EXPLORATION OF GENERATION Z USING SOCIAL MEDIA FROM AN EMOTION PERSPECTIVE

by

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As members of the Dissertation Committee, we certify that we have read the dissertation prepared by Xueyan Li, titled *Exploration of Generation Z Using Social Media from an Emotion Perspective* and recommend that it be accepted as fulfilling the dissertation requirement for the Degree of Doctor of Philosophy.

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Abstract

Social media has been popular for more than a decade. Generation Z (Gen Z) started using social media to build their social networks earlier than any older generations. This paper conducted two studies to explore how Gen Z's activities on and perceptions of social media connect to their emotional expressivity, emotion regulation, self-esteem, academic achievement, and personality traits. Relationships among these variables were also examined. The first study included ADHD and depression symptoms to understand those relationships. The second study added self-regulation and perceived stress level for further explanations. Both studies demonstrated similar results on common variables. Results suggested that social media activities and perceptions were closely associated with Gen Z's emotion perspectives. The researcher proposed two models demonstrating these relationships and generated a final model using common variables. Limitations and future directions are discussed.

Keywords: social media, emotion regulation, emotional expressivity, young generation

Exploration of Generation Z Using Social Media from an Emotion Perspective

This research discusses the impact social media has on Generation Z (Gen Z) from various perspectives including emotion regulation, emotional expressivity, self-esteem, self-regulation, and stress. It also explores how these variables connect to this generation's personality characteristics, an external psychological symptom (i.e., Attention-deficit/hyperactivity disorder; ADHD), and an internal psychological symptom (i.e., depression).

What is Social Media?

Over the last two decades, social media has gained massive number of users. For many people, social media has become a part of their daily routines. Obar and Wildman (2015) reviewed previous literature on social media and defined current social media platforms as Web 2.0 Internet-based (which supports interactive web experiences) applications that present user-generated contents and connect a profile, which is created by individuals or groups, with other profiles to help users build social networks. Based on this definition, the first social media platform in use would be "Six Degrees", which was created in 1997 with its concept of "all living things and everything else in the world is six or fewer steps away from each other." This platform is still active today.

Subsequently, there was an explosive growth in the number of social media platforms in the 2000s decade. Many well-known platforms were created and became popular during that time including but not limited to MySpace, Facebook, Twitter and Tumblr. Some research deemed YouTube as a social media platform (Effing, Van Hillegersberg, & Huibers, 2011; Halpern, & Gibbs, 2013; Khan, 2017; Syed-Abdul et al., 2013). YouTube qualifies for the definition Obar and Wildman (2015) provided for social media, however, it should also be considered that it is becoming the substitute for television just like Netflix among younger

generations. The function of YouTube varies among individuals. For example, people are able to use YouTube to find a certain account (i.e., connect one profile with other profiles), but it is not the mostly used function. The most important functions of YouTube rated by users are to "figure out how to do things they haven't done before", followed by "pass time", "decide whether to buy a product or not", and "understand things happening in the world" (Smith, Toor, & Kessel, 2018). People can watch hours and hours of videos on YouTube without being aware of it as social media. People have spent more time (i.e., more than doubled year by year) watching YouTube on their TV (O'Neil-Hart & Blumenstein, 2016), which partly reflects that they deemed YouTube less likely as a social media platform. As a result, the social media platforms this research refers to do not include platforms such as YouTube and Quora, because communication and social networking may not be their most used functions among users.

Why Generation Z?

Individuals who were born around the 2000s decade such as Gen Z could have access to social media at a very young age. Schroer (2008) defined Gen Z as anyone born between 1995-2012. This research follows this categorization and focuses on college Gen Z students who are over 18 years old (1995-2001). For example, Facebook reached 100 million monthly active users in 2008[1]. At that time, the oldest Gen Z just graduated from their elementary schools. As a result, Gen Zers were likely to start building social networks through social media platforms at younger ages than any older generations. Li and McCaslin (2019) interviewed 25 Gen Zers and these Gen Zers deemed social media platforms as major sources to connect with their friends and families. Statistics also show that billions of active users are on social media worldwide (see Table 1; Lau,

[1] Source of Statisca.com as of September 2008

2019), indicating that it is a pervasive phenomenon that social media is a part of people's daily lives.

Table 1

Leading 15 Social Media Platforms Worldwide as of January 2019

Platform	Monthly Active Users (Millions)
Facebook	2230
WhatsApp	1500
Messenger	1300
WeChat	1060
Instagram	1000
QQ	861
Tumblr	642
QZone	632
Tik Tok	500
Sina Weibo	392
Twitter	335
Reddit	330
Baidu Tieba	300
LindkedIn	294
Viber	260

American Psychological Association (2018) did a survey among Gen Z (born in 1997-2003) and older adults. Results suggested that Gen Z reported to experience higher stress level for various national news including "mass shootings", "rise in suicide rates", "climate change and global warming", "separation and deportation of immigrant and migrant families", and "widespread sexual harassment and assault report" as compared to older generations. Gen Z also reported lower mental health status than older generations. It is worth studying how social media connects to Gen Z's emotion perspectives as well as other related areas that will be discussed later in this chapter.

Social Media Activity

There is not a universal standard questionnaire for measuring social media activity. How researchers measure social media activity depends on which aspects they include in their research question. In this research, the first study explores social media activity generally and asks Gen Zers to report their time spent on social media for communication purposes, time spent for non-communication purposes, and number of friends they have on each platform.

The second study explores and discusses social media activity specifically for each platform. Thus, it approaches social media activity in a detailed manner including Gen Z's perception of social media generally (example item, "I can see social media as a competition"), how much time they access social media generally on each device (i.e., mobile, tablet, laptop, and other), for what purposes they use a specific platform (e.g., communication, entertainment, kill time, etc.), number of friends they have on a specific platform, and their perception/attitudes of a specific platform (example item, "I am a different person when I am on Facebook").

What are Emotions?

Researchers from different backgrounds provide various definitions of emotions. Kleinginna and Kleinginna (1981) reviewed 101 definitions of emotions proposed by previous researchers and provided the following conclusive definition:

> Emotion is a complex set of interactions among subjective and objective factors, mediated by neural/hormonal systems, which can (a) give rise to affective experience such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate wide spread physiological adjustments to the arousing conditions; and (d) lead to behavior that is often, but not always, expressive, goal-directed, and adaptive. (p.355)

Generally, emotions are different from feelings, moods, or attitudes (Scherer, 2005). They are elicited by identifiable stimulus/stimuli and reflect how individuals process as well as interact with that stimulus/those stimuli. As a result, it is important to understand individuals' emotional experiences to better understand their interactions interpersonally and intrapersonally.

Emotion Perspectives

Emotion Regulation

Thompson (1994, p.27-28) suggested the definition, "emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals." Based on this definition, when emotions emerge, people utilize various processes to cope with emotions. These different strategies people use are intended to regulate their emotion. Gross (1998) proposed an emotion regulation process model suggesting that people would experience behavioral, experiential, and physiological response tendencies after receiving emotional cue(s) and before they respond to their emotion(s) (Figure 1).

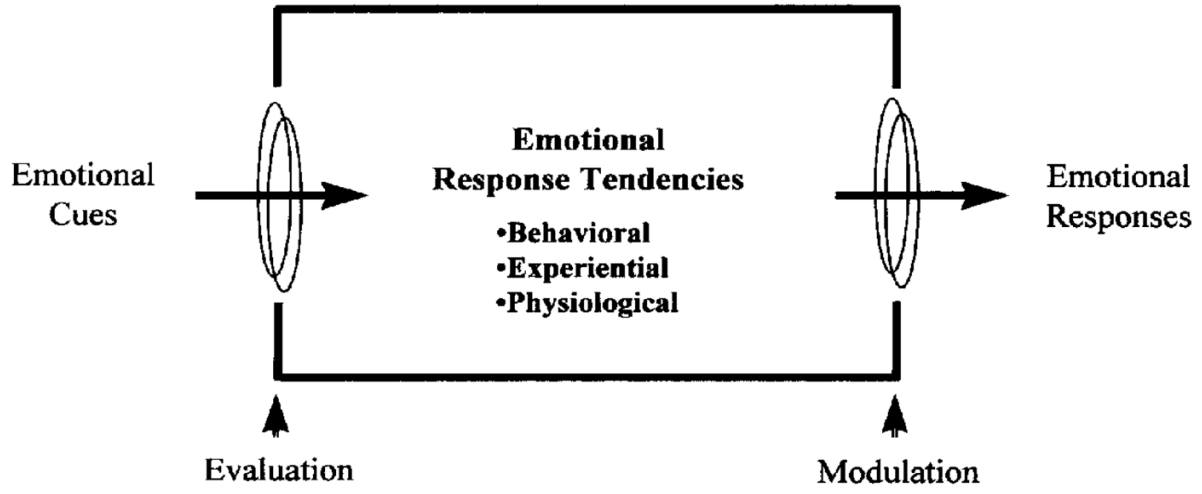

Figure 1. Model demonstrating the overarching process of emotion regulation. (Gross, 1998).

Gross (2002) further explained the process of emotion regulation by proposing a more detailed model demonstrating five stages of emotion generative process (Figure 2): situation selection (e.g., on the night before a job interview, whether choosing to get last minute preparation, or to watch your favorite TV shows to make you relaxed), situation modification (e.g., when you have chosen to prepare, whether you choose to prepare for things you are not familiar with, or to focus on things you already know), attentional deployment (e.g., when you have chosen to prepare for things you are not familiar with, whether you distract yourself from thinking about it, or you let yourself think about how terrible it is for not knowing those aspects), cognitive change (e.g., whether you think not getting this job means you are a failure, or you think the company is not the perfect choice for you and you will get a better opportunity in the future), and response modulation (e.g., after you failed at the job interview, whether you suppress your feelings from showing to others, or you cry because of the sadness). Gross argued

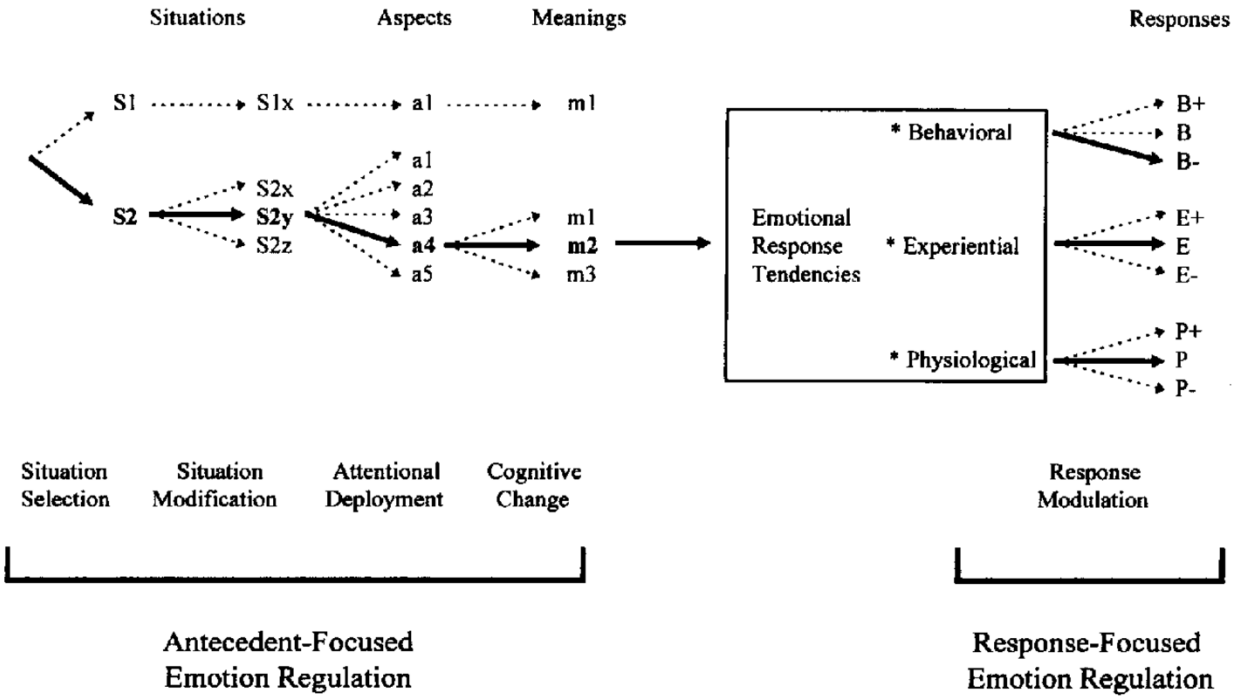

Figure 2. Model demonstrating the detailed processes of emotion regulation. (Gross, 1998).

that emotion response tendencies occur after the first four stages and before the fifth stage emerge. Response modulation deals with experiential, behavioral, or physiological responses that have already been generated from emotions. Thus, the first four stages are "antecedent-focused" emotion regulation strategies, which serve as cognitive reappraisal (CR) strategies, while the fifth one is "response-focused" strategy, which serves as expressive suppression (ES) strategy. This model helped to explain the internal processes for why individuals reacted differently to similar stimuli from emotion regulation perspective, which built the fundamental for this research.

Emotional Expressivity

Individuals express emotions differently and these individual differences were defined as emotional expressivity (Gross & John, 1995). Some people tend to express emotions outwardly, while others are more likely to hold emotions towards themselves. Gross and John proposed a model suggesting that emotions are generated after an input, and due to various response tendencies people have, people may demonstrate different emotional expressive behaviors. Gross and John also suggested that emotional expressivity should be measured from three aspects: impulse strength (IS; i.e., the strength of emotions people feel), positive emotionality (PE; i.e., the extent to which people express positive emotions overtly), and negative emotionality (NE; i.e., the extent to which people express negative emotions overtly). Emotion expression happens after emotion regulation. Consequently, how people regulate their emotions would partly determine how they express these emotions. For example, if individuals tend to regulate their negative emotions by suppressing them, these individuals will definitely score less on NE because they have chosen to suppress their negative emotions.

Self-Regulation

Boekaerts, Pintrich, and Zeidner (2000, p. 14) defined self-regulation as "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals." They also argued that self-regulation may change due to personal, environmental, and behavioral factors.

Baumeister and Heatherton (1996) reviewed previous literature and proposed that self-regulation consistes of three components: standards, monitoring, and operation. They explained failures in self-regulation as follows,

> Underregulation occurs because people lack stable, clear, consistent standards, because they fail to monitor their actions, or because they lack the strength to override the responses they wish to control. Misregulation occurs because they operate on the basis of false assumptions about themselves and about the world, because they try to control things that cannot be directly controlled, or because they give priority to emotions while neglecting more important and fundamental problems. (p. 13)

Baumeister and Heatherton (1996) concluded that successful self-regulation requires appropriate (i.e., not too high or too low) standards or goals, constantly keeping track of what they are doing, and taking actions towards the goals that have been set.

Personal Characteristics

Self-Esteem

Coopersmith (1967) defined self-esteem as:

> The evaluation which the individual makes and customarily maintains with regard to himself: it expresses an attitude of approval and indicates the extent to which an individual believes himself to be capable, significant, successful and worthy. In short,

> self-esteem is a personal judgment of the worthiness that is expressed in the attitudes the individual holds towards himself. (p. 4-5)

Self-esteem refers to how individuals feel about their own worthiness. Research has shown that individuals' self-esteem is positively correlated with their happiness (Branden, 1994; Diener & Diener, 2009; Furnham & Cheng, 2000; Shackelford, 2001) and mental health (Taylor & Brown, 1988). In addition, individuals who have low self-esteem are more likely to show depression (Robinson, Garber, & Hilsman, 1995; Tennen & Affleck, 1993). It is necessary to explore self-esteem to better understand Gen Z's emotional experiences and well-being.

Personality

Magnavita (2002, p. 16) defined personality as, "an individual's habitual way of thinking, feeling, perceiving, and reacting to the world." Schultz and Schultz (2016, p. 9) suggested that personality is "an enduring and unique cluster of characteristics" and is generally stable. They explained that personality may adjust according to various situations; however, it is less likely to change upon sudden stimulus/stimuli. Schultz and Schultz also reviewed the relationship between personality and culture and found that individuals from different cultural backgrounds differ in quite a few characteristics, which can be explained by personality traits, such as optimism (Endo, Heine, & Lehman, 2000), anxiety levels (Lee, Okazaki, & Yoo, 2006), individuality (Kashima et al., 2004), and self-enhancement (Heine, Takata, & Lehman, 2000). This research approaches personality traits from Big Five Personality dimensions.

Goldberg (1990) reviewed previous models of personality based on five factors, which were found to be the only few that were replicable, and labeled them as Extraversion (or Surgency), Agreeableness, Conscientiousness, Neuroticism (or Emotional Stability), and Openness to Experience (or Culture). Extraversion indicates one's sociability, activeness (Judge,

Higgins, Thoresen, & Barrick, 1999), and pleasurable arousal (Abe & Izard, 1999). Research suggested that extraverts were more sociable, energetic, and ambitious (Watson & Clark, 1997). Agreeableness illustrates one's cooperativeness, likeability (Judge et al. 1999), sympathy, and helpfulness (Abe & Izard, 1999). Research has shown that agreeable individuals are more likely to experience positive emotions (McCrae & Costa, 1991). Conscientiousness represents one's organization, persistence (Abe & Izard, 1999), achievement orientation, dependability, and orderliness (Judge et al. 1999). Research has demonstrated that conscientious individuals are more aware of self-control and need for achievement (Costa, McCrae, & Dye, 1991). Neuroticism is "a lack of positive psychological adjustment and emotional stability" (Judge et al., 1999, p. 624), and reflects one's vulnerability to psychological distress (Ross et al., 2009). Costa and McCrae (1992) measured neuroticism from six dimensions: anxiety, hostility, depression, vulnerability, impulsiveness, and self-consciousness. Openness includes "intellectance (philosophical and intellectual) and unconventionality (imaginative, autonomous, and nonconforming)" (Judge et al., 1999, p. 625).

Attention-Deficit/Hyperactivity Disorder (ADHD)

According to DSM-5 (American Psychiatric Association, 2013), ADHD symptoms include two dimensions: (a) inattention and (b) hyperactivity and impulsivity. Inattention includes, but is not limited to, making careless mistakes, thinking about other things when spoken to directly, and getting distracted easily by others or unrelated thoughts. Hyperactivity and impulsivity include, but are not limited to, fidgeting with hands/feet or squirming, feeling restless, talking excessively, and blurting out an answer when it is not his/her turn. ADHD symptoms vary with the development of an individual (i.e., they have different criteria for children, adolescents, and adults). It is crucial to take individual's onset into account for

diagnosis. However, this research will only focus on the level of ADHD symptoms for adults instead of the criteria for diagnosis clinically.

Depression

DSM-5 (American Psychiatric Association, 2013) lists nine symptoms of a Major Depressive Disorder (MDD) diagnosis. These symptoms include, but are not limited to, having depressed mood most of the time, losing interest or pleasure in almost all activities, having insomnia/hypersomnia most of the time, and feeling fatigue most of the time. This research will only focus on the level of depressive symptoms instead of MDD diagnosis criteria clinically.

Social Media, Emotion Perspectives and Personal Characteristics

Social Media and Emotion Regulation, Emotional Expressivity, and Self-Esteem

Li (2019a) reviewed social media use and emotion regulation and found that undergraduates demonstrated more difficulties regulating their emotions if they reportedly used social media platforms excessively (Hormes, Kearns, & Timko, 2014; Spada & Marino, 2017). Specific social media activity (i.e., watching cat related videos) could possibly help provide individuals relief from negative emotions (Myrick, 2015).

Limited research has explored the relationship between social media and emotional expressivity. Oldmeadow, Quinn, and Kowert (2013) found that individuals with high emotional expressivity were less likely to use Facebook when they experienced negative emotions and tended to show less concern about others' thoughts about themselves.

