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# INVESTIGATING VARIATION AND STRENGTH IN SOCIAL NETWORKS

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Participants were 318 college students from two small, Catholic liberal arts institutions in the Upper Midwest. Variation (i.e., having friends with varied interests and activities) of an individual's social network was measured by a researcher-developed inventory, the Social Network Variation Scale (SNVS). Social network strength was measured by the researcher-developed Social Network Strength Scale (SNS). People with more variation or more strength in their social network had higher levels of happiness and lower levels of stress. Autonomy mediated the relationships between variation and stress and strength and stress. Personality moderated the relationships between variation and happiness and variation and stress.

*Keywords:* emerging adulthood, social network, friendship, social network variation, social network strength, happiness, stress

A universal aspect of college life is the development of new social networks that fulfill the student's needs for social support (Arnett, 2000; Blakemore & Mills, 2014; Buote, Pancer, Pratt, Adams, Birnie-Lefcovitch, Polivy, & Wintre, 2007; Lefkowitz, 2005). The present study examined two previously uninvestigated dimensions of social networks: the variety of interests and activities available within students' social networks and the strength of the ties in social networks.

In times of elation and despair, humans look to their social networks for social support and stress reduction (Barrera, 2000; Cowen, 1994; d'Abbs, 1982; House, Umberson, & Landis, 1988; Hrabowski, Maton, & Greif, 1998; Ni, Yang, Zhang, & Dong, 2015; Westaway, Olorunju, & Rai, 2007). Variation is an important component of an individual's social network. For example, Epley and Schroeder

(2014) showed that participants who made an effort to speak with strangers on their daily commute showed more positive perceptions of their commutes than those who did not. Thus, even artificially expanding variation in one's social network has a positive impact.

Friends influence how people see the world (Markiewicz, Lawford, Doyle, & Haggart, 2006). Ahmed and Brumbaugh (2014) found that students with narrow, one-dimensional social networks are more likely to have unresolved stress because they lack the social resources necessary to talk about issues outside of the narrow interests that define their social network. In other words, a narrow social network constricts a person's range of options to deal with stress. Individuals with a narrow social network may perceive that they lack the autonomy to find other options for coping. Consequently, it seems reasonable

to hypothesize that a varied social network provides a sense of perceived autonomy to participate in any activity of choice and obtain social support for a variety of problems, resulting in lower stress.

Granovetter (1983) argued that people have both strong and weak social network ties and that a mix of stronger and weaker ties (i.e., closer, personal friends and more distant acquaintances) is part of what makes a person's social network rewarding. College is a time of profound change and adjustment, so varied social networks are important for autonomy and stress-buffering. If relationships are homogeneous, a student's experience may be homogeneous; if they are varied, students may be exposed to more varied interests and viewpoints. Large networks, and thus varied activities, lead to opportunities for a wide variety of support and entertainment (Merritt & Snyder, 2015), which has a positive effect on overall happiness and reduces social isolation (Alcott, Karlan, Möbius, Rosenblat, & Szeidl, 2007). The benefits different kinds of people bring to a social network abound; therefore, variation in strength of social ties should correlate positively with happiness.

Morin and Seidman (1986) and Hirsch (1981) found that people with social networks outside of their families had better outcomes. Moreover, low-density networks provided more opportunities for refuge in one facet of a social network from another area in the network with which one may have conflict or disagreement. The present study differs from Hirsch (1981) on multiple dimensions. Hirsch measured college students under environmentally-induced stress over 27 days, whereas the present study investigates the daily lives of college students. Second, the present study is concerned with not only the effects of social support, but also the freedom or autonomy linked with having a varied social network. Third, the measures are radically different.

A second dimension of social networks

investigated in the present study was the *strength* of social ties (Granovetter, 1983). A scale was created based on the six friendship functions of Mendelson and Aboud's (1999) McGill Friendship Questionnaire–Friendship Function (MFQ-FF): (a) stimulating companionship, (b) help, (c) intimacy, (d) reliable alliance, (e) self-validation, and (f) emotional security. Studies have shown that a higher frequency of friendship functions available within the person's social network reflects stronger ties and a more multidimensional social network (Kloos, Hill, Thomas, Wandersman, Elias, & Dalton, 2012). Moreover, Krackhardt (1992) found that students with a variety of friendship functions available in their social networks were happier and experienced less stress.

