examine systematically the relationships between the importance of peer feedback, self-esteem, depressed mood and coping strategies. This study makes a few contributions to the extant literature. First, we introduced the importance of peer feedback as a core construct in this study and suggested that peer feedback on social media functions as a KPI of selfie-posting behaviors for teenage girls. Second, to our best knowledge, this study was the first that unveils the categorization of coping strategies in this context, which can be helpful for further research on developing measurement scales. Finally, the concomitant adoption of the two types of coping conformed the co-existence of problem-focused and emotion-focused coping in

addressing stressful events. This study extends the scope of coping theory to the context of receiving peer feedback on social media and integrates the two forms of coping together into the proposed model, which could be a useful analytical framework for future research.

### References

- Agosto, D. E., Abbas, J. & Naughton, R. 2012. Relationships and social rules: Teens' social network and other ICT selection practices. *J. Assoc. Inf. Sci. Technol.* 63(6), 1108-1124. doi:10.1002/asi.22612.
- Angold, A., Erkanli, A., Silberg, J., Eaves, L. & Costello, E. J. 2002. Depression scale scores in 8–17 years old: Effects of age and gender. *J. Child Psychol. Psychiatry.* 43(8), 1052-1063. doi:10.1111/1469-7610.00232.
- Baumeister, R. F. 1982. Self-esteem, self-presentation, and future interaction: A dilemma of reputation. *J. Pers.* 50(1), 29-45. doi:10.1111/j.1467-6494.1982.tb00743.x.
- Baumeister, R. F. 1993. *Self-esteem: The puzzle of low self-regard.* Plenum Press, New York.
- Beck, A. T. & Alford, B. A. 2009. *Depression: Causes and treatment.* University of Pennsylvania Press, Philadelphia.
- Bollen, K. A. & Long, J. S. 1993. *Testing structural equation models.* Sage Publications, Newbury Park.
- Bordo, S. 2004. *Unbearable weight: Feminism, Western culture, and the body,* University of California Press, California.
- boyd, d. 2008. Why youth♥ social network sites: The role of networked publics in teenage social life, in: Buckingham, D. (Eds.) *Youth, identity, and digital media.* The MIT Press, Cambridge, MA, pp. 119–142. doi:10.1162/dmal.9780262524834.119
- boyd, d. 2014. *It's complicated: The social lives of networked teens.* Yale University Press, New Haven.
- boyd, d. & Ellison, N. B. 2007. Social Network Sites: Definition, History, and Scholarship. *J. Comput.-Mediat. Commun.*13(1), 210-230. doi:10.1111/j.1083-6101.2007.00393.x.

- Brown, J. D. 1986. Evaluations of self and others: Self-enhancement biases in social judgments. *Soc. Cogn.* 4, 353-376. doi:10.1521/soco.1986.4.4.353.
- Brown, S. P., Westbrook, R. A. & Challagalla, G. 2005. Good cope, bad cope: Adaptive and maladaptive coping strategies following a critical negative work event. *J. Appl. Psychol.* 90(4), 792-798. doi:10.1037/0021-9010.90.4.792.
- Byrne, B. 2000. Relationships between anxiety, fear, self-esteem, and coping strategies in adolescence. *Adolescence.* 35(137), 201-216.
- Campbell, J. D. 1986. Similarity and uniqueness: The effects of attribute type, relevance, and individual differences in self-esteem and depression. *J. Pers. Soc. Psychol.* 50(2), 281-294. doi:10.1037/0022-3514.50.2.281
- Carver, C. S. 1997. You want to measure coping but your protocol's too long: Consider the brief COPE. *Int. J. Behav. Med.* 4(1), 92-100. doi:10.1207/s15327558ijbm0401\_6.
- Carver, C. S. & Connor-Smith, J. 2010. Personality and coping. *Annu. Rev. Psychol.* 61, 679-704. doi:10.1146/annurev.psych.093008.100352.
- Carver, C. S., Scheier, M. F. & Weintraub, J. K. 1989. Assessing coping strategies: A theoretically based approach. *J. Pers. Soc. Psychol.* 56(2), 267-283. doi:10.1037/0022-3514.56.2.267.
- Caspi, A. 2000. The child is father of the man: Personality continuities from childhood to adulthood. *J. Pers. Soc. Psychol.* 78(1), 158-172. doi:10.1037/0022-3514.78.1.158.
- Chua, T. H. H. & Chang, L. 2016. Follow me and like my beautiful selfies: Singapore teenage girls' engagement in self-presentation and peer comparison on social media. *Comput. Hum. Behav.* 55, 190-197. doi:10.1016/j.chb.2015.09.011.
- Clarke, A. T. 2006. Coping with interpersonal stress and psychosocial health among children and