Li (2019a) also reviewed social media use and self-esteem and found that the relationship between social media use and self-esteem was complicated. Some research argued this relationship to be simpler than others. These authors suggested self-esteem was negatively associated with social media use among adolescents (Errasti, Amigo, & Villadangos, 2017),

undergraduates (Ehrenberg, Juckes, White, & Walsh, 2008; Mehdizadeh, 2010), and individuals in general (age ranged from 16 to 88 years; Andreassen, Pallesen, & Griffiths, 2017). Whereas other research argued this relationship has several mediators. The relationship partly depends on what feedback individuals receive on social media (Valkenburg, Peter, & Schouten, 2006). Adolescents showed increased self-esteem after receiving positive feedback and decreased self-esteem after receiving negative feedback. The relationship also partly depends on what social media activities individuals engage in more often (Gonzales & Hancock, 2011). Specific social media use such as viewing one's own profile page could help to enhance individual's self-esteem. Individuals who were more often making upward social comparisons (i.e., i.e., comparing themselves with superior individuals showing positive characteristics) expressed lower self-esteem (Vogel, Rose, Roberts, & Eckles, 2014).

Considerations. As a result, this research assumes the following hypotheses. *H1*: Gen Z's social media activity correlates with their emotion regulation strategy use; *H2*: Gen Z's social media use is linked to their emotional expressivity; and *H3*: Gen Z's social media use is related to their self-esteem.

Social Media and Personality Traits

Individuals with different personality traits may have various behaviors and choices for the same situation. Li (2019a) reviewed the relationship between social media use and personality traits based on Big Five dimensions and found that personality traits did predict part of their social media activities.

Extraverts have been found to spend more time and have more friends on social media than introverts (Amichai-Hamburger & Vinitzky, 2010; Correa, Hinsley, & De Zuniga, 2010; Ryan & Xenos, 2011). Extraverted individuals, when they also reported high self-presentation,

were more likely to communicate and show their emotions on social media (Seidman, 2013). However, some research disagreed (Ross et al., 2009) and suggested that time spent on social media and number of friends was not connected to extraversion. Some potential reasons for these inconsistencies could be that there are several potential mediators of this relationship. Thus, more variables should be considered to understand this relationship more comprehensively.

Research has shown that individuals with high agreeableness tend to experience and show positive emotions (Liu, Preotiuc-Pietro, Samani, Moghaddam, & Ungar, 2016; McCrae & Costa, 1991). Due to their characteristics of likeability, researchers hypothesized that they should have more friends on social media than those with low agreeableness (Amichai-Hamburger & Vinitzky, 2010; Ross et al., 2009). However, no correlation was found between agreeableness and number of friends on social media (Amichai-Hamburger & Vinitzky, 2010; Correa et al., 2010; Ross et al., 2009).

Conscientiousness has been found to positively correlate with self-control, goal-oriented behaviors (Costa et al., 1991), and number of friends on Facebook (Amichai-Hamburger & Vinitzky, 2010). Conscientious undergraduates were less likely to post pictures (Amichai-Hamburger & Vinitzky, 2010), "like" others' posts, and join group activities on social media (Kosinski, Bachrach, Kohli, Stillwell, & Graepel, 2014).

Research has shown that individuals with high neuroticism are more sensitive to negative events (Judge et al., 1999). These individuals also were more devoted in writing and receiving messages (Butt & Phillips, 2008), willing to share personal information (Seidman, 2013), and likely to use negative words on social media (Schwartz et al., 2013).

Finally, open individuals have been found to spend more time on social media (Correa et al., 2010), and have more friends (Quercia, Lambiotte, Stillwell, Kosinski, & Crowcroft, 2012).

Open individuals also were more likely to "like" others' posts (Bachrach, Kosinski, Graepel, Kohli, & Stillwell, 2012), and utilize more functions of social media (Ross et al., 2009). Correa et al. (2010) further explained that openness only showed positive correlation with time spent among females and adults (30 and older) but not among males or young adults (18-29 years old).

Considerations. This study asserts the following hypothesis. *H4*: Gen Zers who score differently on Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness differ in their social media activity.

ADHD, Social Media, and Emotion Perspectives

Adolescents who scored higher on the ADHD symptom scale have been found to show more addiction to Facebook (Gul, Yurumez Solmaz, Gul, & Oner, 2018; Settanni, Marengo, Fabris, & Longobardi, 2018; Wiederhold, 2019). In addition, they also had more cravings for social networking sites and accessed social media more often while driving than those who scored lower in ADHD symptom scale (Turel & Bechara, 2016). Andreassen et al. (2016) explained this correlation by suggesting that children/adolescents could avoid doing schoolwork because of those distractions (e.g., constant notifications and updates on social media). More research explored internet use and ADHD symptoms, suggesting that ADHD was correlated with internet overuse (Carli et al., 2013; Kuss, Griffiths, Karila, & Billieux, 2014; Yen, Ko, Yen, Wu, & Yang, 2007; Yoo et al., 2004). Kittinger, Correia, and Irons (2012) hypothesized that ADHD and depression were risk factors for internet overuse.

Research showed that challenges in emotion regulation were more likely to be found among children (Walcott & Landau, 2004; Wheeler Meadgen, & Carlson, 2000) and adolescents (Barkley, 2014) with ADHD as compared to typically developing children and adolescents accordingly. Wehmeier, Schacht, and Barkley (2010) explained this relationship by suggesting

that it was because ADHD individuals tended to demonstrate deficits in response inhibition, which was supported by previous research (Nigg, 1999; Scheres et al., 2004; Wodka et al., 2007).

Research has more often explored the relationship between emotional reactivity and ADHD individuals instead of emotional expressivity. Emotional expressivity and emotional reactivity could be seen as similar variables but from a slightly different angle. Musser et al. (2011) measured the emotional reactivity of children with ADHD and typically developing children across four conditions (i.e., negative induction, negative suppression, positive induction, and positive suppression of affect). In induction conditions, children were asked to replicate the facial expressions of the emotions they saw from a character. These emotions were either positive or negative and were reflected by the conditions. In suppression conditions, children were asked to imagine how the character they saw feel and not to show their emotions facially. Results suggested that children with ADHD showed a relatively stable trend in respiratory sinus arrhythmia (i.e., an index associated with emotion regulation) across four conditions, whereas typically developing children demonstrated more activation for negative emotion than positive emotion and more activation for suppression than induction. Based on this finding, it is reasonable to argue that typically developing children were more actively involved in emotion regulation processes than children with ADHD, suggesting that deficits in respiratory sinus arrhythmia among individuals with ADHD should partly explain their challenges in successfully regulate their emotions.

Considerations. This research proposes the following hypotheses. *H5*: Participants with higher scores on ADHD symptoms have different patterns in social media activity as compared to those with lower scores on ADHD symptoms; *H6*: ADHD symptoms are correlated with emotion regulation strategy use; *H7*: ADHD symptoms are linked to emotional expressivity level.

Depression, Social Media, and Emotion Perspectives

The relationship between social media use and depression is more complicated than its relationship with ADHD symptoms. Some research has argued that time spent on Facebook has no correlation with depression (Jelenchick, Eickhoff, & Moreno, 2013), and even decreases depression if it does not trigger feelings of envy (Tandoc, Ferrucci, & Duffy, 2015). However, more typically research has suggested that time spent on social media is positively connected with depression (Bessière, Pressman, Kiesler, & Kraut, 2010; Koc & Gulyagci, 2013; Kross et al., 2013; Lin et al., 2016; Woods & Scott, 2016). Those who used more (i.e., 7-11) social media platforms were found to report more depression and anxiety than those who used fewer (i.e., 0-2) platforms (Primack et al., 2017) when total time spent was controlled. Bessière et al. (2010) further explored this relationship by asking participants to report their time spent for communication (e.g., chatting with friends and families) versus non-communication (e.g., getting news and other information) purposes and found that time spent on communication purposes negatively correlated with depression. Shaw and Gant (2004) conducted an experiment and further developed this relationship into a causal one: more time spent on communication online could lead to less depression and higher self-esteem.

Li (2019b) reviewed the relationship among depression, social media activity, emotional expressivity, and emotion regulation strategies and integrated the findings into a model (Figure 3). Individuals who reported to have more depressive symptoms were found to show less emotional reactivity (Bylsma, Morris, & Rottenberg, 2008; Rottenberg, Kasch, Gross, & Gotlib, 2002), partially mediated by ethnicity (Chentsova-Dutton et al. 2007;

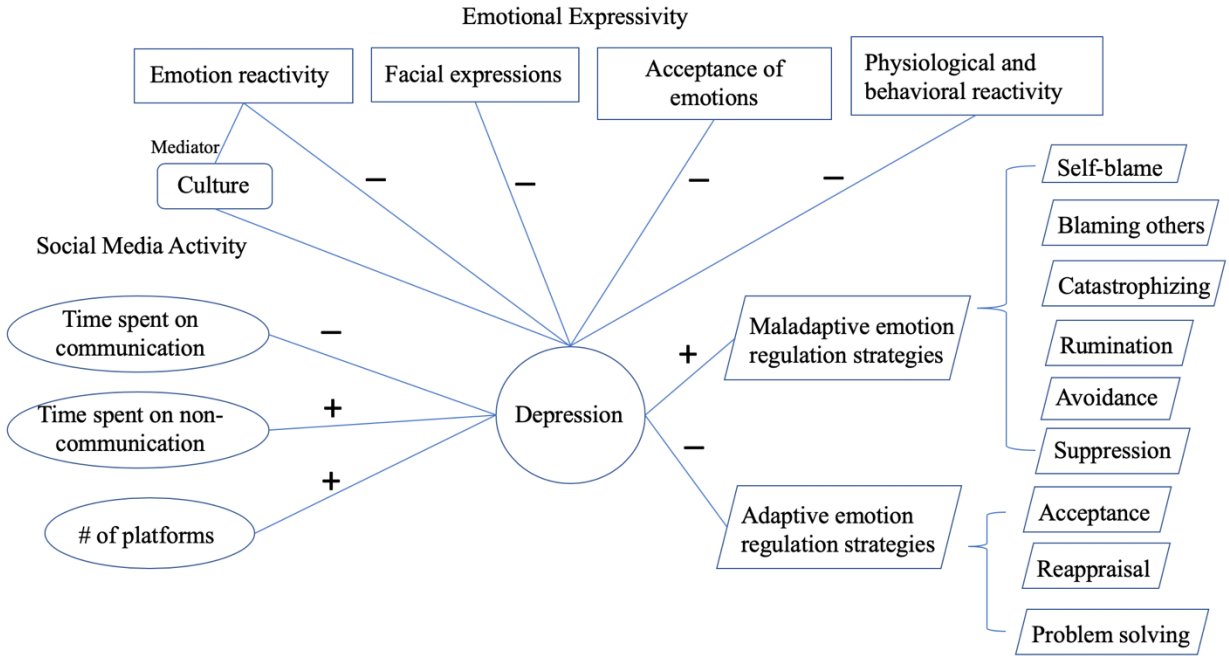

Figure 3. Diagram suggests relationships among social media activity, emotional expressivity, emotion regulation, and depression. "-" suggests negative correlation, whereas "+" indicates positive correlation. Culture mediates the relationship between emotion reactivity and depression.

Chentsova-Dutton, Tsai, & Gotlib, 2010). For example, when watching an amusing film, depressed European Americans demonstrated fewer positive emotions and less cardiac reactivity, whereas depressed Asian Americans showed more positive emotions and more cardiac reactivity as compared to respective control groups), fewer facial expressions (Gaebel & Wölwer, 2004), less physiological and behavioral reactivity (Gross & Levenson, 1997), and fewer acceptance of their own emotions (Flynn, Hollenstein, & Mackey, 2010). Research also suggested that depressive individuals tended to adopt more often maladaptive emotion regulation strategies (e.g., rumination, avoidance, and suppression) and less often adaptive emotion regulation strategies (e.g., acceptance, reappraisal, and problem solving; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Garnefski & Kraaij, 2006; Gross & John, 2003; Martin & Dahlen, 2005; Matheson & Anisman,

2003; Nolen-Hoeksema, Larson, & Grayson, 1999; O'Connor, O'Connor & Marshall, 2007; Segerstrom, Tsao, Alden, & Craske, 2000). Also, the maladaptive emotion regulation strategies that depressive individuals tended to use kept their depressive symptoms from getting better without intervention (Joormann, 2010).

Considerations. This research asserts the following hypotheses. *H8*: Participants with higher scores on depression have different patterns in social media activity as compared to those with lower scores on depression; *H9*: Depression is correlated with emotion regulation strategy use; *H10*: Depression is linked to emotional expressivity level.

Social Media and Stress

Researchers have approached stress from different perspectives. Some research discussed whether social media could be a stressor to social media users. For example, Li and McCaslin (2019) asked participants how they would feel if they cannot get access to social media. Five out of 25 participants' answers were coded into "anxious, left out, and not being up to date". Beyens, Frison, and Eggermont (2016) measured adolescents' score on the Fear of Missing Out scale (FoMO; Przybylski, Murayama, DeHaan, & Gladwell, 2013) and found that adolescents who scored higher on FoMO spent more time on Facebook, reported being unpopular on Facebook to be more stressful (example item: "Receiving little or no 'likes' on a post, picture, or video that I posted on my timeline"), and reported not belonging to a group on Facebook to be more stressful (example item: "Not being invited for a Facebook group"). Facebook was found to serve as both stressor and protector during one's gender transition (Haimson, Brubaker, Dombrowski, & Hayes, 2015). American Psychological Association (2018) found that 55% of Gen Z participants reported social media to be a supportive platform, whereas 45% said it made them "feel judged". Thirty-eight percent of Gen Z participants said they felt bad because of their use of social media.

Other researchers examined how social media linked to users' general stress level. Research showed that users' stress level was reflected and detected by their posts on Twitter (Lin et al., 2014; Lin, Jia, Nie, Shen, & Chua, 2016). In addition, more friends on Facebook was found to link to lower stress level (Nabi, Prestin, & So, 2013), indicating that number of friends may serve as a protective factor for stress.

Considerations. This research explores how Gen Z's general stress level relates to social media use; one goal is to explain the underlying mechanisms. It proposes the following hypothesis. *H11*: Gen Zers' perceived stress level is associated with their social media activity.

Social Media, Self-Regulation, and Academic Achievement

The relationship between self-regulation and academic achievement has been well examined. Research has found that high self-regulation predicts higher academic achievement among children (Becker, McClelland, Loprinzi, & Trost, 2014; Gestsdottir et al., 2014; Matthews, Ponitz, & Morrison, 2009; McClelland & Cameron, 2011; Morrison, Ponitz, & McClelland, 2010), adolescents (Nota, Soresi, & Zimmerman, 2004; Zimmerman & Kitsantas, 2014), and undergraduates (Komarraju, & Nadler, 2013; Valle Arias et al., 2008). Research also has demonstrated that deficits in self-regulation are associated with Facebook overuse (Błachnio & Przepiorka, 2016; Lee, Cheung, & Thadani, 2012; Ryan, Chester, Reece, & Xenos, 2014), indicating that more time spent on social media may link to lower academic achievement. Not only does time spent on social media correlate with self-regulation, perceptions and attitudes about social media also matter. Research showed that adolescents and undergraduates who valued Facebook more as part of their daily lives demonstrated lower self-regulation and less positive attitudes towards school (Koles & Nagy, 2012). Moreover, personality plays a role in this relationship as well. Rouis, Limayem, and Salehi-Sangari (2011) argued that more time

spent on Facebook was linked to lower academic achievement among extraverted undergraduates. Whereas undergraduates with high self-regulation did not show the previous trend between time spent on Facebook and academic achievement. Thus, variables such as self-regulation and personality may mediate the relationship between social media activity and academic achievement.

Considerations. This research asserts the following hypotheses. *H12*: Social media activity predicts self-regulation level; *H13*: Social media activity correlates with academic achievement.

Based on previous hypotheses, this research uses regression analyses to further explain these relationships and examine more nuanced connections among variables. Specifically, there should be different tiers of variables that explain each other. Variables in the first tier predict those in the second and following tiers, variables in the second tier predict those in the third and following tiers, and so forth. Variables in the same tier may explain each other as well. The researcher proposed the following categorization: first tier reflects individual characteristics that includes participants' standards, rules, and goals (SRGs) about social media, personality traits, ADHD symptoms, depression symptoms, and perceived stress level; the second tier reflects individuals' activities on social media; the third tier reflects their psychological processes that include emotion regulation, self-regulation, and self-esteem; finally, emotional expressivity and academic achievement which reflect observable outcomes are in the fourth tier.

Study I

This study explores how Gen Zers' social media use correlates with their personality traits, emotional expressivity, emotion regulation strategy use, and self-esteem. It also inspects how Gen Zers' psychological symptoms correlate with their social media use. This study tests

psychological symptoms from two aspects: depression and ADHD. It also explores how participants' psychological symptoms contribute to the relationships among social media use, personality, emotional expressivity, emotion regulation, and self-esteem. The study tests *H1, H2, H3, H4, H5, H6, H7, H8, H9, H10*, and *H13* (see Figure 4).

H1: Gen Z's social media activity correlates with their emotion regulation strategy use.
H2: Gen Z's social media use is linked to their emotional expressivity.
H3: Gen Z's social media use is related to their self-esteem.
H4: Gen Zers who score differently on Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness differ in their social media activity.
H5: Participants with higher scores on ADHD symptoms have different patterns in social media activity as compared to those with lower scores on ADHD symptoms.
H6: ADHD symptoms are correlated with emotion regulation strategy use.
H7: ADHD symptoms are linked to emotional expressivity level.
H8: Participants with higher scores on depression have different patterns in social media activity as compared to those with lower scores on depression.
H9: Depression is correlated with emotion regulation strategy use.
H10: Depression is linked to emotional expressivity level.
H13: Social media activity correlates with academic achievement.

Figure 4. Hypotheses that are tested in Study I.

Method

Participants. This study included 137 participants. Participants needed to be within the age range from 18 to 24 years old to participate in this study (M = 19.17, SD = 1.27). Participants were recruited from an Educational Psychology participant pool at in a large southwestern university in the U.S. Participation for this study was one option for partially completing the research engagement course requirement in the Educational Psychology course that contributed to the pool.

Instrumentation. The study implemented seven questionnaires each described subsequently to capture data on: social media use (a self-developed questionnaire; see Appendix A), emotion regulation (Emotion Regulation Questionnaire; ERQ; Gross & John, 2003; see Appendix D), emotional expressivity (Berkeley Expressivity Questionnaire; BEQ; Gross & John,

1995; see Appendix E), self-esteem (Rosenberg Self-Esteem Inventory; RSEI; Rosenberg, 1965; see Appendix F), personality trait (The Big Five Inventory ;BFI; John, & Srivastava, 1999; see Appendix G), depressive symptoms (Center for Epidemiologic Studies Depression Scale; CES-D; Radloff, 1977; see Appendix B), and attention-deficit/hyperactivity symptoms (Adult ADHD Self-Report Scale symptom checklist; ASRS-v1.1; Adler, Kessler, & Spencer, 2003; see Appendix C). See Table 2 for all α's.

Social Media Use Questionnaire. A self-developed five-item brief scale (Li & McCaslin, 2019) measured individuals' social media use. Questions asked participants to report what social media platforms they currently use, how much time they spend on social media per day, and how much time they spend for communication (e.g., commenting and sending messages) versus non-communication purposes (e.g., browsing) per day.

ERQ (Gross & John, 2003). A modified version of the original 10-item scale measured individuals' emotion regulation tendencies from two perspectives: (1) Cognitive Reappraisal (CR; six items; original $\alpha = .79$) and (2) Expressive Suppression (ES; four items; original $\alpha = .73$). Participants answered each item on a seven-point Likert-type scale ranging from one (strongly disagree) to seven (strongly agree). This modified version asked participants to report how they suppress their emotions both in person and on social media for applicable items, which makes this scale a total of 12 items. For example, an item "when I am feeling positive emotions, I am careful not to express them" will be split into two items: "when I am feeling positive emotions, I am careful not to express them through in-person interactions", and "when I am feeling positive emotions, I am careful not to express them through social media." This modification tries to screen individuals' ES more specifically since people may have different levels of suppression with different media.

BEQ (Gross & John, 1995). A modified version of the original 16-item scale measured the extent to which people outwardly display their emotions from three perspectives: (1) negative emotionality facet (six items; α = .70), (2) positive emotionality facet (four items; α = .70), and (3) impulse strength facet (six items; α = .80). Participants answered each item on a seven-point Likert-type scale ranging from one (strongly disagree) to seven (strongly agree). This modified version asked participants to report how they express their emotions in both in-person and social media for applicable items, which makes this scale a total of 29 items. For example, an item "people often do not know what I am feeling" will be split into two items: "people often do not know what I am feeling through in-person interactions" and "people often do not know what I am feeling through social media." This modification aims to screen individuals' emotional expressivity more specifically since people can have different levels of expression with different media.