The present study posits that having a variety of weaker *and* stronger ties should lead to a broader perspective on life as a whole, leading to greater happiness and less stress through the opportunity to participate in a variety of activities; an absence of weak ties would restrict information only to a single circle. Hendrickson, Rosen, and Aune (2011) investigated international students studying abroad in Hawai'i and found they benefited from having connections with host-country students; expanding their social networks beyond peers from their home country was beneficial. Host nationals serve as sources of information regarding the host culture's communication patterns, which aids the adjustment of international students (Kim, 2001), allowing individuals to feel more socially connected and leading to greater satisfaction and happiness (Hendrickson et al., 2011).

Granovetter (1973) suggests that strong ties involve individuals with similar interests, personalities, and emotional connections, so the information shared in the friendship tends to be redundant. Weak ties contribute to social networks by increasing variation and integrating cross-network connections; strong ties

tend to be closer, more similar friends. Thus, it is hypothesized that a variety of both strong and weak ties, reflected in the total number of friendship functions available across a number of friends, should provide more diverse perspectives, which provides a valuable source of stress relief. Additionally, weaker ties provide refuge from stress among stronger ties, and vice versa (Hirsch, 1981; Morin & Seidman, 1986). The present study further investigates the ramifications of having increased variation in one's social network.

Previous research (e.g., Lin, Chu, Liang, Chiu, & Lin, 2014; Madanagopal & Thenmozhi, 2015) has supported the notion that one must have a perceived sense of autonomy to be satisfied. Madanagopal and Thenmozhi (2015) found that higher levels of job autonomy were related to higher levels of satisfaction. College students with low degrees of interest variation may have a limit on autonomy because they may feel like they must go along to get along with the group. The present study hypothesizes that freedom to participate in a variety of activities at will, which would be associated with greater social network variation, should relate to higher overall happiness and that a sense of perceived autonomy may be a mediator of such effects.

Self-determination (i.e., the feeling that one is competent to bring about desired outcomes) is a critical factor in psychological health (Bandura & Walters, 1963). Conversely, feeling that behavior and goals are not necessarily attainable through personal competence may lead to a pervasive sense of helplessness (Abramson, Metalsky, & Alloy, 1989), which may inhibit happiness. Deci and Ryan (1985) argue that people must feel autonomous and self-determined in their daily lives to feel capable and happy, and to enjoy the best psychological health. An absence of perceived autonomy in everyday endeavors may lead to negative emotions (Csikszentmihalyi & Figurski, 1982). Using

the Self-Determination Scale as a measure of autonomy, Sheldon, Ryan, and Reis (1996) found support for the notion that autonomy is associated with greater well-being. People who rated their days higher on the Self-Determination Scale (autonomy) tended to have better days overall.

If some friends wish to engage in an undesired activity, a person with a wider network will have alternative friends and activities from which to choose (Granovetter, 1983). Handley, Inder, Kelly, Attia, Lewin, Fitzgerald, and Kay-Lambkin (2012) supported that notion: high friendship availability (i.e., having people who are physically available) and high sense of belonging in the community were associated with lower risk of suicide, and low friendship availability was associated with increased risk of suicide. Further, transitioning from a close friendship with a high school friend to a close relationship with a college friend mediates adjustment to college (Swenson, Nordstrom, & Hiester, 2008). It seems detrimental to autonomy and happiness if one's social network does not allow a wide range of activities and interests or leaves one consistently isolated. The present study hypothesizes that being involved in multiple interests and activities with a variety of people should be positively correlated with happiness.

Having a large network of varied social ties predicts a stronger sense of independence (i.e., autonomy) because the person is not reliant solely on his or her own closest friends. Having a large network available for social support encourages healthy habits (Matureo & Cunningham, 2013) and increases social skills, self-efficacy, and overall happiness (Chan & Lee, 2006). We argue that college students benefit from variation in interests and activities in their social network to offer different perspectives and support and to provide a sense of autonomy to navigate the college landscape by participating in activities

of their choice. More variation in a student's social network means they can participate in a wider range of activities (e.g., study, see a movie, talk, go out to eat, exercise, etc.), because there is usually someone in their social network willing to engage in the activity with them. The same applies to relationship strength, except that the availability of individuals with whom one has stronger ties provides even greater latitude in activities and the range of topics that can be discussed. Thus, both variation and strength of relationships should help people explore different perspectives and have increased autonomy, leading to a social environment conducive to overall growth and happiness.