- adolescents: A meta-analysis. *J. Youth Adolesc.* 35(1), 10-23. doi:10.1007/s10964-005-9001-x
- Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H. & Wadsworth, M. E. 2001. Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychol. Bull.* 127(1), 87-127. doi:10.1037/0033-2909.127.1.87
- Copeland, W. E., Shanahan, L., Costello, E. J. & Angold, A. 2009. Which Childhood and Adolescent Psychiatric Disorders predict which Young Adult Disorders? *Arch. Gen. Psychiatry.* 66(7), 764-772. doi:10.1001/archgenpsychiatry.2009.85
- Craighead, L. W. & Green, B. J. 1988. Relationship between depressed mood and sex-typed personality characteristics in adolescents. *J. Youth Adolesc.* 18(5), 467-474. doi:10.1007/bf02132781
- Crocker, J. 2002. Contingencies of self-worth: Implications for self-regulation and psychological vulnerability. *Self and Identity.* 1(2), 143-149. doi:10.1080/152988602317319320
- Crocker, J., Luhtanen, R., Blaine, B. & Broadnax, S. 1994. Collective self-esteem and psychological well-being among White, Black, and Asian college students. *Pers. Soc. Psychol. Bull.* 20(5), 503-513. doi:10.1177/0146167294205007
- Crocker, J., Luhtanen, R. K., Cooper, M. L. & Bouvrette, A. 2003. Contingencies of self-worth in college students: Theory and measurement. *J. Pers. Soc. Psychol.* 85(5), 894-908. doi:10.1037/0022-3514.85.5.894.
- Crocker, J. & Park, L. E. 2004. The costly pursuit of self-esteem. *Psychol. Bull.* 130(3), 392-414. doi:10.1002/9781444318111.ch18.
- Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS. Q.* 13(3), 319-340. doi:10.2307/249008.



- Dittmar, H. & Howard, S. 2004. Thin-ideal internalization and social comparison tendency as moderators of media models' impact on women's body-focused anxiety. *J. Soc. Clin. Psychol.* 23(6), 768-791. doi:10.1521/jscp.23.6.768.54799
- Dohrenwend, B. P., Shrout, P. E., Egri, G. & Mendelsohn, F. S. 1980. Nonspecific psychological distress and other dimensions of psychopathology. *Arch. Gen. Psychiatry.* 37(11), 1229-1236. doi:10.1001/archpsyc.1980.01780240027003.
- Downey, G. & Feldman, S. I. 1996. Implications of rejection sensitivity for intimate relationships. *J. Pers. Soc. Psychol.* 70(6), 1327 -1343. doi:10.1037/0022-3514.70.6.1327.
- Elkind, D. & Bowen, R. 1979. Imaginary audience behavior in children and adolescents. *Dev. Psychol.* 15(1), 38-44. doi:10.1037/0012-1649.15.1.38.
- Ellison, N. B., Steinfield, C. & Lampe, C. 2011. Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media Soc.* 3(6), 873-892. doi:10.1177/1461444810385389.
- Folkman, S. 2013. Stress: appraisal and coping. *Encyclopedia of behavioral medicine.* Springer, New York.
- Forgas, J. P. 1995. Mood and judgment: The affect infusion model (AIM). *Psychol. Bull.* 117(1), 39-66. doi:10.1037/0033-2909.117.1.39.
- Frison, E. & Eggermont, S. 2015. The impact of daily stress on adolescents' depressed mood: The role of social support seeking through Facebook. *Comput. Hum. Behav.* 44, 315-325. available at: <http://dx.doi.org/10.1016/j.chb.2014.11.070>.
- Frison, E. & Eggermont, S. 2016. Exploring the Relationships Between Different Types of Facebook Use, Perceived Online Social Support, and Adolescents' Depressed Mood. *Soc.*