RSEI (Rosenberg, 1965). A 10-item scale measured both positive and negative feelings about the self and global self-worth (α = .92). Participants answered each item on a Likert scale ranging from strongly agree to strongly disagree. A Likert scale with even number of options does not provide a neutral attitude option and forces participants to choose either more agree or disagree. The study changed the Likert scale from four points to seven points ranging from one (strongly disagree) to seven (strongly agree) to keep participants thinking in a similar mode by having an odd number of options for items assessing agreement throughout the whole questionnaire.

BFI (John, & Srivastava, 1999). A 44-item scale measured individuals' personality traits from five dimensions: Extraversion (eight items; α = .88), Agreeableness (nine items; α = .79), Conscientiousness (nine items; α = .82), Neuroticism (eight items; α = .84), and Openness (10

items; α = .81). Participants answered each item on a five-point Likert Scale from one (strongly disagree) to five (strongly agree).

CES-D (Radloff, 1977). A 20-item scale measured to what extent individuals report depressive symptoms (α = .85 in general population and α = .90 among patients). The scale asked participants to rate how often they experience each symptom over the past week on a four-point Likert scale: "rarely or none of the time (<1 day)", "some or a little of the time (1-2 days)", "occasionally or a moderate amount of the time (3-4 days)", and "most or all of the time (5-7 days)".

ASRS-v1.1 (Adler et al., 2003). An 18-item scale measured to what extent individuals report inattentive symptoms (six items; α = .88) and hyperactive/impulsivity symptoms (12 items; α = .89). The scale asks participants to rate how often they experience each symptom over the past six months on a five-point Likert scale from "never" to "very often".

Procedure. Participants signed up through a department research website to participate in this study. Participants followed the link and completed an online survey on Qualtrics including the questionnaires mentioned above. There was also an item that says, "when you read this, please select 'strongly agree' for this question" to determine if participants read the statements carefully. The data from those participants who failed to choose "strongly agree" for this item (N = 10) were examined separately. The scale also asked participants to report their age and GPA. The total number of items on this scale is 141. All items were randomized and given in one standard order.

Results

The questionnaires for the expressive suppression (ES) subscale of emotion regulation and three subscales of emotional expressivity were modified to allow consideration of context.

Results indicated that the internal consistencies of modified questionnaires were improved for reported NE as compared to the original questionnaires (Li & McCaslin, 2019; Table 2). In all other subscales, internal consistencies of modified questionnaires decreased as compared to the original questionnaires. It is possible that these decreases in internal consistencies may due to the randomization of items across scales. It is also possible that the modification of the scales (i.e., adding "in person" and "through social media" at the end of the statement) was difficult for participants to process.

Table 2

Descriptive Statistics for Two Modified versus Original Questionnaires

	Mean (SD)		Cronbach's α	
	Modified	Original	Modified	Original
Emotion Regulation				
Expressive suppression in person	3.85 (1.09)	3.18 (1.31)	.68	.82
Expressive suppression through social media	5.30 (1.13)		.65	
Emotional Expressivity				
Negative emotionality in person	3.82 (.98)	3.47 (.93)	.69	.46
Negative emotionality through social media	2.36 (1.12)		.70	
Positive emotionality in person	5.56 (.77)	5.64 (1.39)	.45	.79
Positive emotionality through social media	3.76 (1.03)		.43	
Impulse strength in person	4.65 (1.11)	5.40 (1.21)	.71	.84
Impulse strength through social media	2.17 (1.28)		.78	

Social media use descriptive statistics. This study collected participants' social media use from various aspects (Table 3). The questions on time spent on social media asked participants to report how much time they typically spent on social media per day. Data suggested that Gen Z on average used more than four social media platforms currently and spent over three and a half hours on social media per day. One participant out of 137 reported to not

use any social media platforms, but at the same time reported to use social media on average 3.59 hours per day. Surprisingly, four participants reported to spend over eight and a half hours per day on social media, of which one participant reported to spend 18.6 hours per day. These participants were full time students. The 18.6-hour participant was an outlier. Additionally, spending 18.6 hours per day on social media suggests that this participant on average slept at most 5.4 hours and that he/she was always on social media (i.e., while eating, taking showers, taking classes, etc.).

Table 3

Descriptive Statistics for Participants' Social Media Use

	Median	Mean	SD	Min	Max	Skewness		Kurtosis	
	(Per day in hours)					Stat	SE	Stat	SE
Overall Time Spent	3.0	3.59	2.29	.5	18.6	2.84	.22	14.93	.43
Commun Time Spent	1.6	2.20	1.78	.0	8.0	1.44	.23	1.91	.45
Non-Commun Time Spent	2.0	2.74	1.93	.1	9.2	1.07	.23	.91	.45
# of Platforms Currently Use	4	4.16	1.37	0	8	.58	.22	.28	.43

Interestingly, the sum of average time spent for communication purposes and non-communication purposes among all participants was 37.6% larger than their reported average overall time spent on social media. There are three possible explanations. One is that participants were not sure what purposes they were for when they were on social media and there was an overlap between communication and non-communication purposes; or both purposes were active at the same time (e.g., sharing news with friends). Second is that participants underestimated their overall time spent on social media. When they were asked to report individually for different purposes, they possibly did more reflections about themselves as compared to when they were asked to report overall time spent, which may result in this discrepancy. Finally, they

may underestimate time spent for each purpose since it was easier to think about total time spent than pieces. Taking these descriptive statistics together, we can conclude that social media is definitely a large part of Gen Z's daily lives and it probably has different meanings to them as compared to older generations.

Data suggested that the majority of participants actively used platforms including Snapchat (94.89%), Instagram (94.16%), Facebook (68.61%), and Twitter (64.96%; Figure 5). Facebook has been studied more than any other social media platform in the literature and was thought to be the most popular platform. However, more Gen Zers are on Snapchat and Instagram than Facebook.

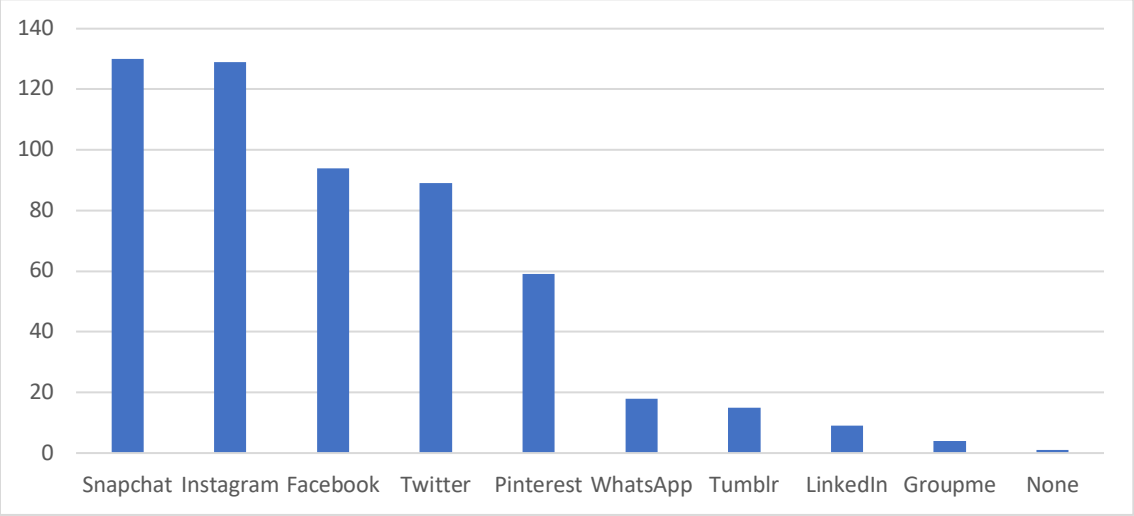

Figure 5. Histogram demonstrating number of participants on each platform ($N = 137$).

Emotion perspectives on social media versus in-person. This study split applicable questionnaire items into two versions, which asked participants to report separately their emotion experiences on social media versus in in-person interactions. Applicable items existed in ERQ (i.e., ES subscale) and BEQ (i.e., all three subscales). Paired samples t-tests were conducted accordingly to see if participants demonstrated different emotional patterns on social media as

compared to when they were with other people. Results suggested that participants reported significantly different ES, NE, PE, and IS when they were on social media as compared to in person (Table 4). These results suggested that participants were more likely to express more emotions in in-person interactions than on social media.

Table 4

Descriptive Statistics for Emotion Perspectives on Social Media versus In-Person

	Expre_Suppresion		Neg_Emotion		Pos_Emotion		Imp_Strength	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
IP	3.85	1.09	3.82	.98	5.56	.77	4.65	1.11
SM	5.30	1.13	2.36	1.12	3.76	1.03	2.17	1.28

Note. All four conditions, p <.001.

Bivariate correlation testing hypotheses. A bivariate Pearson correlation was conducted among all interval and ratio variables (see Appendix K). Missing data (1.68%) were replaced with sample means accordingly. Data from participants who failed at attention check were excluded from the following analyses, which reduced the sample size to 127.

Results supported *H1* (i.e., Gen Z's social media activity correlates with their emotion regulation strategy use). Gen Z's ES (one subscale of emotion regulation) in in-person interaction positively correlated with their overall time spent (r = .25, p = .004), time spent for communication (r = .19, p = .049), and time spent on non-communication purposes (r = .27, p = .004) on social media.

Results also supported *H2* (i.e., Gen Z's social media use is linked to their emotional expressivity). Overall time spent on social media positively linked to NE in social media interaction (r = .23, p = .02) and IS in social media interaction (r = .25, p = .005), whereas it

negatively correlated with PE among in-person interaction (r = -.20, p = .03). Time spent on communication purposes was positively associated with IS in social media interaction (r = .20, p = .04). Number of platforms participants currently used was positively correlated with IS in in-person interaction (r = .21, p = .02).

However, results failed to support *H3* (i.e., Gen Z's social media use is related to their self-esteem). No reported social media activity related to self-esteem. Results partly supported *H4* (i.e., Gen Zers who score differently on Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness differ in their social media activity). Time spent on non-communication purposes negatively correlated with Conscientiousness (r = -.24, p = .01). Time spent on communication purposes was not found to correlate with any personality trait. Extraversion, Neuroticism, and Openness did not link to any social media activity.

Results supported *H5* (i.e., participants with higher scores on ADHD symptoms have different patterns in social media activity as compared to those with lower scores on ADHD symptoms). Gen Z's score on ADHD Inattentive symptoms positively correlated with time spent on non-communication purposes (r = .22, p = .02) but no other social media activity was associated with ADHD symptoms. Results supported *H6* (i.e., ADHD symptoms are correlated with emotion regulation strategy use). Gen Z's score on ADHD Inattentive symptoms positively linked to ES in in-person interaction (r = .19, p = .04) but no other emotion regulation strategies were correlated with ADHD symptoms. Results also supported *H7* (i.e., ADHD symptoms are linked to emotional expressivity level). ADHD Hyperactive score positively correlated with IS in in-person interaction (r = .19, p = .03) as well as in social media interaction (r = .20, p = .03).

Results rejected *H8* (i.e., participants with higher scores on depression have different patterns in social media activity as compared to those with lower scores on depression). None of

social media activity correlated with depression, suggesting that those with more depression symptoms did not demonstrate different patterns of social media use as compared to those with fewer depression symptoms. *H9* (i.e., depression is correlated with emotion regulation strategy use) was supported that depression negatively linked to CR (r = -.31, p < .001), suggesting that depressive individuals were less successful in regulating their emotions by cognitively changing the way they were thinking. Results supported *H10* (i.e., depression is linked to emotional expressivity level). Depression positively correlated with IS in in-person interaction (r = .21, p = .02). IS is different from NE and PE that it assessed how individuals felt about the strength of their emotions. NE and PE measured how strong they expressed emotions. Individuals who reported more depression experienced stronger emotions but did not express more emotions than those who reported less depression, which means that they should have adopted more suppression. This discrepancy in emotional expressivity may explain part of individuals' depressive symptoms. Results supported *H13* (i.e., social media activity correlates with academic achievement). Overall time spent on social media was negatively correlated with academic achievement (r = -.19, p = .03), suggesting that spending more time on social media had a potential negative impact on individuals' academic achievement.

Multiple regression model. This study built linear regression models from Tier one to Tier four to explain the relationships among variables with directionality. These models focused on processes within this system to better understand how personal characteristics and social media activities predicted internal processes as well as observable outcomes. Models do not address potential reciprocal relationships among variables (e.g., outcome influences upon personal characteristics).

Predictors for emotion regulation. Stepwise Linear Regressions were conducted to detect how personality traits and social media use explained emotion regulation strategy use. Results suggested 10.3% variance in CR was uniquely explained by Neuroticism (b = -.32, 95% CI = [-.58, -.17], p = .001, sr^2 = .10). Extraversion (b = -.46, 95% CI = [-.75, -.31], p < .001 , sr^2 = .15), time spent on non-communication purposes (b = .24, 95% CI = [.04, .23], p = .006, sr^2 = .05), Neuroticism (b = -.27, 95% CI = [-.59, -.10], p = .006, sr^2 = .05), and Conscientiousness (b = -.21, 95% CI = [-.78, -.08], p = .016, sr^2 = .04) together explained 28.6% variance (p < .001) in In-Person ES. Because Extraversion and Neuroticism were negatively correlated, collinearity diagnostics were conducted (1.00 < *VIFs* < 1.37); plots showed data's homoscedasticity. Extraversion (b = -.26, 95% CI = [-.55, -.07], p = .013, sr^2 = .06) and Agreeableness (b = -.24, 95% CI = [-.87, -.07], p = .022, sr^2 = .05) were predictors of Social Media ES, which explained 16.4% variance (p < .001).

ADHD symptoms and Depression were then included for Stepwise Linear Regression to see if they help personality traits and social media activity explain the variance in emotion regulation strategy use. Results indicated that neither ADHD symptoms nor Depression statistically significantly contributed to explain variance in CR or Social Media ES. ADHD Inattentive symptoms (b = .23, 95% CI = [.11, .78], p = .010, sr^2 = .04) together with Extraversion (b = -.49, 95% CI = [-.79, -.35], p < .001 , sr^2 = .17), time spent on non-communication purposes (b = .24, 95% CI = [.04, .23], p = .006, sr^2 = .05), and Neuroticism (b = -.33, 95% CI = [-.67, -.17], p = .001, sr^2 = .07) explained 29.1% variance in ES in in-person interaction. Collinearity diagnostics were conducted (1.00 < *VIFs* < 2.21) and plots showed homoscedasticity.

Predictors for self-esteem. Results from Stepwise Linear Regressions, analyzing how all interval and ratio variables contribute to explain self-esteem, suggested that Depression (b = -.51, 95% CI = [-1.62, -.89], $p < .001$, $sr^2 = .12$), Conscientiousness(b = .19, 95% CI = [.22, .80], $p = .001$, $sr^2 = .03$), Extraversion(b = .16, 95% CI = [.01, .06], $p = .008$, $sr^2 = .02$), Neuroticism (b = -.18, 95% CI = [-.57, -.03], $p = .028$, $sr^2 = .01$) and CR (b = .18, 95% CI = [.09, .40], $p = .002$, $sr^2 = .03$) together explained 77.4% variance in self-esteem ($p < .001$; $1.08 < VIFs < 1.28$).

Predictors for emotional expressivity. Stepwise Linear Regressions were first conducted to detect how personality traits and social media use explain emotional expressivity. Then ADHD and Depression symptoms were brought into the model. Finally, emotion regulation strategies were added into model to see how they help personality and social media activity contribute to explain emotional expressivity.

Results suggested that Extraversion (b = .23, 95% CI = [.02, .45], $p = .036$, $sr^2 = .04$) and Neuroticism (b = .40, 95% CI = [.21, .70], $p < .001$, $sr^2 = .11$) together explained 11.4% variance ($p = .001$) in NE in in-person interaction. Because Extraversion and Neuroticism were negatively correlated, collinearity diagnostics were conducted ($VIFs$ = .1.37) and plots showed data was homoscedastic. Neither ADHD nor Depression symptoms showed significance. When emotion regulation strategies were brought in, results suggested that In-Person ES (b = -.50, 95% CI = [-.64, -.35], $p < .001$, $sr^2 = .30$), overall time spent on social media (b = .24, 95% CI = [.03, .16], $p = .005$, $sr^2 = .08$), and Neuroticism (b = .28, 95% CI = [.12, .50], $p = .001$, $sr^2 = .06$) served as significant predictors and together explained 38.5% variance ($p < .001$) in NE in in-person interaction. Collinearity was checked ($1.10 < VIFs < 2.10$) and plots showed homoscedasticity.

Results suggested that overall time spent on social media (b = .22, 95% CI = [.01, .18], $p = .035$, $sr^2 = .05$) uniquely explained 4.7% variance in Social Media NE. ADHD and Depression

symptoms did not statistically significantly contribute to the model. After bringing in emotion regulation, In-Person ES (b = .29, 95% CI = [.10, .46], p = .003, sr^2 = .06) and Social Media ES (b = .09, 95% CI = [-.86, -.51], p < .001, sr^2 = .40) together with Conscientiousness (b = -.23, 95% CI = [-.81, -.14], p = .007, sr^2 = .05) explained 41.9% variance (p < .001) in NE on social media.

Agreeableness (b = .32, 95% CI = [.19, .70], p = .001, sr^2 = .09), Extraversion (b = .32, 95% CI = [.10, .44], p = .002, sr^2 = .07), and Neuroticism (b = .21, 95% CI = [.01, .38], p = .042, sr^2 = .03) together explained 20.4% variance in In-Person PE (p < .001). Because these three variables correlated with one another, collinearity diagnostics were conducted (1.11 < *VIFs* < 1.45) and plots showed data were homoscedastic. ADHD and Depression symptoms showed no statistically significant contribution to this model. After adding in emotion regulation, In-Person ES (b = -.32, 95% CI = [-.38, -.09], p = .001, sr^2 = .08), CR (b = .29, 95% CI = [.10, .36], p = .001, sr^2 = .08), and Social Media ES (b = -.25, 95% CI = [-.32, -.04], p = .011, sr^2 = .05) predicted In-Person PE that together explained 36.4% of its variance (p < .001).

Extraversion (b = .23, 95% CI = [.05, .46], p = .016, sr^2 = .05) uniquely explained 5.1% of the variance of Social Media PE. ADHD and Depression symptoms showed no statistically significant contribution to this model. When emotion regulation was brought in, Social Media ES (b = -.51, 95% CI = [-.61, -.30], p < .001 , sr^2 = .26) and CR (b = .18, 95% CI = [.002, .35], p = .048, sr^2 = .03) explained 30.3% variance in PE in social media interaction (p < .001).

Neuroticism (b = .66, 95% CI = [.64, 1.14], p < .001, sr^2 = .30), Openness (b = .48, 95% CI = [.18, .79], p = .002, sr^2 = .06), and Extraversion (b = .28, 95% CI = [.12, .57], p = .003, sr^2 = .06) explained 33.7% of the variance of In-Person IS (p < .001). Because these three variables were correlated with one another, collinearity diagnostics were conducted (1.07 < *VIFs* < 1.41) and plots showed homoscedasticity. ADHD and Depression symptoms showed no statistically

significant contribution to this model. After adding in emotion regulation, In-Person ES (b = -.38, 95% CI = [-.58, -.23], p < .001, sr^2 = .14), together with Neuroticism (b = .55, 95% CI = [.53, .99], p < .001, sr^2 = .29), Openness (b = .20, 95% CI = [.07, .71], p = .018, sr^2 = .04), and time spent for communication purposes (b = .18, 95% CI = [.01, .23], p = .033, sr^2 = .03) explained 42.1% variance in In-Person IS (p < .001; 1.08 < *VIFs* < 1.65).