Thus, autonomy could mediate the relationship between variation and happiness. We deduce that individuals need to feel a sense of autonomy to experience the stress-buffering impact of variation. If one has a variety of different people with whom to participate in different activities, a sense of autonomy may be absent if the person is too dependent on one or more groups. For example, a person may be too connected to one segment of his or her network and thus not perceive autonomy to reach out to other segments. Alternatively, one may be so dependent on each segment of one's social network that one cannot make one's own decisions. Thus, we infer that autonomy mediates the relationships between social network characteristics and happiness and stress.

Russell, Booth, Reed, and Laughlin (1997) determined that extraversion appears to influence both network formation and maintenance. Extraverts reported having more support, more frequent interactions, and more people in their social network. Thus, introverts may have different preferences in social networks than do extraverts. Introverts may not prefer to be around a variety of people; they prefer to be alone and "enjoy the peace and quiet of solitude" (Larsen & Buss, 2018,

p. 437). The general tendency of introverts to become more easily overaroused than extraverts is what ultimately leads them to seek out more restrained, inhibited situations. In short, introverts do not seek out social stimulation, because they want to maintain their already-optimal level of arousal (Matthews & Gilliland, 1999).

Consequently, introverts may not desire a social network with varying interests and activities. They may prefer to stick to more solitary kinds of activities with a more restricted range of people. Introverts draw energy from their own inner world and a limited social network of close friends, so having too varied a social network may be stressful for them. Thus, introversion–extraversion may moderate the relationships among variation and strength of social networks, happiness, and stress.

The following specific hypotheses were tested in the present study.

**Hypothesis 1:** Variation in social networks is positively correlated with happiness.

**Hypothesis 2:** Strength in social networks is positively correlated with happiness.

**Hypothesis 3:** Variation in social networks is negatively correlated with stress.

**Hypothesis 4:** Strength in social networks is negatively correlated with stress.

**Hypothesis 5:** Autonomy is positively correlated with variation.

**Hypothesis 6:** Autonomy is positively correlated with happiness.

**Hypothesis 7:** Autonomy is negatively correlated with stress.

**Hypothesis 8:** Autonomy mediates the relationship between (a) variation and happiness and (b) strength and happiness.

**Hypothesis 9:** Autonomy mediates the Relationship between (a) variation and stress and (b) strength and stress.

**Hypothesis 10:** Introversion–extraversion moderates (a) the relationship between variation and happiness and (b) the relationship between variation and stress.

## Method

### Participants

The participants were 318 college students (202 females; 115 males) from two small, Catholic, single-sex liberal arts colleges in the Upper Midwest, enrolling about 79% Caucasian students, and with a joint academic curriculum and course catalog that practically cause the two campuses to function as a single institution. In the sample, 1.9% were 18 years old, 10.1% were 19, 28.6% were 20, 39.3% were 21, 18.6% were 22, and 1.3% were 23 years or older. About 3,900 students attend the combined institutions, 70% of whom were Catholic, and 90% from the Upper Midwest. Although one campus enrolls only males and the other only females, virtually all classes are coeducational. Participation was limited to the sophomore, junior, and senior classes because they had adequate time to develop social networks.

### Measures

**Social Network Variation Scale.** Social network variation was measured by the researcher-developed Social Network Variation Scale (SNVS), and will henceforth be referred to as “Variation.” The first section asks the participants’ feelings about their social network. The second section lists different activities participants would like to pursue, how likely they are to desire to participate in the activity, and how likely they are to have someone with whom to participate in the specific activity. The SNVS score was computed by finding the total for both sections. The original SNVS was highly reliable (63 items;  $\alpha = .928$ ). We shortened the original scale to 35 items ( $\alpha = .904$ ) by removing items that were specific

to the college campus on which the survey was administered and/or did not significantly affect alpha. This researcher-developed scale is available at: [https://digitalcommons.csbsju.edu/honors\\_thesis/33/](https://digitalcommons.csbsju.edu/honors_thesis/33/).