- Sci. Comput. Rev. 34(2), 153-171. doi:10.1177/0894439314567449.
- Goffman, E. 1969. *The presentation of self in everyday life*. Penguin Books, London.
- Hammen, C. & Zupan, B. A. 1984. Self-schemas, depression, and the processing of personal information in children. *J. Exp. Child Psychol.* 37(3), 598-608. doi:10.1016/0022-0965(84)90079-1.
- Hampel, P. & Petermann, F. 2006. Perceived stress, coping, and adjustment in adolescents. *J. Adolesc. Health.* 38(4), 409-415. doi:10.1016/j.jadohealth.2005.02.014.
- Jackson, C. A. & Luchner, A. F. 2017. Self-presentation mediates the relationship between Self-criticism and emotional response to Instagram feedback. *Personal. Individ. Differ.* doi:10.1016/j.paid.2017.04.052.
- Jacobsen, R. H., Lahey, B. B. & Strauss, C. C. 1983. Correlates of depressed mood in normal children. *J. Abnorm. Child Psychol.* 11(1), 29-39. doi:10.1007/bf00912175.
- Jang, J. Y., Han, K., Shih, P. C. & Lee, D. 2015. Generation like: Comparative characteristics in Instagram. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (CHI '15)* Seoul, Republic of Korea: ACM. doi:10.1145/2702123.2702555.
- Jong, S. T. & Drummond, M. J. 2016. Hurry up and “like” me: immediate feedback on social networking sites and the impact on adolescent girls. *Asia-Pacific Journal of Health, Sport and Physical Education.* 7(3), 251-267. doi:10.1080/18377122.2016.1222647.
- Kandel, D. B. & Davies, M. 1982. Epidemiology of depressive mood in adolescents: An empirical study. *Arch. Gen. Psychiatry.* 39(10), 1205-1212. doi:10.1001/archpsyc.1982.04290100065011.
- Kim, E., Lee, J.-A., Sung, Y. & Choi, S. M. 2016. Predicting selfie-posting behavior on social

- networking sites: An extension of theory of planned behavior. *Comput. Hum. Behav.* 62, 116-123. doi:10.1016/j.chb.2016.03.078.
- Koutamanis, M., Vossen, H. G. & Valkenburg, P. M. 2015. Adolescents' comments in social media: Why do adolescents receive negative feedback and who is most at risk? *Comput. Hum. Behav.* 53, 486-494. doi:10.1016/j.chb.2015.07.016
- Krayer, A., Ingledew, D. & Iphofen, R. 2008. Social comparison and body image in adolescence: A grounded theory approach. *Health Educ. Res.* 23(5), 892-903. doi:10.1093/her/cym076.
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., Shablack, H., Jonides, J. & Ybarra, O. 2013. Facebook use predicts declines in subjective well-being in young adults. *PLoS One.* 33, 323-331. doi:10.1371/journal.pone.0069841.
- Lazarus, R. S. 1991. *Emotion and adaptation*. Oxford University Press, New York, NY.
- Lazarus, R. S. 1999. *Stress and emotion: A new synthesis*. Springer, New York, NY.
- Lazarus, R. S. & Folkman, S. 1984. *Stress, appraisal, and coping*. Springer, New York, NY.
- Lim, M. S. & Choi, S. B. 2017. Stress caused by social media network applications and user responses. *Multimed. Tools Appl.* 76(17), 17685-17698. doi:10.1007/s11042-015-2891-z.
- Lysaker, P. H., Erickson, M., Ringer, J., Buck, K. D., Semerari, A., Carcione, A. & Dimaggio, G. 2011. Metacognition in schizophrenia: The relationship of mastery to coping, insight, self-esteem, social anxiety, and various facets of neurocognition. *Br. J. Clin. Psychol.* 50(4), 412-424. doi:10.1111/j.2044-8260.2010.02003.x.
- Madden, M., Lenhart, A., Cortesi, S., Gasser, U., Duggan, M., Smith, A. & Beaton, M. 2013. *Teens, social media, and privacy*. Available at:

- [http://www.pewinternet.org/files/2013/05/PIP\\_TeensSocialMediaandPrivacy\\_PDF.pdf](http://www.pewinternet.org/files/2013/05/PIP_TeensSocialMediaandPrivacy_PDF.pdf).
- Marcus, S. 2015. Picturing'ourselves into being: assessing identity, sociality and visuality on Instagram. Presented at the International Communication Association conference, San Juan, Puerto Rico.
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B. & Bryant, F. B. 2009. The relationships among self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Res. Nurs. Health.* 32(1), 96-109. doi:10.1002/nur.20304.
- McAndrew, F. T. & Jeong, H. S. 2012. Who does what on Facebook? Age, sex, and relationship status as predictors of Facebook use. *Comput. Hum. Behav.* 28, 2359-2365. doi:10.1016/j.chb.2012.07.007.
- McElhaney, K. B., Antonishak, J. & Allen, J. P. 2008. "They like me, they like me not": Popularity and adolescents' perceptions of acceptance predicting social functioning over time. *Child Dev.* 79(3), 720-731. doi:10.1111/j.1467-8624.2008.01153.x.
- McFarlin, D. B. & Blascovich, J. 1981. Effects of self-esteem and performance feedback on future affective preferences and cognitive expectations. *J. Pers. Soc. Psychol.* 40(3), 521-531. doi:10.1037/0022-3514.40.3.521.
- NapoleonCat. 2017. Facebook and Instagram user demographics in Singapore – August 2017 [Online]. Available at: <https://napoleoncat.com/blog/en/facebook-and-instagram-user-demographics-in-singapore-august-2017/> [Accessed].
- Neira, B., Corey, J. & Barber, B. L. 2014. Social networking site use: Linked to adolescents' social self-concept, self-esteem, and depressed mood. *Aust. J. Psychol.* 66(1), 56-64. doi:10.1111/ajpy.12034
- Orth, U. & Robins, R. W. 2013. Understanding the link between low self-esteem and depression.

- Curr. Dir. Psychol. 22(6), 455-460. doi:10.1177/0963721413492763
- Orth, U. & Robins, R. W. 2014. The Development of Self-Esteem. Curr. Dir. Psychol. 23(5), 381-387. doi:10.1177/0963721414547414
- Orth, U., Robins, R. W., Trzesniewski, K. H., Maes, J. & Schmitt, M. 2009. Low self-esteem is a risk factor for depressive symptoms from young adulthood to old age. J. Abnorm. Psychol. 118(3), 472. doi:10.1037/a0015922
- Pempek, T. A., Yermolayeva, Y. A. & Calvert, S. L. 2009. College students' social networking experiences on Facebook. J. Appl. Dev. Psychol. 30(3), 227-238. doi:10.1016/j.appdev.2008.12.010
- Penley, J. A., Tomaka, J. & Wiebe, J. S. 2002. The association of coping to physical and psychological health outcomes: A meta-analytic review. J. Behav. Med. 25(6), 551-603. doi:10.1023/A:1020641400589
- PiperJaffray. 2016. Talking Stock With Teens - Spring 2016 [Online]. Piper Jaffray. Available at: <http://www.piperjaffray.com/3col.aspx?id=4035> [Accessed].
- Plunkett, S. W., Henry, C. S., Robinson, L. C., Behnke, A. & Falcon, P. C. 2007. Adolescent perceptions of parental behaviors, adolescent self-esteem, and adolescent depressed mood. J. Child Fam. Stud. 16(6), 760-772. doi:10.1007/s10826-006-9123-0
- Pounders, K., Pounders, K., Kowalczyk, C. M., Kowalczyk, C. M., Stowers, K. & Stowers, K. 2016. Insight into the motivation of selfie postings: Impression management and self-esteem. Eur. J. Marketing 50, 1879-1892. doi:10.1108/ejm-07-2015-0502.
- Prinstein, M. J. & Aikins, J. W. 2004. Cognitive moderators of the longitudinal association between peer rejection and adolescent depressive symptoms. J. Abnorm. Child Psychol. 32(2), 147-158. doi:10.1023/b:jacp.0000019767.55592.63.