Overall time spent on social media (b = .25, 95% CI = [.04, .24], p = .009, sr^2 = .06) uniquely explained 6.1% variance in Social Media IS. ADHD and Depression symptoms showed no statistically significant contribution to this model. After adding in emotion regulation, In-Person ES (b = .20, 95% CI = [.03, .47], p = .027, sr^2 = .03), Social Media ES (b = -.76, 95% CI = [-1.09, -.68], p <.001, sr^2 = .41), Conscientiousness (b = -.21, 95% CI = [-.95, -.15], p = .008, sr^2 = .04), and time spent for communication purposes (b = .22, 95% CI = [.05, .28], p = .005, sr^2 = .05) together explained 50.8% variance in Social Media IS (p < .001; 1.07 < *VIFs* < 1.37).

In sum, the explained portion of variance across all subscales in emotional expressivity significantly improved after adding in emotion regulation strategies, which was consistent with previous research that emotional expressivity resulted from emotion regulation and its variabilities should partly be explained by different emotion regulation strategies individuals have adopted.

Predictors for academic achievement. Results from Stepwise Linear Regression after adding in all interval and ratio variables showed that Gen Z's overall time spent on social media (b = -.22, 95% CI = [-.09, -.005], p = .029, sr^2 = .05) and CR(b = -.28, 95% CI = [-.23, -.04], p = .007, sr^2 = .08) predicted GPA (r^2 = .11, p = .005).

To better illustrate the relationships among interval and ratio variables, paths were integrated and demonstrated in the model (Figure 6). Variables with arrow pointing towards

them suggest that they were the dependent variables in this relationship. Bidirectional arrows suggest that two variables contributed to explain each other. As predicted, the flows showed that personality traits explained Gen Z's physical activity (i.e., social media use), emotional activity (i.e., emotion regulation strategy use), and psychological symptoms (i.e., ADHD and Depression symptoms), which predicted their outcomes (i.e., self-esteem, emotional expressivity, and academic achievement).

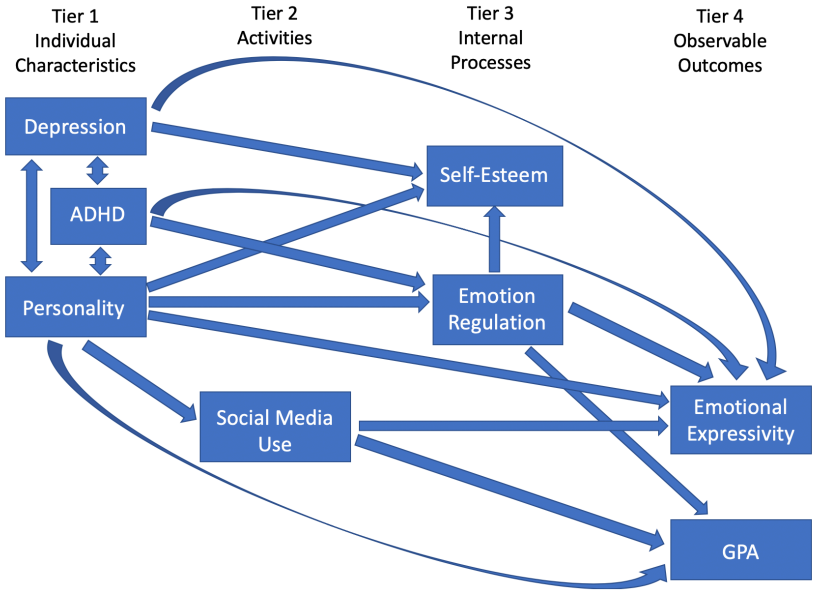

Figure 6. Diagram suggests paths explaining relationships among these variables. Coefficients are not labeled because several variables include subscales and coefficients differ accordingly.

Attention check failures. Welch t-tests, due to drastic difference in sample sizes, were conducted between those who succeeded at attention check ($N = 127$) and those who failed at attention check ($N = 10$). Interestingly, failures reported similar overall time spent on social media ($M = 4.35$, $SD = 2.44$) as compared to successors, but significantly more time spent for communication purposes ($M = 3.69$, $SD = 1.96$) as well as more time spent for non-communication purposes ($M = 4.56$, $SD = 1.96$). Failures reported spending more time for non-communication purposes than their overall time spent on social media, which does not make

sense. It partially indicated that their responses were invalid. It is possibly because either they did not pay attention to questions they received, or they over-underestimated their overall time spent on social media. The researcher assumes that it is more likely the former case because they spent significantly less time on this questionnaire than successors (Table 5).

In addition, failures also reported lower Agreeableness, lower Conscientiousness, higher NE in social media, and higher IS in social media (Table 5). It is possible that their tendencies to show stronger and negative emotions contributed to their personality traits (according to Figure 6). It is also possible that their lack of agreeableness and conscientiousness led them to not take this study seriously. However, further discussion should not be necessary when considering the reliability of these data.

Table 5

Significant Difference Detected Variables Comparisons between Failures and Successors for Attention Check

	Mean (SD)					
	Failures	Successors	df1	df2	t	Sig.
Duration(mins)	14.88(14.18)	26.15(30.07)	1	16.36	4.67	.046
Agreeable	3.39(.57)	4.14(.54)	1	10.29	16.08	.002
Conscientious	3.29(.37)	3.82(.52)	1	12.03	17.89	.001
NE_SM	3.84(.55)	2.36(1.02)	1	15.63	54.89	.000
IS_SM	4.25(.79)	2.17(1.28)	1	13.09	57.14	.000

Discussion

As presented in the model (Figure 6), paths supported previous assumptions that variables on the left predicted those on the right. Based on the model, individuals' characteristics explained how participants utilized social media (e.g., number of platforms they used and time spent on it) and their internal process, which ultimately predicted their observable outcomes such

as emotional expressivity and academic achievement. The underlying system should be more complicated than proposed model. More variables should be added in to better understand this system of how social media plays a role in Gen Z's emotion perspectives.

More Gen Z participants are using Instagram and Snapchat than Facebook. As shown in Figure 7, the percentage of Facebook users does not differ across age groups. However, the percentages of users on Snapchat, Instagram, and Twitter decreases as users' ages increase. Considering that Gen Z's parents and/or grandparents may regularly use Facebook, it is understandable that fewer Gen Z are using Facebook. Gen Z probably use social media for peer interactions more often than, for instance, family support. It seems that Gen Z are "escaping" from platforms that are used by their parents and/or grandparents. In the future, younger generation will probably find a later social media platform that most of the users on this platform are at their similar age.

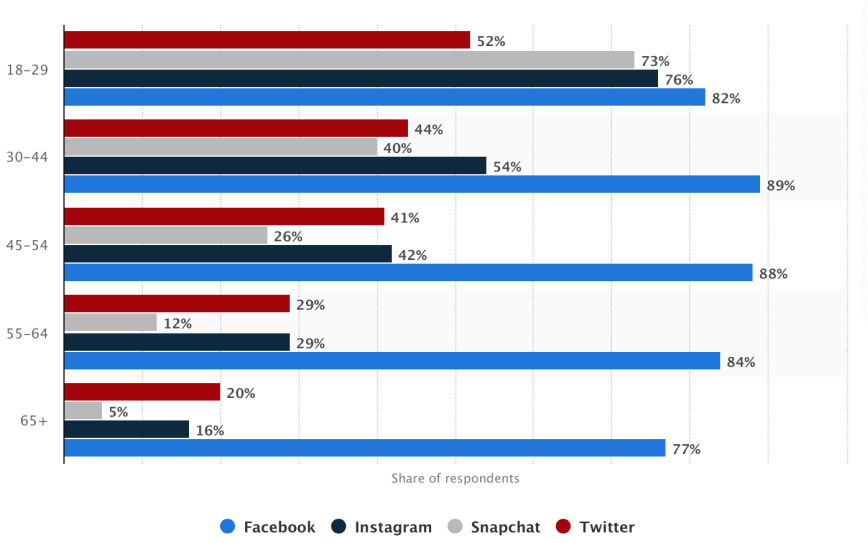

Figure 7. Chart shows the percentage of internet users in the U.S. with accounts on Facebook, Instagram, Snapchat, and Twitter sorted by age group as of February 2018[2]

[2] Source of Statista on May 24, 2018

It is interesting to find that Gen Z reportedly suppressed both their positive and negative emotions more often on social media as compared to when they are physically with other people. It is consistent with Li and McCaslin (2019) that participants described social media as “not real” and “you only see what other people want you to see”. Results demonstrated that adopting a suppressive strategy to regulate in-person emotions only correlated with in-person emotional expressivity aspects. In comparison, adopting a suppressive regulation strategy when on social media correlated with both in-person and online emotional expressivity. This suggests if ES is successful, then individuals should feel less tendency to express their emotions. Gen Zers who tended to regulate their emotions by suppression when they were with other people utilized social media platforms to vent their emotions. Apparently, suppression was not completely effective; the need to express their feelings persisted. This suppression stayed at a superficial level possibly because of the pressure of being with other people. Suppression while with other people may increase their need to find a way to release these feelings. Social media does not require in-person interactions and could be a good option for them. However, those who were able to regulate their emotions by suppression when they were on social media showed “effective” regulation; thus, they felt less need to express their emotions in any case. This is not suggesting that suppression is a better strategy for regulating emotions. It is still unknown whether less emotional expressivity is because participants actually perceived less strong feelings, or because they were more reluctant to show their feelings to anyone. More variables should be included to further explore these relationships. Recall that splitting applicable items into two versions to test emotion perspectives with different media did not improve the internal consistencies of each subscale. However, the drastic mean differences in each subscale suggest it is necessary to distinguish these contexts. In the next study, the modification will use more accessible language

(i.e., using words such as “when people are with me” and “in my posts”). In addition, all participants will complete scales in the same order but items within each scale will be randomized.

ADHD and depressive symptoms contributed to personality traits, which can explain quite a few relationships. Those who reported more inattentive symptoms were less conscientious. Since conscientiousness linked to less social media use and higher GPA, the negative relationship between inattentiveness and conscientiousness may explain their struggles in academia. Inattentiveness inhibits conscientiousness and being in control of what one should versus should not do, which may explain more frequent social media use. Depressive symptoms predicted higher neuroticism and conscientiousness. Though they are conscientious and aware of what they physically doing, neuroticism inhibits CR of negative outcomes, which makes them more vulnerable to negative events. Previous research has suggested that depressive individuals are more likely to adopt maladaptive strategies such as rumination, avoidance, and suppression. These strategies cannot provide long-term support. It is possible that tendencies to ruminate create psychological pressure, which strengthens neuroticism and its negative outcomes, even when individuals are self-aware.

Results demonstrated that more ES predicted less emotional expressivity; whereas adopting a CR strategy predicted the expression of more positive emotions. This pattern is consistent both on social media and in-person. Interestingly Gen Zers who were extraverted, agreeable, and neurotic all reportedly expressed stronger emotions. However, the underlying mechanisms are different. Extraversion and agreeableness were either positively correlated with CR or negatively correlated with ES. Their stronger emotion expressions were either towards positive emotions or overall expressions. On the other hand, neuroticism negatively correlated

with CR; and positively with more negative emotions. Openness did not contribute to any of the variables in the model.

Conscientious Gen Zers were less likely to spend time for non-communication purposes on social media, which is consistent with previous research (Costa, McCrae, & Dye, 1991). Conscientious individuals were more self-aware and goal oriented. They went on social media for the purposes they intended (i.e., communication), and were less likely to get distracted by other stimuli such as news, funny videos, etc. (i.e., non-communication purposes). Their self-awareness and goal orientation could be reasons for their higher academic achievement.

As a result, Gen Z with different personality traits are likely to experience various tendencies to regulate or show their emotions. These different tendencies may explain different strength of needs to express themselves, which was ultimately shown by choosing different activities such as posting on social media or suppressing their emotions. It is necessary to evaluate their purposes more specifically on social media (e.g., having more categories than just communication versus non-communication) to better understand their emotion experiences and behaviors.

Social media use was predicted by emotional expressivity. Specifically, those who are more likely to show stronger feelings, regardless if they are with people or in their posts on social media, are more likely to use social media more heavily (either spend more time or use more platforms). This is consistent with the notion that Gen Z utilize social media to vent their emotions. Results suggested the majority of Gen Zers (83.5%) reportedly used social media for two hours daily or longer. According to the results, Gen Zers should be aware of their usage on social media, especially their overall time spent, when considering its correlation with academic achievement and other negative impacts. Spending too much time could leave them insufficient

time for studying, reflecting about themselves, or even basic daily functioning. Learning to use social media in an efficient way (e.g., getting support and information but not addiction) is important for Gen Z.

Study II

This study aims to investigate if individuals' self-regulation as well as perceived stress level contributes to their social media use, emotional expressivity, emotion regulation, self-esteem, and personality traits. It also explores if using social media has an impact on these variables as reflected by their questionnaire responses. This study also follows the tiers of variables previously discussed (p. 26). The first tier shows individual characteristics that includes participants' personality traits and perceived stress level; the second tier reflects individuals' activities on social media; the third tier demonstrates psychological processes that include emotion regulation, self-regulation, and self-esteem; finally, emotional expressivity and academic achievement which demonstrate observable outcomes are in the fourth tier. This study creates a five-minute break in the middle of the questionnaire. It builds a quasi-experimental design and randomly assigns participants into different conditions providing different instructions on how they should spend these five minutes. The study tests *H1, H2, H3, H4, H11, H12,* and *H13* (see Figure 8). This study also tests whether how they spend those five minutes has an impact on their outcome variables.

H1: Gen Z's social media activity correlates with their emotion regulation strategy use.
H2: Gen Z's social media use is linked to their emotional expressivity.
H3: Gen Z's social media use is related to their self-esteem.
H4: Gen Zers who score differently on Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness differ in their social media activity.
H11: Gen Zers' perceived stress level is associated with their social media activity.
H12: Social media activity predicts self-regulation level
H13: Social media activity correlates with academic achievement.

Figure 8. Hypotheses that are tested in Study II.

Method

Participants. This study recruited 199 participants (Female $N = 169$, Male $N = 25$, Transgender male $N = 1$, Non-binary $N = 2$, Unknow $N = 2$; 61.3% White, 19.6% Hispanic or Latino, 12.6% Asian/Pacific Islander, 2% Black or African American, 2% Mixed, 1.5% Middle Eastern, and 1% Native American or American Indian). Participants needed to be within the age range from 18 to 24 to participate ($M = 19.17$, $SD = 1.05$). Participants were recruited from an Educational Psychology participant pool at in a large southwestern university in the U.S. Participation for this study was one option for partially completing the research engagement course requirement in the Educational Psychology course that contributed to the pool.

Instrumentation. The study implemented seven questionnaires to capture data on social media activity (a self-developed questionnaire see Appendix J), emotion regulation (Emotion Regulation Questionnaire; ERQ; Gross & John, 2003; see Appendix D), emotional expressivity (Berkeley Expressivity Questionnaire; BEQ; Gross & John, 1995; see Appendix E), self-esteem (a short version of Rosenberg Self-Esteem Inventory; RSEI; Rosenberg, 1965; see Appendix F), personality trait (The Big Five Inventory ;BFI; John, & Srivastava, 1999; see Appendix G), perceived stress level (Perceived Stress Scale; PSS; Cohen, Kamarck, & Mermelstein, 1983; see Appendix H), and self-regulation (a revised version of the Self-Regulation Questionnaire; SSRQ; Carey, Neal, & Collins, 2004; see Appendix I). See Table 7 for all α's.

Self-developed Social Media Activity Questionnaire. A 115-item (maximum, depending on how many platforms participants currently use) self-developed questionnaire measured individuals' social media activity on different platforms. There were 15 general questions targeting participants' social media activities and perceptions about social media generally (example item, "I tend to compare myself to others based on social media") that participants

answer based on a Likert-scale from one to seven. These questions were inspired by the answers received from participants in Li and McCaslin (2019). One of the 15 general questions asked participants to check all of the platforms they are currently using. This study adopted every social media platforms participants mentioned using (Li & McCaslin, 2019; i.e., Facebook, Twitter, Snapchat, Instagram, Pinterest, Tumblr, LinkedIn, Reddit, and Tik Tok) and asked participants to report the frequency, purpose, and perception of using these nine social media platforms (example item, "how many times do you post on Facebook per day?"). There was also an "other" option if participants use platforms that are not included in the standard nine. There were 10 items for each platform; the questionnaire will only show questions for platforms that participants have checked in the previous question.

ERQ (Gross & John, 2003). A 10-item scale measured individuals' emotion regulation tendencies from two perspectives: (1) Cognitive Reappraisal (six items; $\alpha = .79$) and (2) Expressive Suppression (four items; $\alpha = .73$). Participants answered each item on a seven-point Likert-type scale ranging from one (strongly disagree) to seven (strongly agree).

BEQ (Gross & John, 1995). A modified version of the original 16-item scale measured the extent to which people outwardly display their emotions from three perspectives: (1) negative emotionality facet (six items; original $\alpha = .70$), (2) positive emotionality facet (four items; original $\alpha = .70$), and (3) impulse strength facet (six items; original $\alpha = .80$). Participants answered each item on a seven-point Likert-type scale ranging from one (strongly disagree) to seven (strongly agree). This modified version asked participants to report how they express their emotions both in in-person and social media for NE subscale, which makes this scale a total of 21 items. For example, an item "it is difficult for me to hide my fear" will be split into two items: "it is difficult for me to hide my fear when I am with other people" and "it is difficult for me to

hide my fear in my posts on social media." The PE and IS subscales will be used in their original version.

A Revised Version of RSEI (Rosenberg, 1965). A 10-item scale measured both positive and negative feelings about the self and global self-worth (α = .92). Participants answered each item on a Likert scale ranging from strongly agree to strongly disagree. The study changed the Likert scale from four-point to seven-point ranging from one (strongly disagree) to seven (strongly agree) to keep participants thinking in a similar mode by having odd number of options for items assessing agreement throughout the whole questionnaire. This study dropped one regular item (#4) and one reversed item (#8; based on the results from student in the same cohort showing these two items have the lowest item-rest scores) to get the equal number of regular and reversed items in the first half and second half (i.e., two regular and two reversed items in the first half, and two regular and two reversed items in the second half).

BFI (John, & Srivastava, 1999). A 44-item scale measured individuals' personality traits from five dimensions: Extraversion (eight items; α = .88), Agreeableness (nine items; α = .79), Conscientiousness (nine items; α = .82), Neuroticism (eight items; α = .84), and Openness (10 items; α = .81). Participants answer each item on a five-point Likert Scale from one (strongly disagree) to five (strongly agree).

PSS (Cohen et al., 1983). A 10-item scale measured individuals' perceived stress level during the last month (α = .85). Participants answered each item (e.g., example item, "In the last month, how often have you found that you could not cope with all the things that you had to do?") on a five-point Likert scale: never (one), almost never (two), sometimes (three), fairly often (four), and very often (five).

SSRQ (Carey et al., 2004). A 31-item scale measured individuals' self-regulation skills towards goal-oriented behaviors (α = .92). Participants answered each item (e.g., example item, "I set goals for myself and keep track of my progress.") on a five-point Likert scale from one (strongly disagree) to five (strongly agree).

Procedure. The study was conducted both online and in person. Half of the participants completed the questionnaires online. The other half completed the questionnaires in person. Participants, regardless of what conditions they were assigned to, completed five anagrams before beginning study instrumentation to attenuate possible influences of recent experience such as using social media while waiting for participating in the study. Participants were directed to the study instruments after finishing the anagrams or working on anagrams for five minutes (whichever came first). The proceed button did not appear until three minutes of working on anagrams to make sure participants did not skip this part.

Each of the six questionnaires testing five dimensions (i.e., emotional expressivity, emotion regulation, self-esteem, stress, and self-regulation) were randomly split in half. In comparison, the scale on personality traits was not cut in half since personality is relatively stable and changes before versus after the in-between-five-minute break were not expected. The social media activity questionnaire was divided into three parts: a) asking participants to report information such as percentage of time spent generally on each device, b) asking participants to report their usage on and perception of each platform individually, and c) attitudes about and perception of social media generally. Parts a, b, and c were presented before the five-minute break. Part c was also presented after the break to detect any possible attitude change due to the break. The experimenter clarified what counted as social media at the beginning of social media activity questionnaire.