**Social Network Strength Scale.** Social network strength was measured by the researcher-developed Social Network Strength Scale (SNSS), and will henceforth be referred to as “Strength.” The SNSS asks respondents to list the first and last initials of up to 12 friends and then check from zero to all six of the friendship functions each friend serves. Asking for initials ensures the respondent has an actual friend in mind, not some hypothetical person. The SNSS derives its six friendship functions from the McGill Friendship Questionnaire–Friendship Function (MFQ–FF; Mendelson & Aboud, 1999): (a) stimulating companionship, (b) help, (c) intimacy, (d) reliable alliance, (e) self-validation, and (f) emotional security. The role of *stimulating companionship* encompasses engaging in pleasant, entertaining, and interesting activities. *Help* addresses the provision of direction, advice, support, and other forms of assistance. *Intimacy* concerns understanding of the states and needs of the other, providing openness to honest expression of thoughts, emotional states, and private information. *Reliable alliance* reflects availability and continuous loyalty. *Self-validation* includes the purpose of reassuring, encouraging, and assisting one another to uphold a positive self-image. Lastly, *emotional security* covers the delivery of comfort and trust in novel or threatening circumstances. These definitions of the six friendship functions were provided at the beginning of the instrument. The total numbers of checked boxes are summed; higher numbers (social network strength scores) indicate higher social network strength. The SNSS was found to be highly reliable (12 items;  $\alpha = .959$ ). The full scale is available at: [https://digitalcommons.csbsju.edu/honors\\_thesis/33/](https://digitalcommons.csbsju.edu/honors_thesis/33/).

**Oxford Happiness Questionnaire.** Happiness was measured by the 29-item Oxford Happiness Questionnaire (OHQ; Hills & Argyle, 2002), and will henceforth be referred to as “Happiness.” The scale demonstrated high scale reliabilities with a value  $\alpha = .91$ . Each question (e.g., “I am well satisfied about everything in my life”) is answered using a six-point Likert scale using reverse scoring on 12 of the items. Scores range from 1 to 6, with higher scores indicating higher levels of happiness.

**Perceived Stress Scale.** Stress was measured by the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983), and will henceforth be referred to as “Stress.” The scale demonstrated adequate reliability with a value  $\alpha = .85$ . The PSS is a ten-item measure designed to evaluate the degree to which participants perceive their lives as stressful. Individuals rate each item on a five-point Likert scale ranging from 1 (not at all satisfied) to 5 (very satisfied). A sample question is “I am well satisfied about everything in my life.” Higher scores indicate greater perceptions of life stress; lower scores reflect lower perceptions of stress.

**Self-Determination Scale.** Autonomy was measured by the Self-Determination Scale (SDS; Sheldon, Ryan, & Reis, 1996), and will henceforth be referred to as “Autonomy.” The scale demonstrated adequate reliability with a value  $\alpha = .84$ . Questions ask participants to report which of two statements has more truth. For example, “My emotions sometimes seem alien to me” versus “My emotions always seem to belong to me” is a self-contact item and “What I do is often not what I’d choose to do” versus “I am free to do whatever I decide to do” is a choicefulness item. It has been consistent as a strong predictor of psychological health outcomes, such as self-actualization, empathy, and life satisfaction, resistance to peer pressure, and creativity.

**Mini-IPIP.** The introversion–extraversion dimension was measured by the introversion–extraversion items on the Mini-IPIP (Donnellan, Oswald, & Lucas, 2006), and will henceforth be referred to as “Introversion.” The scale demonstrated acceptable reliability with a value of  $\alpha = .77$  for its introversion–extraversion items. This measure has comparable internal consistencies as larger measures. A sample item is “I am the life of the party.”

### Procedure

Each participant took an online survey at his or her convenience. A link to the online survey was emailed to them. Instructors on campus from various disciplines were asked to solicit participation of students in their classes, some with the added incentive of small amounts of extra credit. This sample provided a wide variety of majors, yielding a representative sample of the institution as a whole. Table 1 shows descriptive statistics for the measures used in the study.