- Prinstein, M. J., Borelli, J. L., Cheah, C. S. L., Simon, V. A. & Aikins, J. W. 2005. Adolescent Girls' Interpersonal Vulnerability to Depressive Symptoms: A Longitudinal Examination of Reassurance-Seeking and Peer Relationships. *J. Abnorm. Psychol.* 114(4), 676-688. doi:10.1037/0021-843x.114.4.676
- Qiu, L., Lu, J., Yang, S., Qu, W. & Zhu, T. 2015. What does your selfie say about you? *Comput. Hum. Behav.* 52, 443-449. doi:10.1016/j.chb.2015.06.032
- Rosenberg, M. 1965. Rosenberg self-esteem scale. *PsycTESTS Dataset*. doi:10.1037/t01038-000.
- Rosenberg, M. 1979. *Conceiving the self*. Basic Books, New York, NY.
- Rui, J. R. & Stefanone, M. A. 2013. Strategic Image Management Online. *Inf. Commun. Soc.* 16(8), 1286-1305. doi:10.1080/1369118X.2013.763834
- Schoenmakers, E. C., van Tilburg, T. G. & Fokkema, T. 2015. Problem-focused and emotion-focused coping options and loneliness: How are they related? *Eur. J. Ageing.* 12(2), 153-161. doi:10.1007/s10433-015-0336-1
- Seiffge-Krenke, I. & Klessinger, N. 2000. Long-term effects of avoidant coping on adolescents' depressive symptoms. *J. Youth Adolesc.* 29(6), 617-630. doi:10.1023/A:1026440304695
- Sherman, L. E., Payton, A. A., Hernandez, L. M., Greenfield, P. M. & Dapretto, M. 2016. The power of the like in adolescence: Effects of peer influence on neural and behavioral responses to social media. *Psychol. Sci.* 27(7), 1027-1035. doi:10.1177/0956797616645673
- Skinner, E. A., Edge, K., Altman, J. & Sherwood, H. 2003. Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychol. Bull.* 129(2), 216-269. doi:10.1037/0033-2909.129.2.216

- Sontag, L. M. & Graber, J. A. 2010. Coping with perceived peer stress: Gender-specific and common pathways to symptoms of psychopathology. *Dev. Psychobiol.* 46(6), 1605-1620. doi:10.1037/a0020617
- Sowislo, J. F. & Orth, U. 2013. Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychol. Bull.* 139(1), 213-240. doi:10.1037/a0028931
- Statista. 2017. Number of monthly active Instagram users from January 2013 to September 2017 [Online]. Available at: <https://www.statista.com/statistics/253577/number-of-monthly-active-instagram-users/> [Accessed].
- Steinberg, L. 2008. A social neuroscience perspective on adolescent risk-taking. *Dev. Rev.* 28(1), 78-106. doi:10.1016/j.dr.2007.08.002
- Steiner, H., Erickson, S. J., Hernandez, N. L. & Pavelski, R. 2002. Coping styles as correlates of health in high school students. *J. Adolesc. Health.* 30(5), 326-335. doi:10.1016/s1054-139x(01)00326-3
- Taylor, S. E. & Brown, J. D. 1988. Illusion and well-being: a social psychological perspective on mental health. *Psychol. Bull.* 103(2), 193-210. doi:10.1037/0033-2909.103.2.193
- Valkenburg, P. M. & Peter, J. 2011. Online communication among adolescents: An integrated model of its attraction, opportunities, and risks. *J. Adolesc. Health.* 48(2), 121-127. doi:10.1016/j.jadohealth.2010.08.020
- Valkenburg, P. M., Peter, J. & Schouten, A. P. 2006. Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *CyberPsychol. Behav.* 9(5), 584-590. doi:10.1089/cpb.2006.9.584
- van den Berg, P., Paxton, S. J., Keery, H., Wall, M., Guo, J. & Neumark-Sztainer, D. 2007. Body dissatisfaction and body comparison with media images in males and females. *Body*