Questionnaire order in the first half (i.e., prior to the break) was: perceived stress, personality traits, emotional expressivity, self-regulation, emotion regulation, self-esteem, and social media activity. Questions about social media activity were last to prime participants before the break. All participants received the same items in first half, but the item order within each scale was randomized. In the second half questionnaire order was: perceived stress, emotional expressivity, self-regulation, emotion regulation, self-esteem, and social media activity. All participants received the same items but the item order within each scale was randomized. Participants were assigned to a, b, c, and d accordingly (Table 6). Online participants were randomly assigned to one of the two primary conditions: (a) complete all questionnaires without a five-minute break (first half, second half) and answer one reflection question about what they answered, and (b) complete first half, spend five minutes waiting time as they wish, complete second half, and finally answer two reflections questions to report how they spend those five minutes and what they answered. Condition b received instruction after first half said, "The last piece of the study needs five minutes to load. You can spend the five minutes as you wish, and you will see a "next" button available when it is ready to continue."

Table 6

Table Illustrating the Design of Study II.

Online	a Continuous (No Break)	b Free Time Break
In-Person	c Social Media Break	d No Social Media During Break

In-person participants were randomly assigned to one of two conditions: (c) complete first half, use social media during five minutes waiting time, complete second half, and finally answer two reflections questions to report how they spend those five minutes and their

questionnaire answers, and (d) complete first half, do not use phone during five minutes waiting time, complete second half, and finally answer two reflections questions to report how they spend those five minutes and their questionnaire answers. Participants in condition c and d were asked to bring their personal laptops/tablets to complete questionnaires in a private room in the university library. After finishing the first part of questionnaires, these participants were asked to spend five minutes waiting time. Condition c received instruction said, "The last piece of the study needs five minutes to load. What you will do during this waiting period matters a lot to this research. For research purposes, please use your phone to access social media while you are waiting. Apologies for the delay. I will let you know when it is ready. Thank you." Condition d received instruction that said, "The last piece of the study needs five minutes to load. What you will do during this waiting period matters a lot to this research. For research purposes, please sit here and reflect. Please do not use your phone or laptop to access social media while you are waiting. Apologies for the delay. I will let you know when it is ready. Thank you." The experimenter observed the behaviors of participants who were in condition c and d during the waiting period. Participants who participated at the same time were assigned to the same condition to avoid complications.

The survey also asked participants to report their ethnicity, gender, age, relationship status, and GPA. Participants who were first semester in university reported their GPA in high school. The survey consisted of 165 to 265 questions, depending on how many platforms participants reportedly used.

Results

The internal consistencies for the modified questionnaire subscales (i.e., subscales in emotional expressivity and emotion regulation) also were analyzed in this study (Table 7).

Because none of the subscales had sufficient internal consistency (i.e., $\alpha \geq .70$) in both first and second administrations, mixed ANOVA to examine how five-minute break influenced their responses on various subscales were not conducted among these subscales. Combined social media IS consisted of two items. In addition, IS reflects how strong participants feel their emotions at that moment. Because of the limited number (i.e., two) of modifiable items for social media context, social media IS cannot be reliably measured. Analyses conducted later among ES and emotional expressivity subscales used combined scales instead.

Demographic characteristics. One-way ANOVA tested if participants with different demographic characteristics differed in reported social media activity use and perception, emotion regulation, emotional expressivity, self-esteem, perceived stress, personality traits, and academic achievement.

Table 7

Internal Consistencies (Cronbach's αs) Comparisons among Study I and Study II across Modified Expressive Suppression in Emotion Regulation and Emotional Expressivity

		Exp_IP	Exp_SM	Neg_IP	Neg_SM	Pos_IP	Pos_SM	Imp_IP	Imp_SM
Study I		.68	.65	.69	.70	.45	.43	.71	.78
Study II	Comb	.70	.56	.71	.62	.61	.56	.72	.46
	First	.80	.66	.51	.59	.41	.36	.49	
	Second	.05	.12	.57	.15	.57		.58	

Note. Items were randomly split in half as indicated by first (before break) and second (after break) in Study II. Slashed column indicates the items are too few (i.e., $N = 1$) to calculate reliability for certain subscale.

Ethnicity. Sample sizes for African American ($N = 4$), Middle Eastern ($N = 3$), Mixed ($N = 4$), and Native American ($N = 2$) were limited. Analyses were conducted among White ($N = 122$), Hispanic/Latino ($N = 39$), and Asian/Pacific Islander ($N = 25$) participants.

Results suggested that Asian/Pacific Islander participants used significantly fewer social media platforms as compared to White participants ($p < .001$), and Hispanic/Latino participants ($p = .005$; Table 8). White participants were more likely to use different social media platforms than Asian/Pacific Islander participants ($p = .02$). Asian/Pacific Islander participants reported that they relied on social media more heavily for their relationship (e.g., romantic, family, and friendships); an average of nearly 60% of their relationships were maintained by social media. Since this study was conducted in the U.S., these students were mostly international students. Social media could be the most affordable way to maintain their relationships. In comparison, White participants reported nearly 40% ($p = .05$). White participants reported more extraversion ($p = .03$) and more conscientiousness ($p = .03$) than Asian/Pacific Islander participants (Table 8).

Table 8

Means and Standard Deviations of Selective Variables among White, Latino, and Asian/Pacific Islander Participants

	White Mean (SD)	Latino Mean (SD)	Asian/Pacific Islander Mean (SD)
# of Platform	4.27 (1.37)	4.10 (1.12)	2.88 (1.30)
Extraversion	3.42 (.81)	3.17 (.83)	2.84 (.75)
Conscientiousness	3.75 (.62)	3.65 (.56)	3.31 (.55)

Gender. Mean comparisons were only conducted between males and females because of limited sample sizes in other groups. Results demonstrated that females used more social media platforms ($M = 4.26$, $SD = 1.37$) than males ($M = 3.12$, $SD = 1.20$, $p = .001$). There were also gender differences in the perception of social media. Females liked social media more than males ($p < .001$). Females were more likely to see "social media influencer" as a legitimate career for

themselves than males ($p = .01$). Interestingly, females were more likely to compare themselves with others based on social media than males were ($p < .001$).

Males tended to adopt ES more often to regulate their emotions than females both in-person and on social media ($M_{Male\_SM} = 5.75$, $SD = .96$, $M_{Female\_SM} = 5.45$, $SD = 1.04$, $p = .006$; $M_{Male\_IP} = 4.15$, $SD = .88$, $M_{Female\_IP} = 4.02$, $SD = 1.12$, $p = .04$). Males tended to adopt more CR strategy ($M = 5.39$, $SD = 1.20$) than females ($M = 4.99$, $SD = 1.09$, $p = .01$) as well, indicating males showed more action in regulating emotions. When they were with other people, females reported more IS ($M = 4.93$, $SD = 1.04$) than males ($M = 3.98$, $SD = 1.14$, $p < .001$). In addition, females reported more neurotic traits ($M = 3.32$, $SD = .71$) than males ($M = 2.84$, $SD = .88$, $p = .01$).

Relationship status. There were too few participants reported to be "married" ($N = 3$), "in a relationship, cohabiting" ($N = 8$), "complicated" ($N = 4$), or "other" ($N = 1$), thus mean differences were compared between those who were "single" ($N = 129$) and "in a relationship" (combining cohabiting and non-cohabiting together, $N = 62$). Results suggested that single participants reported to have higher GPA ($M = 3.50$, $SD = .44$), less Neuroticism ($M = 3.18$, $SD = .70$), and lower in-person IS ($M = 4.59$, $SD = 1.08$) than participants who were in a relationship ($M = 3.34$, $SD = .51$, $p = .01$; $M = 3.41$, $SD = .81$, $p = .05$; $M = 5.17$, $SD = 1.07$, $p = .001$ respectively).

Social media use descriptive statistics. This study measured social media use from several perspectives to get a glance at Gen Z's activities on each platform individually. Similarly, the most used platforms among Gen Z were Instagram (93.0%) and Snapchat (92.5%), followed by Facebook (68.8%), Twitter (62.8%), Pinterest (46.2%), Tik Tok (27.6%), Tumblr (8.5%), and Reddit (7.0%). One out of 199 participants (0.5%) reported to not use any social media platforms

currently. Participants on average used more than four social media platforms (M = 4.12, SD = 1.40). They reported their average time spent on each platform per day individually. The researcher assumed time spent for each platform was mutually exclusive and that the sum of time spent per day across platforms should not exceed 24. However, four participants reported to spend over 24 hours on average per day on various platforms (Max = 34.6). These participants may have used multiple social media platforms at the same time. In addition, if adding their time spent across all platforms together, the mean (M = 7.24, SD = 5.22) was much higher than that in Study I (M = 3.59, SD = 2.29), though their other statistics were similar. As a result, it was decided to not sum reported time spent on each platform. The analyses between scale variables and social media activity were done for each platform individually. Descriptive statistics for Instagram, Snapchat, Facebook, Twitter, Pinterest, and Tik Tok were calculated. Other platforms had data from fewer than 20 participants and were not analyzed individually.

Instagram. Participants (N = 185) spent 2.24 hours (SD = 1.67) per day on average on Instagram mainly for entertainment (M = .62, SD = .79) and communication (M = .43, SD = .66). Participants reported to have on average of 975 followers (SD = 725.20, $Median$ = 900, Max = 5000, Min = 3) and not frequently posting activities (i.e., once a week or less, 87%).

Snapchat. On Snapchat, participants (N = 184) spent 2.84 hours per day on average (SD = 2.12) mainly for communication (M = 1.73, SD = 1.72) and entertainment (M = .33, SD = .58). Number of friends showed variation with an average of 239 (SD = 229.07, $Median$ = 200, Max = 2000, Min = 20). Majority posted once a week or less (42.4%) and several time (2~5) a week (35.3%).

Facebook. Participants (N = 137) on average reportedly spent .96 hours per day on Facebook (SD = 1.17), mainly for communication (M = .26, SD = .50) and entertainment (M

= .20, *SD* = .60). Number of friends showed large variation with an average of 418 (*SD* = 369.65, *Median* = 300, *Max* = 2000, *Min* = 0). Participants did not report actively posting on Facebook; with majority saying posting once a week or less (89.6%).

Twitter. Participants (*N* = 125) spent 1.98 hours (*SD* = 1.89) on average per day on Twitter mainly for entertainment (*M* = .89, *SD* = 1.42) and killing time (*M* = .20, *SD* = .34). Number of followers showed large variation with an average of 470 (*SD* = 1855.72, *Median* = 236, *Max* = 20000, *Min* = 0). Participants did not report actively posting on Twitter; with majority saying posting once a week or less (69.4%).

Pinterest. On Pinterest, participants (*N* = 91) spent on average .65 hours per day (*SD* = .77) mainly for entertainment (*M* = .08, *SD* = .21), killing boredom (*M* = .03, *SD* = .15), and getting ideas (*M* = .03, *SD* = .10). Majority participants did not have many friends on Pinterest (*M* = 42.86, *SD* = 83.12, *Median* = 5, *Max* = 400, *Min* = 0) or post frequently (i.e., 94.6% posted once a week or less). One participant commented in this section saying he/she never knew you could have followers on Pinterest.

Tik Tok. Participants (*N* = 55) reported to spend daily 1.64 hours on average (*SD* = 1.40) on Tik Tok mainly for entertainment (*M* = 1.06, *SD* = .99) and getting rid of boredom (*M* = .18, *SD* = .13). Number of followers showed large variation with an average of 803 (*SD* = 3543.37, *Median* = 4.5, *Max* = 20000, *Min* = 0). Majority of participants posted once a week or less (94.5%) on Tik Tok.

Bivariate correlation analyses. The self-developed questionnaire on social media activity included five items for each platform (Table 9). Medians of how participants perceived each platform were calculated. Questions asking about activities on the same platform were put in the same cluster in randomized order. In each item, “it” was replaced with the name of the platform

for reading and processing easiness. Results showed that participants had various perceptions of social media platforms, which will be discussed further in discussion section.

Table 9

Medians for Five Items Analyzing Gen Z's Perception of Each Platform

Item	Instagram	Snapchat	Facebook	Twitter	Pinterest	Tik Tok
1. It has become part of my daily routine.	6	6	2	5	2	5
2. I am a different person when I am on it.	3	2	1	2	1	2
3. I feel left out when I haven't logged onto it for a while.	4	5	1	2	1	2
4. I check frequently for comments/likes after posting on it.	6	4	2	3	1	2
5. After accessing it, I feel happier.	4	4.5	4	4	5	6

Note. Participants answered each item on a seven-point Likert-scale from one (strongly disagree) to seven (strongly agree).

Bivariate correlation analyses were conducted among social media use and perception items. Results suggested that participants tended to spend more time on the platform when they deemed the platform as part of their daily routine: Facebook ($r = .46$, $p < .001$), Twitter ($r = .48$, $p < .001$), Instagram ($r = .39$, $p < .001$), Snapchat ($r = .41$, $p < .001$), Pinterest ($r = .57$, $p < .001$), and Tik Tok ($r = .54$, $p < .001$). In addition, participants presented themselves as a more different person on Snapchat ($r = .19$, $p = .01$) tended to spend more time on it. Participants felt more left out if they have not logged on for a while: Facebook ($r = .27$, $p = .002$), Instagram ($r = .24$, $p = .001$), Snapchat ($r = .18$, $p = .02$), and Tik Tok ($r = .30$, $p = .03$); checked frequently for comments/likes after posting: Facebook (r = .38, $p < .001$) and Snapchat ($r = .20$, $p = .007$); and

felt happier after accessing it: Facebook (r = .29, p = .001), Twitter (r = .21, p = .03), and Snapchat (r = .22, p = .003).

Bivariate correlation testing hypotheses. Bivariate correlation analyses were also conducted among social media activity and interval and ratio variables (i.e., emotion regulation, emotional expressivity, self-regulation, self-esteem, personality traits, perceived stress level, and GPA). The study averaged "before" and "after" of each variable and computed it as an overall variable.

Results supported *H1* (i.e., Gen Z's social media activity correlates with their emotion regulation strategy use). CR positively correlated with time spent for stress relief on Facebook (r = .17, p = .05), but CR negatively linked to overall time spent on Instagram (r = -.21, p = .005), time spent for communication on Snapchat (r = -.17, p = .02), for entertainment on Instagram (r = -.17, p = .02), for killing time on Instagram (r = -.18, p = .02), and for getting rid of boredom on Instagram (r = -.20, p = .008).

In-person ES positively linked to overall time spent on Instagram (r = .22, p =.004), Snapchat (r = .20, p = .009), and Pinterest (r = .29, p = .01), and time spent for communication on Instagram (r = .18, p = .01). However, in-person ES negatively correlated with time spent for job promotion on Instagram (r = -.17, p = .02). Social media ES negatively correlated with time spent for communication on Twitter (r = -.20, p = .02), entertainment on Snapchat (r = -.15, p = .04), and getting rid of boredom on Snapchat (r = -.16, p = .04). Social media ES also was negatively correlated with posting frequency on Twitter (r = -.25, p = 006) and Snapchat (r = -.15, p = .04); however, it positively linked to time spent following celebrities on Instagram (r = .18, p =.01).

Results supported *H2* (i.e., Gen Z's social media use is linked to their emotional expressivity). In-person NE positively correlated with number of platforms they used (r = .23, p = .001); however, in-person NE negatively correlated with time spent for getting news on Twitter (r = -.24, p = .007). In-person PE positively correlated with number of platforms used (r = .14, p = .04); however in-person PE negatively linked to time spent to "kill time" on Tik Tok (r = -.34, p = .01) and for self-validation on Twitter (r = -.22, p = .01). In-person IS positively linked to number of platforms used (r = .19, p =. 009) and time spent for stress relief on Twitter (r = .28, p = .002). In-person IS negatively correlated to time spent for entertainment on Pinterest (r = -.24, p = .03), killing time on Instagram (r = -.32, p = .02), and job promotion on Instagram (r = -.16, p = .03).

Social Media NE positively linked to time spent overall on Snapchat (r = .21, p = .004), for communication (r = .18, p = .02), and entertainment on Snapchat(r = .17, p = .02); for stress relief on Pinterest (r = .22, p = .04), getting rid of boredom on Twitter (r = .18, p = .05), and posting frequency on Instagram (r = .18, p = .01) and Snapchat (r = .21, p = .005). Social media NE negatively correlated with time spent following celebrities' updates on Instagram (r = -.19, p = .01). Social Media PE positively related to time spent for communication on Snapchat (r = .16, p = .03) and posting frequency on both Instagram (r = .16, p = .03) and Snapchat (r = .20, p = .009). Social Media IS positively linked to overall time spent (r = .15, p = .05) and time spent for communication on Snapchat (r = .18, p = .01); for entertainment on Facebook (r = .22, p = .009) and Snapchat (r = .17, p = .02); for academic purposes on Snapchat (r = .17, p = .02); and posting frequency on Instagram (r = .28, $p < .001$) and Snapchat (r = .26, $p < .001$). Social media IS negatively correlated with time spent for following celebrities' updates on Instagram (r

= -.15, p = .05) and overall time spent (r = -.35, p = .009) and time spent for entertainment on Tik Tok (r = -.36, p = .008).

Results supported *H3* (i.e., Gen Z's social media use is related to their self-esteem). Self-esteem was negatively related to overall time spent on Instagram (r = -.18, p = .02) and Snapchat (r = -.21, p = .006), time spent for self-validation on Twitter (r = -.19, p = .04), and for killing time on Tik Tok (r = -.27, p = .05).

Results supported *H4* (i.e., Gen Zers who score differently on Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness differ in their social media activity). Extraverts: use more platforms (r = .21, p = .004), have more followers on Twitter (r = .21, p = .03) and Instagram (r = .35, p < .001), more friends on Snapchat (r = .20, p = .01), and post more frequently on Instagram (r = .28, p < .001) and Snapchat (r = .30, p < .001). Extraversion was negatively related to: overall time spent on Pinterest (r = -.25, p = .03), time spent killing time on Instagram (r = -.15, p = .05) and Tik Tok (r = -.30, p = .03), getting rid of boredom on Twitter (r = -.23, p = .01), and getting ideas on Pinterest (r = -.21, p = .05).

Agreeableness positively correlated with time spent for stress relief on Twitter (r = .23, p = .01) and number of followers on Instagram (r = .17, p = .03). In comparison, Agreeableness negatively correlated with overall time spent on Pinterest (r = -.34, p = .002); time spent for escaping boredom on Twitter (r = -.18, p = .04), Instagram (r = -.22, p = .003), and Snapchat (r = -.15, p = .05), time spent killing time on Twitter (r = -.19, p = .04) and Instagram (r = -.19, p = .01); and posting frequency on Pinterest (r = -.31, p = .002).

Conscientiousness negatively correlated with time spent for stress relief on Instagram (r = -.15, p = .04). Neuroticism positively linked to overall time spent for Snapchat (r = .18, p = .02), and escaping boredom on Twitter (r = .18, p = .04) and Instagram (r = .24, p = .001). In

comparison, Neuroticism negatively correlated with time spent for entertainment on Pinterest (r = -.27, p =.01).

Interestingly, Openness positively correlated with posting frequency on Twitter (r = .24, p = .007) and time spent for academic purposes on Snapchat (r = .18, p = .02). However, Openness negatively correlated with time spent for entertainment on Facebook (r = -.21, p = .01), Twitter (r = -.18, p = .04), and Snapchat (r = -.20, p = .008); for killing time on Twitter (r = -.18, p = .05), and escaping boredom (r = -.19, p = .03) and overall time spent on Facebook (r = -.21, p = .02). These findings contrast with Study I, where Openness did not correlate with any social media activity.

Results supported *H11* (i.e., Gen Zers' perceived stress level is associated with some of their social media activity). Perceived stress level was positively associated with number of platforms participants currently used (r = .15, p = .04), overall time spent (r = .17, p = .03) and time spent for communication on Snapchat (r = .15, p = .05), and escaping boredom on Twitter (r = .19, p = .03). However, perceived stress negatively related to time spent for entertainment on Pinterest (r = -.24, p = .02),

Results supported *H12* (i.e., social media activity predicts self-regulation level). Self-regulation negatively linked to time spent for entertainment on Snapchat (r = -.17, p = .02) and getting rid of boredom on Instagram (r = -.17, p = .02). Self-regulation positively correlated with time spent for job promotion on Instagram (r = .15, p = .05).

Results supported *H13* (i.e., social media activity correlates with academic achievement). Academic achievement (i.e., reported GPA) negatively correlated with overall time spent on Facebook (r = -.19, p = .04), Snapchat (r = -.22, p = .003), and Pinterest (r = -.29, p = .009).

Intervention Effects. It was hypothesized that participants in all four conditions (i.e., in-person use social media, in-person not use social media, online free time, and online no break) would show no significant differences in any variables in the first part of the questionnaires prior to interventions (*H14*). Participants should demonstrate similar characteristics in the first part of the study and serve as a baseline to see whether the condition to which they were assigned (i.e., use social media, not use social media, spend free time, no break) had any influence on them. The conclusions of intervention effects could only be generated after *H14* was supported.

Because questionnaires were randomly split in half, we cannot assume participants would get identical scores on the first- and second-part items without interventions. Thus, the no break condition was set as a baseline to test if there were any differences between first part (i.e., before) and second part (i.e., after) on CR, self-regulation, self-esteem, and perceived stress questionnaire responses. Results suggested that there was no significant mean difference between first and second part in CR ($p = 1.00$) or self-regulation ($p = .35$). However, participants scored significantly higher self-esteem in the first part ($M = 5.04$, $SD = 1.37$) than the second part ($M = 4.59$, $SD = 1.42$, $p < .001$). In addition, they reported less stress in the first part ($M = 10.45$, $SD = 2.90$) than the second part ($M = 13.17$, $SD = 3.89$). It seems that participating in this study was stressful to participants. They might experience psychological processes such as self-reflections that challenged their self-worth during the study. As a result, two-way mixed ANOVAs were conducted in CR and self-regulation to see whether how participants spent the five-minute break mattered. For self-esteem and perceived stress, one-way ANOVA were conducted to see if participants in different conditions differed in the responses of second part of questionnaires.

One-way ANOVAs. Result from one-way ANOVA showed that no difference was detected in reported self-esteem in either first ($p = .38$) or second ($p = .32$) administration among

four conditions. Participants in different conditions did not differ in self-esteem. Results also did not reveal a difference in perceived stress in either first (p = .17) or second (p = .18) administration among the four conditions. However, participants in the in-person not use social media condition reported that the five minutes felt slower than did participants in the in-person use social media condition (p = .002).

Two-way mixed ANOVAs. Two-way mixed ANOVAs were conducted for CR in emotion regulations and self-regulation to assess if condition influenced outcome variables. Recall that participants were randomly assigned to one of the four conditions (i.e., in-person use social media, in-person no use social media, online free time, and online no break). Participants were assigned to the same condition if they participated in the same time slot. Tests conducted below were 2 (time) x 4 (condition) mixed ANOVAs.

Self-regulation. Results suggested that there was a significant main effect of time F (1, 188) = 20.17, $p < .001$. However, there was neither a significant main effect of condition, F (3, 188) = 2.48, p = .06, or a significant interaction between time and conditions, F (3, 188) = .90, p = .44. A one-way ANOVA was conducted among the three conditions who had a five-minute break to further examine the potential mean difference before and after the break. Results suggested that participants' self-regulation score was significantly lower after the break (M = 3.59) as compared to before (M = 3.71, $p < .001$) regardless what conditions they were assigned to. In addition, a one-way ANOVA was conducted among all participants to check if any conditions showed a different start point (i.e., different at first administration) and results indicated that in-person use social media condition (M = 3.84) had significantly higher self-regulation score before the break than that of online free time condition (M = 3.53, p = .03). This result did not support *H14*. Participants differed in self-regulation across conditions before they

participated in the current study. It is worth noting that participants voluntarily chose whether they participated in an online or in-person study. It is possible that participants who preferred online studies showed less self-regulation than those preferred in-person studies. Since this violated the assumption for comparing the conditions, no conclusions should be drawn based on it.

Cognitive Reappraisal. Results suggested there was no significant effect of time, condition, or interaction between them. When excluding the no break condition and comparing the rest of three conditions to see if the five-minute break played a role, results demonstrated that participants' CR was similar before and after the break ($p = .16$).

Multiple Regression Model. In order to include social media activities and perception, which were highly correlated with each other, into the model, it would be ideal to conduct a principal component analysis to reduce the number of independent variables. However, due to limited sample size (i.e., fewer than 300), principal component analyses could not be ideally conducted. An additional concern is that not all participants used all social media platforms. As a result, the model for this study only included reported overall time spent on social media, number of platforms participants used, and their perception of social media to represent social media activity. Even though some participants apparently reported overlapped time spent on multiple social media platforms (i.e., the sum of overall time spent on social media per day exceeded 24 hours), multitasking appeared among most participants (e.g., reported average time spent increased from 3.59 hours in Study I to 7.24 hours in this study, yet distributions in two studies seemed similar). Thus, sum of time spent on all platforms should be a qualified indicator to predict outcome variables. Variables in the same Tier or previous Tiers as the predicted variable were entered in each model respectively.

Predictors for social media activity. Results demonstrated that number of platforms participants used on social media was predicted (r^2 = .19, p < .001) by the extent to which they used various platforms for different purposes (b = .23, 95% CI = [.11, .43], p = .001, sr^2 = .05), how much they liked social media (b = .25, 95% CI = [.14, .46], p <.001 , sr^2 = .06), Extraversion (b = .19, 95% CI = [.08, .52], p = .008, sr^2 = .03), and Perceived Stress (b = .19, 95% CI = [.01, .07], p = .007, sr^2 = .04) (1.02 < *VIFs* < 1.08).

Overall time spent on social media was predicted (r^2 = .19, p < .001) by how much participants liked social media (b = .23, 95% CI = [.41, 1.68], p = .001, sr^2 = .05), Perceived Stress (b = .30, 95% CI = [.12, .34], p < .001, sr^2 = .08), and to what extent they saw "social media influencer" as a legitimate career for other people (b = -.16, 95% CI = [-.79, -.06], p = .023, sr^2 = .03). Collinearity was diagnosed (1.02 < *VIFs* < 1.11) and plot showed homoscedasticity.

Predictors for self-regulation. Results from Stepwise Linear Regression showed that Conscientiousness (b = .56, 95% CI = [.40, .58], p < .001, sr^2 = .26), Perceived Stress (b = -.19, 95% CI = [-.03, -.006], p = .002, sr^2 = .02), CR (b = .13, 95% CI = [.02, .11], p = .009, sr^2 = .01), Self-Esteem (b = .18, 95% CI = [.02, .13], p = .009, sr^2 = .01), and Openness (b = .10, 95% CI = [.001, .19], p = .047, sr^2 = .01) together explained 65.5% variance in Self-Regulation (p < .001; 1.07 < *VIFs* < 2.10).

Predictors for self-esteem. Self-Esteem was predicted (r^2 = .61, p < .001) by Perceived Stress (b = -.32, 95% CI = [-.09, -.04], p < .001, sr^2 = .05), Self-Regulation (b = .26, 95% CI = [.35, .89], p < .001, sr^2 = .05) , Neuroticism (b = -.28, 95% CI = [-.70, -.26], p < .001, sr^2 = .04), In-Person ES (b = -.18, 95% CI = [-.32, -.10], p < .001, sr^2 = .03), and how much they liked

social media (b = .15, 95% CI = [.06, .28], p = .003, sr^2 = .02) Data did not violate collinearity (1.01 < *VIFs* < 1.97) and showed homoscedasticity.

Predictors for emotion-regulation. Results showed that Self-Regulation (b = .24, 95% CI = [.17, .85], p = .004, sr^2 = .04), Openness (b = .18, 95% CI = [.08, .79], p = .014, sr^2 = .03) , and Neuroticism (b = -.19, 95% CI = [-.53, -.05], p = .018, sr^2 = .03) together explained 17.2% of the variance of CR (p < .001). Data showed homoscedasticity (1.05 < *VIFs* < 1.32).

Variance in In-Person ES was partially (r^2 = .15, p < .001) explained by Extraversion (b = -.19, 95% CI = [-.45, -.05], p = .014, sr^2 = .03), Self-Esteem (b = -.24, 95% CI = [-.38, -.08], p = .002, sr^2 = .05), and to the extent participants thought that social media negatively influenced their generation (b = -.17, 95% CI = [-.26, -.02], p = .018, sr^2 = .03). Data did not show multicollinearity (1.01 < *VIFs* < 1.10) or heteroscedasticity. Results also demonstrated that the extent to which participants posted their "bad side" on social media (b = .32, 95% CI = [.16, .42], p < .001, sr^2 = .10) uniquely explained 10.2% variance of Social Media ES.

Predictors for emotional expressivity. Similar to Study I, quite a few variables predicted emotional expressivity. In-Person ES (b = -.71, 95% CI = [-.75, -.55], p < .001, sr^2 = .44), Social Media ES (b = .13, 95% CI = [.02, .23], p = .024, sr^2 = .01), GPA (b = -.11, 95% CI = [-.50, -.001], p = .049, sr^2 = .) , number of platforms used (b = .13, 95% CI = [.08, .24], p < .001, sr^2 = .01) , how much they believed social media had a negative influence on themselves (b = .12, 95% CI = [.01, .15], p = .031, sr^2 = .01), how much they believed "social media influencer" was a career for other people (b = .15, 95% CI = [.02, .13], p = .006, sr^2 = .02) together explained 55.9% variance of In-Person NE (p < .001; 1.02 < *VIFs* < 1.15). Variance in Social Media NE was partially (r^2 = .52, p < .001) explained by Social Media ES (b = -.59, 95% CI = [-.64, -.43], p <.001, sr^2 = .30), self-regulation (b = -.14, 95% CI = [-.44, -.05], p = .014, sr^2 = .02), to what

extent participants tended to post "bad sides" about themselves on social media (b = .13, 95% CI = [.01, .21], p = .030, sr^2 = .01), and to what extent they considered social media a biased platform where you could only see what other people wanted you to see) (b = -.14, 95% CI = [-.20, -.02], p = .017, sr^2 = .02) (1.07 < *VIFs* < 1.23). Both plots showed homoscedasticity.

In-Person PE was predicted (r^2 = .52, p < .001) by In-Person ES (b = -.34, 95% CI = [-.33, -.15], p < .001, sr^2 = .11), Agreeableness (b = .34, 95% CI = [.27, .65], p < .001, sr^2 = .10), how much they cared about comments and likes on social media (b = .22, 95% CI = [.04, .17], p = .001, sr^2 = .04), Neuroticism (b = .38, 95% CI = [.20, 57], p < .001, sr^2 = .07), Extraversion (b = .20, 95% CI = [06, 31], p = .005, sr^2 = .03), and Perceived Stress (b = -.22, 95% CI = [-.05, -.005], p = .014, sr^2 = .03) (1.08 < *VIFs* < 1.96). Social Media ES (b = -.48, 95% CI = [-.70, -.40], p < .001, sr^2 = .22), how much participants cared about comments and likes on social media (b = .16, 95% CI = [02, .22], p = .017, sr^2 = .03), and to what extent they used social media platforms for different purposes (b = .15, 95% CI = [.02, .31], p = ..031, sr^2 = .02) together explained 28.6% variance in Social Media PE (p < .001; 1.01 < *VIFs* < 1.02). Both plots showed homoscedasticity.

Partial variance of In-Person IS (r^2 = .44, p < .001) was explained by Neuroticism (b = .65, 95% CI = [.77, 1.14], p < .001, sr^2 = .36), in-person ES (b = .-.26, 95% CI = [-.38, -.14], p < .001, sr^2 = .07), Agreeableness (b = .23, 95% CI = [.22, .71], p < .001, sr^2 = .05), and to what extent they believed "social media influencer" was a career for themselves (b = .14, 95% CI = [.02, .20], p = .021, sr^2 = .02) (1.01 < *VIFs* < 1.15). Finally, 40.4% variance in Social Media IS (p < .001) was explained by Social Media ES (b = -.60, 95% CI = [-.84, -.56], p < .001, sr^2 = .36), GPA (b = -.13, 95% CI = [-.69, -.03], p = .034, sr^2 = .02), and Neuroticism (b = .13, 95% CI = [.008, .39], p = .041, sr^2 = .02) (1.01 < *VIFs* < 1.16). Both plots showed homoscedasticity.

Predictors for academic achievement. Time spent on social media (b = -.32, 95% CI = [-.04, -.02], $p < .001$, $sr^2 = .09$), how much participants cared about comments and likes (b = .18, 95% CI = [.01, .09], $p = .013$, $sr^2 = .03$), Conscientiousness (b = .22, 95% CI = [.05, .26], $p = .004$, $sr^2 = .05$), and CR (b = -.18, 95% CI = [-.13, -.01], $p = .020$, $sr^2 = .03$) contributed to explain the variances in GPA ($r^2 = .17$, $p < .001$). Collinearity was checked and ($1.02 < VIFs < 1.06$) and results showed homoscedasticity.

In sum, regression results in Study II were identical to those in Study I for common variables except that GPA contributed to explain the variance in Emotional Expressivity in Study II but not in Study I. Results from regression analyses were illustrated by the following model (Figure 9).

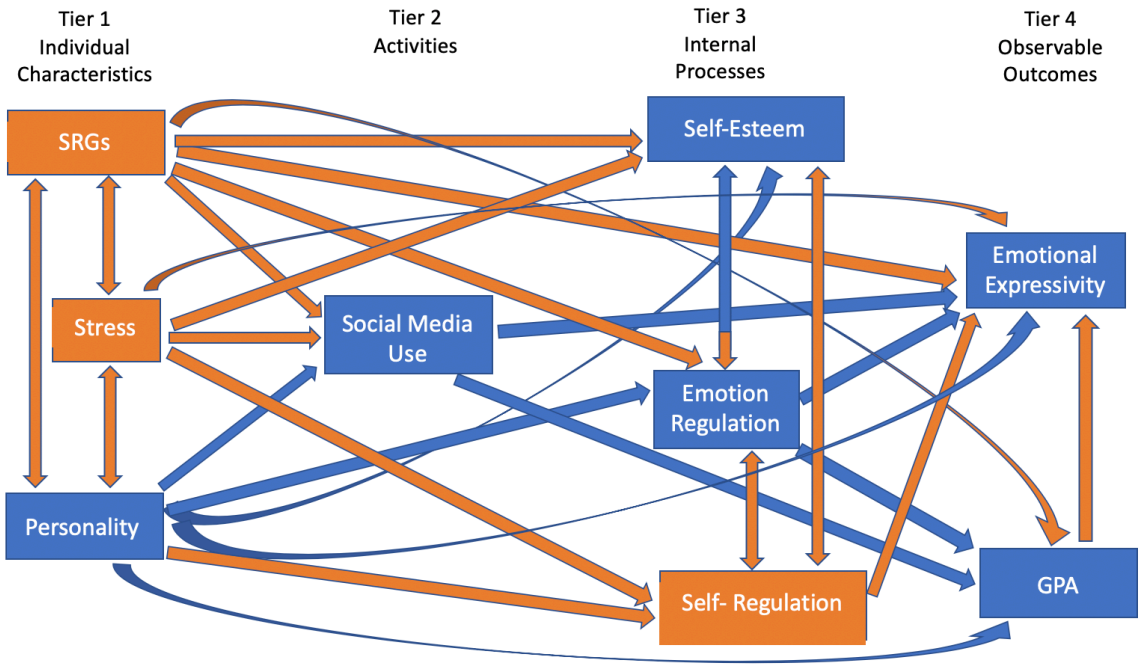

Figure 9. Diagram suggests paths explaining relationships among these variables. Variables and arrows in blue indicate identical variables and relationships as in Study I. Variables and arrows in orange are those findings in Study II that differ from findings in Study I. Coefficients are not labeled because several variables include subscales and coefficients differ accordingly.

Discussion

Results supported all hypotheses in this study. After adding in variables on SRGs about social media, perceived stress, and self-regulation, there were more correlations showed among variables (Figure 9). Participants' SRGs about social media and personality traits predicted most other variables.

In this study, more demographic information was collected than in Study I, and interesting trends were found in several variables. Participants in different ethnicity groups demonstrated various social media activities. Asian/Pacific Islander participants relied more heavily on social media for their relationships than did White participants. However, they used fewer social media platforms than most other ethnicities (i.e., White, Latino, African American, and Mixed). It seems that Asian/Pacific Islander participants used social media for less varied purposes than other participants.

Interestingly, ethnicity correlated with personality traits. White participants were more extraverted than Asians/Pacific Islanders. Though it may not be sufficient to use the data we have to explain why people in certain ethnicity showed particular trends demonstrating certain traits, it would be helpful to understand that these differences existed among people in various ethnicity groups.

Gender differences in social media use, personality traits, emotion regulation strategy use, and emotional expressivity have been well explored. Research has shown that males and females tend to spend time differently online (Kimbrough, Guadagno, Muscanell, & Dill, 2013). Results from the current study are consistent with previous research that females were more likely to compare themselves with others on social media (Haferkamp & Krämer, 2011), had

more positive attitudes towards mediated technology (Kimbrough, et al., 2013), and reported more neuroticism (Lynn & Martin, 1997).

Kimbrough et al. (2013) argued that males spent more time for information seeking, while females spent more time for communication and interactions. Slightly different from previous research, this study suggested that males spent less time than females on social media generally. Though this study asked participants to report their use of social media for all purposes, the focus was on platforms which mainly supported communication and interactions (i.e., YouTube and Quara were excluded from social media category). This may be one of the reasons to explain this discrepancy.

Research has suggested that females tend to more often reappraise (McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008) and engage in more various emotion regulation strategies (Nolen-Hoeksema & Aldao, 2011) than do males. However, results from the current study did not support these arguments. Males reported to more often adopt both CR and ES strategies, which could be the reason why they reportedly express less intense emotions when they are with other people. This study recruited more females than males. It would be ideal to reexamine these gender differences among balanced samples.

Relationship status did not correlate with reliance on social media. The majority participants were either single or in a relationship. Surprisingly, being in a relationship was linked to lower academic achievement, more neurotic, and expressing more intense emotions. It is necessary to be aware that most participants were in their first and second year of college. They could be still in the process of learning time management and balancing college workload and their relationships. The negative correlation between being in a relationship and academic achievement does not necessary exist among older undergraduates. Personal relationships

interact with one's emotion experiences closely. Being in a stable relationship at this age usually means that it requires one to communicate and interact with their partner actively to express themselves. In this process, showing stronger emotions could possibly be more efficient for communication (e.g., showing love or showing anger). In addition, because of being with another individual, they usually needed to be more sensitive to what others said, did, etc. to maintain a good relationship, which could possibly explain their higher neuroticism. As a result, it is plausible that those who were in a relationship demonstrated stronger emotional expressivity and differences in personality traits.

Consistent with Study I, results showed that participants spent a large amount of time on social media, which demonstrated that this generation relies heavily on mediated technology on a daily basis for various purposes. This study included a "time spent" intervention. Participants were randomly assigned to one of four different conditions in the middle of the survey to see whether accessing social media would affect some of their emotion perspectives. No significant differences were found between conditions. It seems that accessing social media for five minutes does not significantly affect emotion perspectives. The experimenter observed behaviors of those who participated in in-person conditions. A few participants showed happiness ($n \approx 6$) after receiving instruction to use social media during the waiting period. More participants ($n \approx 16$) who were asked to use social media during the break put down their phone before the five minutes ended. They stared at screen and waited for the page to automatically proceed to the next part even though they were asked to use these five minutes to access social media. Asking participants to access social media in a lab setting possibly cannot simulate their daily use of it. Furthermore, social media has integrated into Gen Z's lives so well that it can hardly be separated from them so as to build a causal relationship to examine its influence. Upon reflection,

it could be challenging for Gen Zers to identify how much time they spend for certain purpose on social media. They may not be aware why they were on social media at a particular time point. To further understand how social media influences Gen Z's various perspectives, it would be helpful to conduct a longitudinal study asking participants to keep a daily log of their use of social media.

How Gen Z deemed social media and their perceived stress level predicted how much they used it, which ultimately explained variance in their academic achievement. Results from the current study indicated that Gen Zers tended to use multiple platforms when they saw it as a competition. In addition, individuals who were more stressed tended to devote more energy into social media (e.g., spending more time on it and using more platforms). Social media could temporarily distract them from their current stress, but not in a long-term fashion. As mentioned in literature review section, 38% Gen Zers felt bad due to their usage of social media (American Psychological Association, 2018), indicating that being stressed, using social media, and getting more stressed can build a vicious circle that potentially harms this generation. Having more friends/followers, likes, and comments usually means being popular on social media, which is public information on most social media platforms and can possibly be interpreted as having more influence and power. Devoting more energy into social media can possibly gain more followers and influence for them to win this "competition" that is invisibly going on among this generation. However, if putting efforts in it does not work, they may feel more stressed which could result in more heavily usage of it. According to the results, when they devoted more energy into social media, unfortunately, they were more likely to be less successful in academic achievement. It is necessary for Gen Z to see social media in a healthy way, in which they are able to function well mentally as well as physically and get things such as schoolwork done.