- Image. 4(3), 257-268. doi:10.1016/j.bodyim.2007.04.003
- van den Eijnden, R. J., Meerkerk, G. J., Vermulst, A. A., Spijkerman, R. & Engels, R. C. 2008. Online communication, compulsive Internet use, and psychosocial well-being among adolescents: A longitudinal study. *Dev. Psychobiol.* 44(3), 655-665. doi:10.1037/0012-1649.44.3.655
- Vandenbosch, L. & Eggermont, S. 2012. Understanding Sexual Objectification: A Comprehensive Approach Toward Media Exposure and Girls' Internalization of Beauty Ideals, Self-Objectification, and Body Surveillance. *J. Commun.* 62(5), 869-887. doi:10.1111/j.1460-2466.2012.01667.x
- Vander Stoep, A., Adrian, M., Mc Cauley, E., Crowell, S. E., Stone, A. & Flynn, C. 2011. Risk for Suicidal Ideation and Suicide Attempts Associated with Co-occurring Depression and Conduct Problems in Early Adolescence. *Suicide Life-Threat. Behav.* 41(3), 316-329. doi:10.1111/j.1943-278x.2011.00031.x
- Vonk, R., Radstaak, M., De Heus, P. & Jolij, J. 2017. Ironic effects of feedback on contingency of self-worth: Why self-reports of contingency are biased. *Self and Identity.* 1-18. doi:10.1080/15298868.2017.1406400
- Wadsworth, M. E. & Compas, B. E. 2002. Coping with family conflict and economic strain: The adolescent perspective. *J. Res. Adolesc.* 12(2), 243-274. doi:10.1111/1532-7795.00033
- Wadsworth, M. E., Raviv, T., Compas, B. E. & Connor-Smith, J. K. 2005. Parent and adolescent responses to poverty-related stress: Tests of mediated and moderated coping models. *J. Child Fam. Stud.* 14(2), 283-298. doi:10.1007/s10826-005-5056-2
- Walther, J. B., Van Der Heide, B., Hamel, L. M. & Shulman, H. C. 2009. Self-Generated Versus Other-Generated Statements and Impressions in Computer-Mediated Communication: A



Test of Warranting Theory Using Facebook. *Commun. Res.* 36(2), 229-253.

doi:10.1177/0093650208330251

Watson, D. & Kendall, P. 1989. Common and differentiating features of anxiety and depression: Current findings and future directions, in: Kendall, P. & Watson, D. (Eds.) *Anxiety and depression: Distinctive and overlapping features*. Academic Press, San Diego, CA, pp. 493–508.

We are social Singapore. 2017. *Digital in Southeast Asia in 2017* [Online]. Available at:

<https://wearesocial.com/sg/blog/2017/02/digital-southeast-asia-2017> [Accessed].

Weissman, M. M. & Klerman, G. L. 1977. Sex differences and the epidemiology of depression.

*Arch. Gen. Psychiatry.* 34(1), 98-111. doi:10.1001/archpsyc.1977.01770130100011

Wilson, K., Fornasier, S. & White, K. M. 2010. Psychological predictors of young adults' use of social networking sites. *Cyberpsychology Behav. Soc. Netw.* 13(2), 173-177.

doi:10.1089/cyber.2009.0094

### Appendix A

#### Item Loadings of Measures

Construct	Item	Loading
Importance of Peer Feedback	It is important for me to get a lot of <i>likes</i> on my selfies.	.897
	It is important for me to get <i>likes</i> as quickly as possible.	.878
	It is important for me to receive positive comments on my selfie.	.771
	It is important for me to have a lot of Instagram followers.	.781
Depressed Mood	I have trouble going to sleep or staying asleep.	.741
	I feel unhappy, sad, or depressed.	.859
	I feel nervous or tense.	.825
Self-esteem	I feel that I have a number of good qualities.	.546
	I take a positive attitude toward myself.	.729
	I am satisfied with myself.	.843
Problem-focused Coping	I would come up with new plans and post more attractive selfies on Instagram next time.	.763
	I would seek advice and help from my friends to improve my selfies.	.662
	I would try to control the negative feeling by deleting my selfies.	.678
Emotion-focused Coping	I would try to accept the negative feeling and live with it.	.615
	I would turn to other activities to take my mind off.	.748
	I would give up trying to deal with it.	.544