Using social media to relieve their stress may not be as successful as they thought. For Gen Z, it would be more effective to reduce the stress level by identifying what makes them anxious and stressed. For example, you feel stressed mainly because you have a 10-page essay due tomorrow and you only finished one page. Accessing social media can entertain you and distract you from your current situation. However, escaping does not make the situation better. You have to face the situation sooner or later. It would be much more effective to relieve your stress level by working on the project as soon as possible than using distractors such as social media. If the stress is caused by a chronic stressor such as what I should do for my career in the future, getting advise from other people and making plans would be more helpful than distracting yourself. In addition, Gen Z could keep an eye on their social media usage, such as time spent, to reflect about their psychological status. For example, one could use social media more intensely than usual for a month but not know why this happened. At this point, they could ask themselves if they were experiencing more stressful events than they normally would and they were not aware. Using social media wisely is an important task for Gen Z. Furthermore, it is important for educators to help Gen Z identify their stressors to avoid getting into the vicious circle mentioned above.

Gen Z's SRGs about social media and perceived stress level explained variances in self-regulation and emotion regulation, which ultimately predicted self-esteem. Less stressed participants were more likely to succeed in self-regulation. Success in self-regulation predicted higher self-esteem. Self-esteem has been well researched to predict, even cause, positive outcomes such as life satisfaction and less negative affect (Orth, Robins, & Widaman, 2012). Intense stress could hinder one's awareness of what they are doing, which is reflected by self-regulation. As mentioned above, reducing stress levels is a task worth studying among this

generation. Gen Z's perception of social media, interestingly, correlated with their emotion regulation strategy use not only on social media, but also in in-person interactions. Results suggested that participants were less likely to adopt ES while with others when they deemed social media had negative influence on their generation. Regulating emotions by ES has been categorized as maladaptive strategy and linked to negative outcomes such as depression (Nolen-Hoeksema et al., 1999; O'Connor et al., 2007).

Generally speaking, social media has both positive and negative influence on Gen Z. It eases the process of communication and supports various activities and entertainment. However, as shown in these results, spending more time on social media was linked to negative outcomes. Those who cognitively admitted the negative influence of social media on their generation were more likely to be those who were less likely to regulate their emotions by suppression, which also predicted their higher self-esteem. Moreover, participants who liked social media were more likely to report higher self-esteem. Seeing the negative side of social media does not necessarily refer to less preference for it. Gen Zers in this study (i.e., 198 out of 199 participants) currently use at least one social media platform. Thus, it is probably beneficial to like what you are doing (i.e., using social media) and taking a dialectical perspective towards it (i.e., seeing both the negative and positive influences of it) to achieve the ideal outcome (i.e., higher self-esteem).

How much Gen Z relied on social media for their relationships (e.g., family, friend, and romantic relationships) explained variance in their emotional expressivity among both in-person and social media interactions. Results from current study showed that Gen Z expresses stronger emotions on social media in all three emotional expressivity subscales when they relied on social media more heavily for their relationships. Showing stronger emotions may be due to either having stronger tendencies to express (e.g., this difference could be reflected by personality

traits), or adopting ES less often because of certain reasons such as trusting the current environment, or both. Here we only discuss the second possibility (i.e., adopting ES) which is less stable and could be modified by cognition with less effort as compared to, for example, personality traits. Gen Zers need to trust social media platforms first to rely on them for their personal relationships. In previous research (Monsour, 1992), 26 – 42 percent of participants used emotional expressiveness to define intimacy. People tend to connect with others by showing emotions and sharing emotional experiences. Keeping emotions to oneself could let others feel the psychological distance that then push others away. With more than half of their relationships reportedly maintained by using social media, these Gen Zers "need" to express stronger emotions on social media to keep this intimacy.

In sum, it is beneficial for Gen Z to understand their personal characteristics and be aware of activities they engage in on social media to better support their internal processes and ultimate outcomes such as academic achievement. Knowing the predictors for certain negative outcomes can be the first step to change the less ideal situations.

General Discussion

In these two studies, the researcher proposed four tiers of variables (i.e., individual characteristics, activities, internal processes, and observable outcomes) and supported their relationships using results from multiple regression analyses. This step is an attempt to understand one direction of the processes going on among these variables. It does not necessarily mean that variables in Tier four have no contributions to explain the variance in variables in Tier one. For example, one may give up studying and actively use social media after working hard on that subject but receiving a bad grade. The relationships among person, behavior, and environment is a reciprocal system and they contribute to explain each other (Bandura, 1978).

The multiple regression models from Tier one to Tier four only describe one aspect of what really happens in life. For example, what grade students receive would probably contribute to their future attitudes and behaviors, a reciprocal influence not considered here. The proposed final model is based on correlations across both studies to see these variables and relationships from a broader perspective.

Consistent correlations in two studies (e.g., both showed significant negative correlations between in-person ES and in-person NE) are assumed to indicate meaningful implications. After integrating the common variables and results from two studies, the following models (Figure 10 and Figure 11) are proposed.

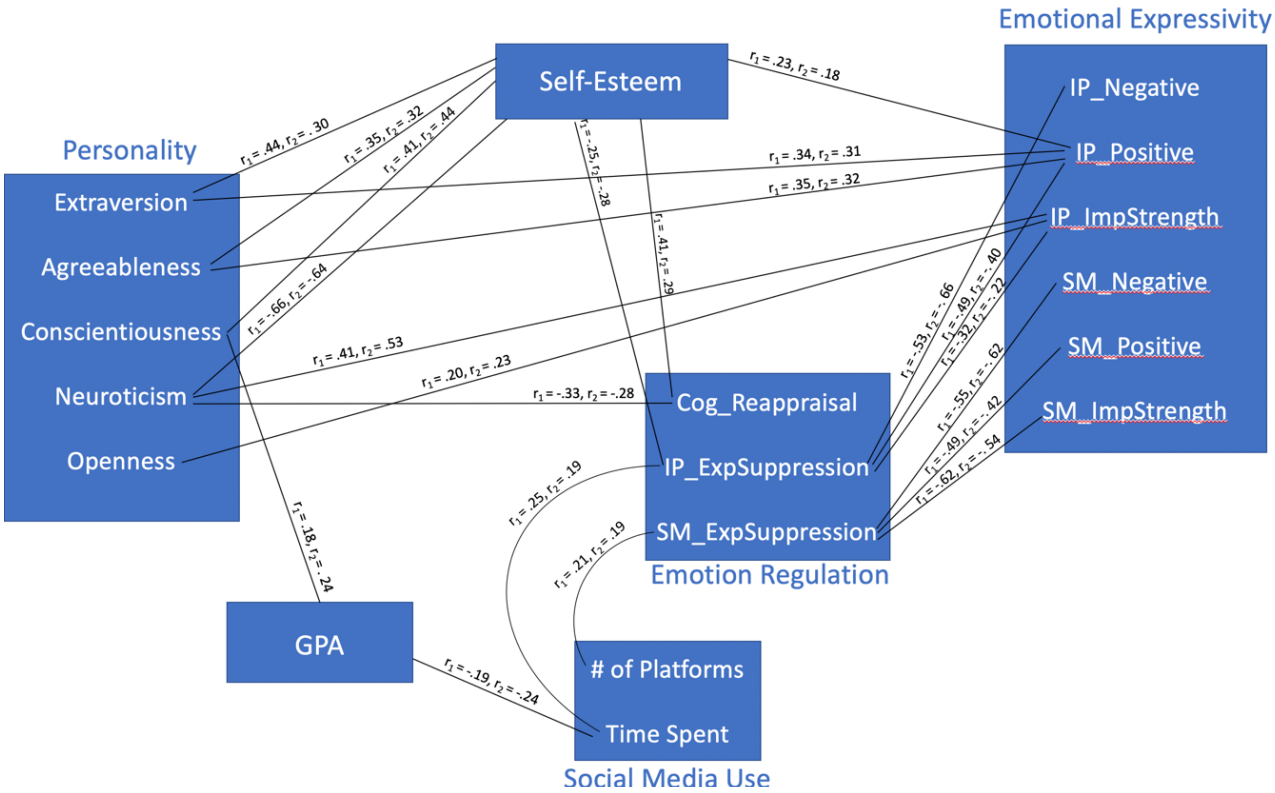

Figure 10. Model demonstrates correlations with coefficients among subscales. r_1 indicates coefficient in Study I, and r_2 indicates coefficient in Study II. Each pair of correlation coefficients is shown on top (or right) of its respective line.

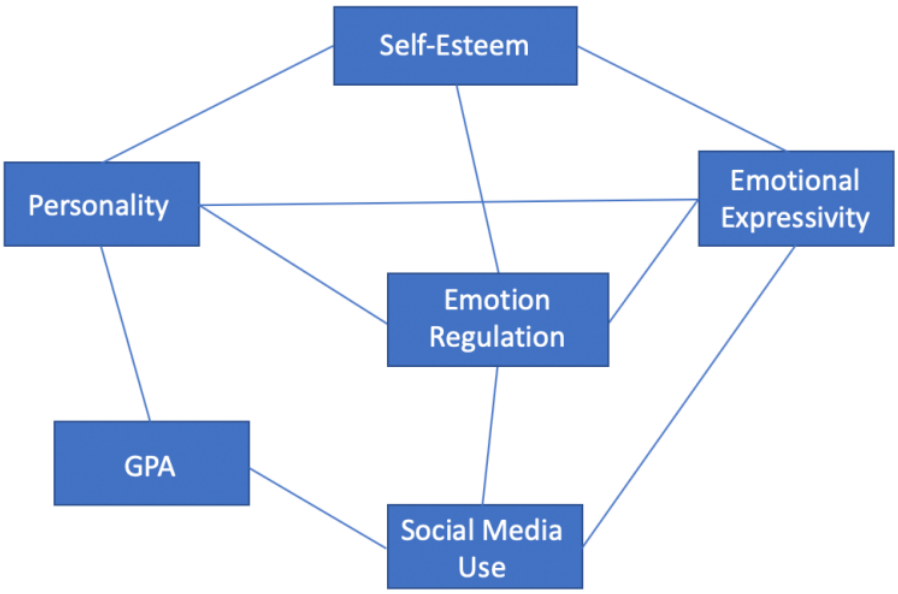

Figure 11. Final model as a concise version of Figure 10 demonstrates consistent correlations among common variables.

Some personality traits (i.e., Extraversion, Agreeableness, and Conscientiousness) positively connected to positive outcomes (e.g., self-esteem) than did other personality traits (i.e., Neuroticism). Part of personality is determined naturally. Another part of personality could be shaped by how individuals interact with the environment as well as themselves. For example, those who were more likely to adopt CR tended to perceive higher self-esteem. Perhaps neurotic individuals could possibly feel better about themselves by changing the way they think about certain negative situation. For instance, a person overthinks about his/her failure on an exam and believes that his/her professor will treat him/her differently because of this bad grade. If this person successfully engages in CR, this person could possibly change the thought to that professor will understand that I am under great pressure and offer help if needed. Some of emotion regulation strategy use is determined by individual characteristics such as personality traits. However, one can also learn to utilize a strategy with which he/she is not familiar.

Learning to use CR seems to be a task that would probably be helpful for individuals with certain characteristics.

As predicted, emotion regulation strategies linked to emotional expressivity. Specifically, In-person and Social Media ES negatively correlated with all three subscales of emotional expressivity for in-person and social media interactions respectively with moderate to large effect sizes. These results supported that individuals who more often suppressed their emotions were more likely to demonstrate less strong expressions of emotions. It is neither supporting nor attacking that ES effectively reduces their perceived strength of emotions. Expressing fewer emotions does not necessarily mean experiencing fewer emotions. However, previous research suggested that adopting ES more often linked to negative outcomes such as depression. Thus, it would be alarming for individuals to experience a lot of emotions but suppress most of them. In addition, subscales on emotional expressivity in social media were independent of other variables and only correlated with social media ES. This supported previous proposed possibility (p. 44) that social media closely connected to Gen Z's emotion perspectives and suppression Gen Z adopted on social media reflected more "realness" than in-person suppression.

Devoting more energy on social media (i.e., spending more time or using more platforms) was linked to either lower GPA or adopting more ES. Social media is an important part of Gen Z's life and even part of their daily routine (e.g., Instagram and Snapchat). Older generations might require more face-to-face interactions for relationships (e.g., family, friends, or romantic relationships) and/or rely less on Internet for information or entertainment. For majority Gen Z, social media has become the major platform for relationship, information, and entertainment. Unlike traditional media such as newspapers, social media is more efficient; it carries much information in a short period of time. Getting used to these intense stimuli could be harmful for

one's attention span; they might find a movie provides insufficient stimuli and is too long to concentrate on.

This research helps Gen Z to reflect about themselves and some possibilities for certain outcomes. For example, they might perceive lower self-esteem partly because they did not learn the most adaptive ways of emotion regulation. Understanding these relationships can provide this young generation with the information to monitor themselves to follow healthier psychological processes to achieve better outcomes.

The second study also asked participants to leave comments or reflections after completing the questionnaires. Selective responses about Gen Zers' thoughts about social media as well as themselves include, "I show my emotions very differently to different people. Some people can't tell what I'm feeling but the people closest to me can tell immediately" (from a participant who was assigned to online free time condition); "It was weird at first, just sitting there without use your phone, but it was nice to be just one with your thoughts instead of on the phone" (from a participant who was assigned to in-person no use social media condition); "I am working on limiting the time I spend on social media in order to be more present" (from a participant who was assigned to online no break condition);

> One reflection I had was that I realized that I thought social media was bad for my generation, but I still continue to use it. It must be the time we're in, it's how our community connects to each other, the only way we really know how. (From a participant who was assigned to in-person no use social media condition.)
>
> I used to compare myself more, now that I am 20, I don't see social media as a huge attachment. I feel as though I went through a phase though. Now I just don't necessarily

care as much about it. (From a participant who was assigned to online free time condition.)

It should be considered that individuals express emotions differently when they are with different people. This research only measures emotional expressivity from a global aspect. It might be a different pattern for emotional expressivity if adding in specific questions towards specific situation such as with acquaintances versus with close friends. This potential difference could possible better explain variables such as self-esteem, and is worth studying.

Apparently, some participants have realized the negative side of social media usage and started working on limiting it. The participant used "be present" as opposed to spend time on social media. Also, some participants reported they use less social media with their growth or maturation. Social media provides platforms for this young generation to connect to each other. Understanding and perceiving a dialectical perspective of social media is helpful for Gen Zers to reflect about themselves and spend time wisely.

Limitations and Future Directions

Participants in both Study I and Study II were taking the same general education course and could share similar backgrounds or characteristics. The sample sizes for both studies were not large enough to conduct factor analyses among variables, which limited the power of proposed conclusions. Setting of Study II was a quasi-experiment to simulate usage of social media but did not show success. Future researchers should consider conducting longitudinal studies to examine the possible impact directly from social media.

Due to the modification of questionnaire on emotion regulation and emotional expressivity, internal consistencies for some subscales were less than ideal. Some items for in-person interactions can hardly be modified for social media interactions such as "My body reacts

very strongly to emotional situations." Insufficient number of items in certain subscales could explain low internal consistency. In addition, emotion regulation questionnaire does not separately measure positive emotions and negative emotions. However, emotional expressivity questionnaire treats them individually. Using consistent pair of questionnaires to measure emotion regulation and emotional expressivity may achieve more consistent relationships and better interpretations. More aspects (e.g., measuring emotional expressivity in specific situation) should be added to better understand how it relates to other variables.

Appendices

Appendix A-Social media use for Study I

1. Does your phone tell you how much time you spent on social media/networking?
    a. Yes
    b. No
2. How much time do you spent on social media?
    a. _____hours ____minutes
3. Please check all of the platforms that you currently use.
    a. Facebook
    b. WhatsApp
    c. Instagram
    d. Snapchat
    e. Twitter
    f. Pinterest
    g. Tumblr
    h. LinkedIn
    i. Others (Please specify)_____
4. When you go on social media, how much time you spent is for communication (i.e., posting, commenting, or messaging) purposes?
    a. _____hours ____minutes
5. When you go on social media, how much time you spent is for non-communication (i.e., surfing) purposes?
    a. _____hours ____minutes

Appendix B-Depression scale

Center for Epidemiologic Studies Depression Scale (CES-D)
Please choose the option that best describes your feeling.

A. Rarely or none of the time (<1 day)
B. Some or a little of the time (1-2 days)
C. Occasionally or a moderate amount of the time (3-4 days)
D. Most or all of the time (5-7 days)

1. I was bothered by things that don't usually bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with the help of my family or friends.
4. I felt that I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt everything I did was an effort.
8. I felt hopeful about the future.
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
14. I felt lonely.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people disliked me.
20. I could not get "going".

Appendix C-ADHD scale

Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist
Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, place the option in the box that best describes how you have felt and conducted yourself over the past 6 months. Please give this completed checklist to your healthcare professional to discuss during today's appointment.
Options:
A. Never B. Rarely C. Sometimes D. Often E. Very often
1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?
2. How often do you have difficulty getting things in order when you have to do a task that requires organization?
3. How often do you have problems remembering appointments or obligations?
4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?
5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time? 6. How often do you feel overly active and compelled to do things, like you were driven by a motor?
7. How often do you make careless mistakes when you have to work on a boring or difficult project?
8. How often do you have difficulty keeping your attention when you are doing boring or repetitive work? 9. How often do you have difficulty concentrating on what people say to you, even when they are speaking to you directly?
10. How often do you misplace or have difficulty finding things at home or at work?
11. How often are you distracted by activity or noise around you?
12. How often do you leave your seat in meetings or other situations in which you are expected to remain seated?
13. How often do you feel restless or fidgety?
14. How often do you have difficulty unwinding and relaxing when you have time to yourself?
15. How often do you find yourself talking too much when you are in social situations?
16. When you're in a conversation, how often do you find yourself finishing the sentences of the people you are talking to, before they can finish them themselves?
17. How often do you have difficulty waiting your turn in situations when turn taking is required?
18. How often do you interrupt others when they are busy?

Appendix D-Emotion regulation questionnaire

For each statement below, please indicate your agreement or disagreement. Do so by filling in the blank in front of each item with the appropriate number from the following rating scale:

1	**2**	**3**	**4**	**5**	**6**	**7**
strongly disagree			**neutral**			**strongly agree**

1. ____ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.

2. ____ I keep my emotions to myself.
3. ____ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.

4. ____When I am feeling *positive* emotions, I am careful not to express them.

5. ____When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.

6. ____ I control my emotions by *not expressing them*.
7. ____When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.

8. ____ I control my emotions by *changing the way I think* about the situation I'm in.

9. ____When I am feeling *negative* emotions, I make sure not to express them.

10. ____When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

Appendix E-Emotional expressivity scale

For each statement below, please indicate your agreement or disagreement. Do so by filling in the blank in front of each item with the appropriate number from the following rating scale:

1	**2**	**3**	**4**	**5**	**6**	**7**
strongly disagree			**neutral**			**strongly agree**

____ 1. Whenever I feel positive emotions, people can easily see exactly what I am feeling.

____ 2. I sometimes cry during sad movies.
____ 3. People often do not know what I am feeling.
____ 4. I laugh out loud when someone tells me a joke that I think is funny.

____ 5. It is difficult for me to hide my fear.
____ 6. When I'm happy, my feelings show.

____ 7. My body reacts very strongly to emotional situations.

____ 8. I've learned it is better to suppress my anger than to show it.

____ 9. No matter how nervous or upset I am, I tend to keep a calm exterior.

____10. I am an emotionally expressive person.

____11. I have strong emotions.

____12. I am sometimes unable to hide my feelings, even though I would like to.

____13. Whenever I feel negative emotions, people can easily see exactly what I am feeling.

____14. There have been times when I have not been able to stop crying even though I tried to stop.

____15. I experience my emotions very strongly.
____16. What I'm feeling is written all over my face.

Appendix F-Rosenberg self-esteem inventory (modified)

Instructions

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1	**2**	**3**	**4**	**5**	**6**	**7**
strongly disagree			**neutral**			**strongly agree**

1. On the whole, I am satisfied with myself

2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.

4. I feel I do not have much to be proud of.
5. I certainly feel useless at times.

6. I feel that I'm a person of worth, at least on an equal plane with others.

7. All in all, I am inclined to feel that I am a failure.

8. I take a positive attitude toward myself.

Appendix G-The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number (1 to 5, 1 means strongly disagree, 5 means strongly agree) next to each statement to indicate the extent to which you agree or disagree with that statement.

I see Myself as Someone Who...

___ 1. Is talkative
___ 2. Tends to find fault with others
___ 3. Does a thorough job
___ 4. Is depressed, blue
___ 5. Is original, comes up with new ideas
___ 6. Is reserved
___ 7. Is helpful and unselfish with others
___ 8. Can be somewhat careless
___ 9. Is relaxed, handles stress well
___ 10. Is curious about many different things
___ 11. Is full of energy
___ 12. Starts quarrels with others
___ 13. Is a reliable worker
___ 14. Can be tense
___ 15. Is ingenious, a deep thinker
___ 16. Generates a lot of enthusiasm
___ 17. Has a forgiving nature
___ 18. Tends to be disorganized
___ 19. Worries a lot
___ 20. Has an active imagination
___ 21. Tends to be quiet
___ 22. Is generally trusting
___ 23. Tends to be lazy
___ 24. Is emotionally stable, not easily upset
___ 25. Is inventive
___ 26. Has an assertive personality
___ 27. Can be cold and aloof
___ 28. Perseveres until the task is finished
___ 29. Can be moody
___ 30. Values artistic, aesthetic experiences
___ 31. Is sometimes shy, inhibited
___ 32. Is considerate and kind to almost everyone
___ 33. Does things efficiently
___ 34. Remains calm in tense situations
___ 35. Prefers work that is routine
___ 36. Is outgoing, sociable
___ 37. Is sometimes rude to others
___ 38. Makes plans and follows through with them
___ 39. Gets nervous easily

___ 40. Likes to reflect, play with ideas
___ 41. Has few artistic interests
___ 42. Likes to cooperate with others
___ 43. Is easily distracted
___ 44. Is sophisticated in art, music, or literature

Appendix H-Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by circling how often you felt or thought a certain way.

1=Never 2=Almost never 3=Sometimes 4=Fairly often 5=Very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

2. In the last month, how often have you felt that you were unable to control the important things in your life?

3. In the last month, how often have you felt nervous and “stressed”?

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

5. In the last month, how often have you felt that things were going your way?

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

7. In the last month, how often have you been able to control irritations in your life?

8. In the last month, how often have you felt that you were on top of things?

9. In the last month, how often have you been angered because of things that were outside of your control?

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix I-A Short version of the Self-Regulation Questionnaire

The Short version of the Self-Regulation Questionnaire (SSRQ) is a 31-item self-report measure of the ability to regulate behavior to achieve one's goals. Participants indicate the extent to which they agree with each item using a 5-point Likert scale: 1 (Strongly Disagree), 2 (Somewhat Disagree), 3 (Neutral), 4 (Somewhat Agree), and 5 (Strongly Agree).

1. I have trouble making plans to help me reach goals.
2. I have a hard time setting goals for myself.
3. Once I have a goal, I can usually plan how to reach it.
4. I give up quickly.
5. I set goals for myself and keep track of my progress.
6. When I'm trying to change something, I pay attention to how I'm doing.
7. I don't notice the effects of my actions until it's too late.
8. I tend to keep doing the same thing, even when it doesn't work.
9. I have personal standards and try to live up to them.
10. I get easily distracted from my plans.
11. I have trouble following through with things once I've made up my mind to do something.
12. I have a lot of willpower.
13. I'm able to accomplish goals I set for myself.
14. If I make a resolution to change something, I pay a lot of attention to how I'm doing.
15. I put off making decisions.
16. Most of the time I don't pay attention to what I'm doing.
17. I don't seem to learn from my mistakes.
18. If I wanted to change, I am confident that I could do it.
19. I usually keep track of my progress toward my goals.
20. I usually think before I act.
21. As soon as I see a problem or challenge, I start looking for possible solutions.
22. When it comes to deciding about a change, I feel overwhelmed by the choices.
23. I learn from my mistakes.
24. I am able to resist temptation.
25. Often I don't notice what I'm doing until someone calls it to my attention.
26. I have trouble making up my mind about things.
27. I know how I want to be.
28. I usually only have to make a mistake one time in order to learn from it.
29. I can stick to a plan that is working well.
30. I can usually find several different possibilities when I want to change something.
31. It's hard for me to notice when I've had enough (alcohol, food, sweets)

Appendix J-Social Media Use Questionnaire for Study II

This study focuses on social media platforms that emphasize more on communication and social-networking functions than others. Thus, platforms such as YouTube and Quora do not count as social media platforms in this study though they might be seen as social media platforms in a broader definition.

General

1. Please check all social media platforms that you currently use.
    a. Facebook
    b. Twitter
    c. Instagram
    d. Snapchat
    e. Pintrist
    f. Tumblr
    g. LinkedIn
    h. Reddit
    i. Tik Tok
    j. Other, please specify
    k. I do not use any social media platform
2. To what extent do you think you rely on social media for your relationships (e.g., romantic, family, and friendships)?
    a. > 80% of my relationships are maintained through social media.
    b. 60%~80% of my relationships are maintained through social media.
    c. 40%~59% of my relationships are maintained through social media.
    d. 20%~39% of my relationships are maintained through social media.
    e. < 20% of my relationships are maintained through social media.
3. Please write down the estimated time proportion of you accessing social media using each device.
    a. Mobile _____%
    b. Laptop/computer _____%
    c. Tablet _____%
    d. Others, please specify _____, _____%

For each statement below, please indicate your agreement or disagreement.

Strongly Disagree. Disagree. Slight Disagree. Neutral. Slight Agree. Agree. Strongly Agree.
1 2 3 4 5 6 7

4. I like social media.
5. I can see being a social media influencer (e.g., become an Instagrammer) as a legit career for people.
6. I can see being a social media influencer (e.g., become an Instagrammer) as my current/future job.
7. I can see social media as a competition.
8. I care about how many likes and comments I receive.
9. You can only see what other people want you to see on social media.
10. I tend not to post the bad side of me on social media.

11. I tend to compare myself to others based on social media.
12. Social media has a negative influence on me.
13. Social media has a negative influence on my generation.
14. I go on social media more often when I am sad than I am happy.
15. I use different social media platforms for different purposes (if applicable).

Facebook (Questions would be the same for different platforms)

1. How much time do you typically spend on Facebook per day?
    a. < 1 hour
    b. 1 hour ~2 hours
    c. 2 hours ~ 4 hours
    d. > 4 hours
2. For what purposes do you use Facebook? Please check all that apply.
    a. Communication (e.g., keep up with friends and families)
    b. Entertainment
    c. Academical support
    d. Stress relief
    e. Killing time
    f. Getting rid of boredom
    g. Self-validation
    h. News
    i. Keep updated with celebrities
    j. Others, please specify
3. Please write down the estimated percentage of total time that you spend on Facebook for each purpose you checked above (options would change depending on what options they checked in question #2).
    a. _____%
    b. _____%
    c. _____%
    d. _____%
4. Approximately how many friends do you have on Facebook?
    a. _____
5. How often do you typically post on Facebook?
    a. Once a week or less.
    b. Several times (2~5) a week.
    c. Once per day.
    d. Multiple times (2~5) per day.
    e. More than 5 times per day.

For each statement below, please indicate your agreement or disagreement.

Strongly Disagree. Disagree. Slight Disagree. Neutral. Slight Agree. Agree. Strongly Agree.
1 2 3 4 5 6 7

6. Facebook has become part of my daily routine.
7. I am a different person when I am on Facebook.
8. I feel left out when I haven't logged onto Facebook for a while.
9. I check frequently for comments/likes after I post a new feed.

10. After accessing Facebook, I feel happier.

Twitter

1. How much time do you typically spend on Twitter per day?
    a. < 1 hour
    b. 1 hour ~2 hours
    c. 2 hours ~ 4 hours
    d. > 4 hours
2. For what purposes do you use Twitter? Please check all that apply.
    a. Communication (e.g., keep up with friends and families)
    b. Entertainment
    c. Academical support
    d. Stress relief
    e. Killing time
    f. Getting rid of boredom
    g. Self-validation
    h. News
    i. Keep updated with celebrities
    j. Others, please specify
3. Please write down the estimated percentage of total time that you spend on Twitter for each purpose you checked above (options would change depending on what options they checked in question #2).
    a. _____%
    b. _____%
    c. _____%
4. Approximately how many followers do you have on Twitter?
    a. _____
5. How often do you typically post on Twitter?
    a. Once a week or less.
    b. Several times (2~5) a week.
    c. Once per day.
    d. Multiple times (2~5) per day.
    e. More than 5 times per day.

For each statement below, please indicate your agreement or disagreement.

Strongly Disagree. Disagree. Slight Disagree. Neutral. Slight Agree. Agree. Strongly Agree.
1 2 3 4 5 6 7

6. Twitter has become part of my daily routine.
7. I am a different person when I am on Twitter.
8. I feel left out when I haven't logged onto Twitter for a while.
9. I check frequently for comments/likes after I post a new feed.
10. After accessing Twitter, I feel happier.

Instagram

1. How much time do you typically spend on Instagram per day?

   a. < 1 hour
   b. 1 hour ~2 hours
   c. 2 hours ~ 4 hours
   d. > 4 hours
2. For what purposes do you use Instagram? Please check all that apply.
   a. Communication (e.g., keep up with friends and families)
   b. Entertainment
   c. Academical support
   d. Stress relief
   e. Killing time
   f. Getting rid of boredom
   g. Self-validation
   h. News
   i. Keep updated with celebrities
   j. Others, please specify
3. Please write down the estimated percentage of total time that you spend on Instagram for each purpose you checked above (options would change depending on what options they checked in question #2).
   a. _____%
   b. _____%
   c. _____%
4. Approximately how many followers do you have on Instagram?
   a. _____
5. How often do you typically post on Instagram?
   a. Once a week or less.
   b. Several times (2~5) a week.
   c. Once per day.
   d. Multiple times (2~5) per day.
   e. More than 5 times per day.

For each statement below, please indicate your agreement or disagreement.
Strongly Disagree. Disagree. Slight Disagree. Neutral. Slight Agree. Agree. Strongly Agree.
1 2 3 4 5 6 7

6. Instagram has become part of my daily routine.
7. I am a different person when I am on Instagram.
8. I feel left out when I haven't logged onto Instagram for a while.
9. I check frequently for comments/likes after I post a new feed.
10. After accessing Instagram, I feel happier.

Snapchat

1. How much time do you typically spend on Snapchat per day?
   a. < 1 hour
   b. 1 hour ~2 hours
   c. 2 hours ~ 4 hours
   d. > 4 hours
2. For what purposes do you use Snapchat? Please check all that apply.

   a. Communication (e.g., keep up with friends and families)
   b. Entertainment
   c. Academical support
   d. Stress relief
   e. Killing time
   f. Getting rid of boredom
   g. Self-validation
   h. News
   i. Keep updated with celebrities
   j. Others, please specify
3. Please write down the estimated percentage of total time that you spend on Snapchat for each purpose you checked above (options would change depending on what options they checked in question #2).
   a. _____%
   b. _____%
   c. _____%
4. Approximately how many friends do you have on Snapchat?
   a. _____
5. How often do you typically post on Snapchat?
   a. Once a week or less.
   b. Several times (2~5) a week.
   c. Once per day.
   d. Multiple times (2~5) per day.
   e. More than 5 times per day.

For each statement below, please indicate your agreement or disagreement.

Strongly Disagree. Disagree. Slight Disagree. Neutral. Slight Agree. Agree. Strongly Agree.
1 2 3 4 5 6 7

6. Snapchat has become part of my daily routine.
7. I am a different person when I am on Snapchat.
8. I feel left out when I haven't logged onto Snapchat for a while.
9. I check frequently for comments/likes after I post a new feed.
10. After accessing Snapchat, I feel happier.

Same questions were also generated for the following platforms if participants checked them in the first question.

   a. Pintrist
   b. Tumblr
   c. LinkedIn
   d. Reddit
   e. Tik Tok
   f. Other, please specify

Appendix K—Bivariate Pearson Correlation for Study I

Bivariate Person Correlation among interval and ratio variables

	A	B	C	D	E	F	G	H
A.GPA	1	p = 0.012	0.029	0.176	0.721	0.936	0.337	0.039
B.Age	r = -.230*	1	0.725	0.613	0.757	0.936	0.266	0.447
C.CogReapp	-.194*	-0.033	1	0.87	0.458	0.681	0.139	0.113
D.ExSup_IP	-0.121	0.047	0.015	1	0.000	0.000	0.004	0.007
E.ExSup_SM	0.035	0.031	-0.073	.470**	1	0.003	0.001	0.036
F.Extraversion	-0.007	-0.007	0.037	-.350**	-.287**	1	0.001	0.066
G.Agreeableness	0.086	-0.103	0.132	-.254**	-.312**	.302**	1	0.000
H.Conscientious	.183*	0.071	0.141	-.237**	-.204*	0.164	.413**	1
I.Neuroticism	0.045	-0.095	-.326**	0.032	0.061	-.519**	-.237**	-0.170
J.Openness	-0.006	0.143	-0.014	-0.099	-0.106	.250**	0.167	.215*
K.EE_Negative_IP	-0.038	-0.112	-0.047	-.525**	-.390**	0.042	0.011	-0.033
L.EE_Negative_SM	-0.178	-0.079	-0.069	-0.035	-.548**	0.061	-0.046	-0.138
M.EE_Positive_IP	0.057	-.193*	.229**	-.492**	-.409**	.340**	.351**	0.122
N.EE_Positive_SM	-0.157	-0.023	.267**	0.003	-.490**	.206*	.209*	-0.016
O.EE_Impulse_IP	0.085	-.242**	-0.059	-.320**	-.281**	0.049	0.088	0.110
P.EE_Impulse_SM	-0.135	-0.097	0.008	-0.036	-.617**	0.06	0.036	-0.137
Q.SelfEsteem	0.057	0.151	.409**	-.253**	-0.173	.436**	.306**	.411**
R.ADHD_Inatten	-0.111	-0.004	-0.04	.187*	0.144	-0.108	-.251**	-.586**
S.ADHD_Hyper	-0.107	-0.061	-0.102	0.009	-0.148	0.174	-.192*	-.377**
T.Depression	-0.105	-0.06	-.306**	0.164	0.088	-.324**	-.212*	-.254**
U.AllTimeSpent	-.190*	-0.005	-0.07	.254**	-0.04	-0.043	-0.144	-0.079
V.ComTimeSpent	-0.017	0.000	-0.041	.189*	0.029	0.036	0.003	-0.008
W.NonCTSpent	-0.076	0.028	-0.106	.268**	0.022	-0.005	-0.139	-.241**
X.# of Platform	0.094	-0.037	-0.128	-0.094	0.003	0.067	0.01	0.101

Note. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Appendix K continued

	I	J	K	L	M	N	O	P
A.GPA	0.618	0.943	0.672	0.067	0.522	0.077	0.341	0.129
B.Age	0.309	0.122	0.229	0.434	0.037	0.806	0.008	0.295
C.CogReapp	0.000	0.880	0.600	0.481	0.010	0.002	0.51.	0.925
D.ExSup_IP	0.722	0.268	0.000	0.719	0.000	0.974	0.000	0.689
E.ExSup_SM	0.536	0.282	0.000	0.000	0.000	0.000	0.004	0.000
F.Extraversion	0.000	0.005	0.641	0.535	0.000	0.020	0.585	0.501
G.Agreeableness	0.007	0.061	0.899	0.641	0.000	0.018	0.327	0.685
H.Conscientiousness	0.056	0.015	0.712	0.157	0.171	0.861	0.217	0.126
I.Neuroticism	1	0.024	0.007	0.244	0.564	0.087	0.000	0.535
J.Openness	-.200*	1	0.476	0.613	0.748	0.666	0.022	0.933
K.EE_Negative_IP	.239**	-0.064	1	0.000	0.000**	0.012	0.000	0.000
L.EE_Negative_SM	0.114	-0.05	.550**	1	0.021*	0.000	0.035	0.000
M.EE_Positive_IP	-0.052	0.029	.446**	.223*	1	0.000	0.000	0.138
N.EE_Positive_SM	-0.152	0.039	.222*	.562**	.316**	1	0.046	0.000
O.EE_Impulse_IP	.406**	.203*	.415**	.205*	.363**	.178*	1	0.001
P.EE_Impulse_SM	0.056	-0.008	.347**	.714**	0.132	.565**	.298**	1
Q.SelfEsteem	-.656**	0.154	0.052	-0.089	.228**	.180*	-0.123	-0.055
R.ADHD_Inatten	.305**	-0.019	-0.143	-0.017	-0.067	-0.157	0.031	0.007
S.ADHD_Hyper	.203*	0.142	0.001	0.156	-0.01	0.002	.188*	.199*
T.Depression	.667**	-0.09	-0.076	0.034	-0.144	-0.143	.207*	0.028
U.AllTimeSpent	0.046	-0.108	0.065	.230*	-.199*	0.154	-0.022	.246**
V.ComTimeSpent	-0.092	0.064	-0.022	0.148	-0.102	0.112	0.045	.196*
W.NonCTSpent	0.010	-0.139	-0.089	0.057	-0.079	0.116	-0.159	0.157
X.# of Platform	0.156	0.083	0.106	0.066	0.082	0.116	.205*	0.052

Note. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Appendix K continued

	Q	R	S	T	U	V	W	X
A.GPA	0.525	0.216	0.232	0.242	0.032	0.861	0.424	0.291
B.Age	0.103	0.968	0.509	0.518	0.957	0.996	0.774	0.693
C.CogReapp	0.000	0.658	0.255	0.000	0.433	0.665	0.263	0.151
D.ExSup_IP	0.004	0.035	0.916	0.066	0.004	0.045	0.004	0.291
E.ExSup_SM	0.077	0.141	0.129	0.369	0.682	0.778	0.830	0.974
F.Extraversion	0.000	0.228	0.051	0.000	0.634	0.703	0.961	0.454
G.Agreeableness	0.000	0.004	0.030	0.017	0.107	0.976	0.140	0.908
H.Conscientiousness	0.000	0.000	0.000	0.004	0.379	0.933	0.010	0.260
I.Neuroticism	0.000	0.000	0.022	0.000	0.604	0.334	0.917	0.080
J.Openness	0.084	0.835	0.112	0.316	0.228	0.501	0.139	0.354
K.EE_Negative_IP	0.559	0.109	0.990	0.395	0.470	0.814	0.347	0.236
L.EE_Negative_SM	0.365	0.866	0.110	0.728	0.018	0.150	0.581	0.503
M.EE_Positive_IP	0.010	0.451	0.911	0.107	0.025	0.281	0.405	0.359
N.EE_Positive_SM	0.043	0.078	0.979	0.110	0.085	0.238	0.220	0.192
O.EE_Impulse_IP	0.168	0.727	0.034	0.019	0.805	0.634	0.091	0.021
P.EE_Impulse_SM	0.543	0.935	0.025	0.757	0.005	0.038	0.096	0.564
Q.SelfEsteem	1	0.000	0.007	0.000	0.530	0.307	0.511	0.654
R.ADHD_Inatten	-.435**	1	0.000	0.000	0.324	0.974	0.019	0.244
S.ADHD_Hyper	-.238**	.580**	1	0.000	0.062	0.645	0.146	0.569
T.Depression	-.809**	.454**	.362**	1	0.429	0.423	0.984	0.499
U.AllTimeSpent	-0.056	0.088	0.166	0.071	1	0.000	0.000	0.069
V.ComTimeSpent	0.097	-0.003	0.044	-0.076	.520**	1	0.009	0.069
W.NonCTSpent	-0.062	.220*	0.137	-0.002	.513**	.247**	1	0.033
X.# of Platform	-0.040	-0.104	0.051	0.061	0.162	0.172	.200*	1

Note. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

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