**Table 1. Descriptive Statistics for Variables Included in the Study**

Measure	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Cronbach's $\alpha$
Variation	132.85	19.42	-.457	.152	.904
Strength	33.97	16.38	.281	-.725	.959
Happiness	127.27	19.08	-.654	.137	.930
Stress	38.32	7.10	.407	-.189	.848
Autonomy	38.59	6.21	-.589	-.082	.844
Introversion	11.02	3.97	.379	-.724	.790

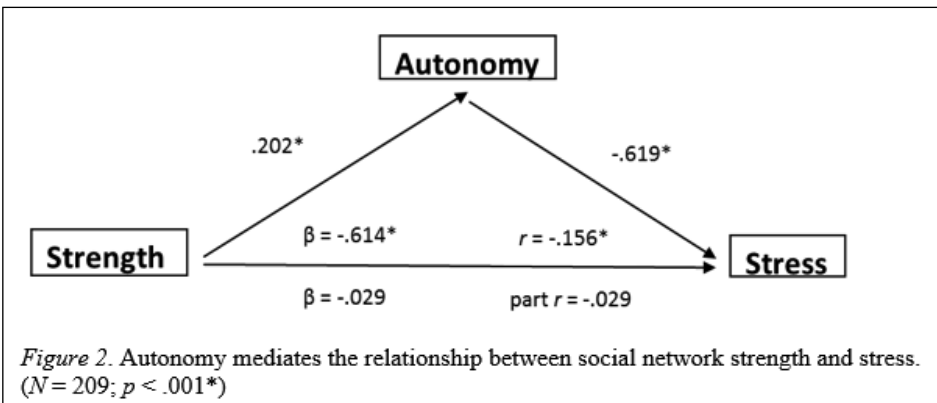
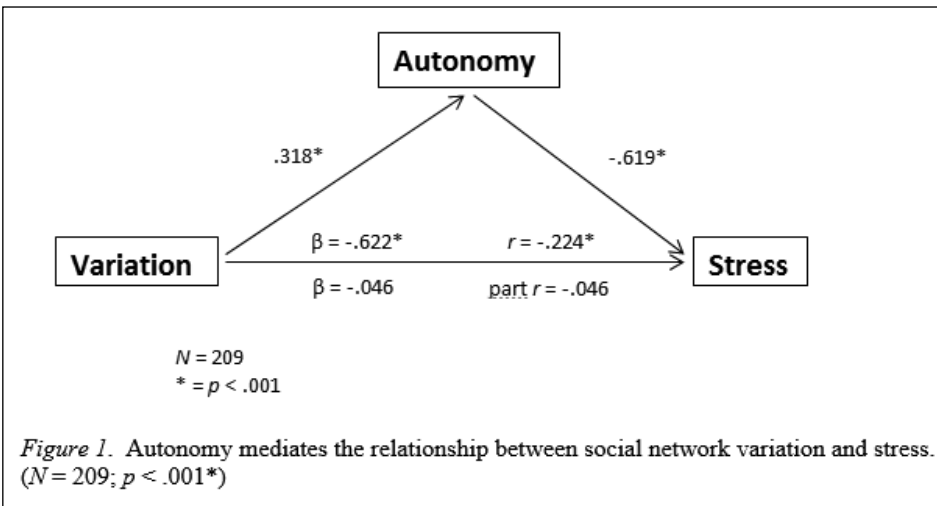
**Results**

As shown by the correlations reported in Table 2, Hypotheses 1 through 7 were supported.

Following the procedures outlined by Wilson-Doenges (2015), four mediation hypotheses — Hypotheses 8(a), 8(b), 9(a), and 9(b) — and two moderation hypotheses — Hypotheses 10(a) and 10(b) — were tested. Results indicated that autonomy mediated the relationship between social network Variation and Stress, as shown in Figure 1. The relationship between Variation and Stress was reduced to nonsignificance when Autonomy was included in the model. In other words,

Variation is negatively associated with Stress *because of* Autonomy. Similarly, Figure 2 shows that Autonomy mediated the relationship between social network Strength and Stress. The negative relationship between Strength and Stress was reduced to nonsignificance when Autonomy was included in the model. In other words, Strength is negatively correlated with Stress *because of* Autonomy. Results indicate that Autonomy may be the reason Variation and Strength predict lower levels of Stress.

Hypotheses 8(a) and 8(b), which predicted that the relationship between (a) Variation and Happiness and (b) Strength and Happiness





would be mediated by Autonomy, were not supported. However, we did find support for hypotheses 9(a) and 9(b) that Autonomy *does* mediate the relationship between (a) Variation and Stress and (b) Strength and Stress, as shown in Figures 1 and 2. The value .318 was the direct correlation between Variation and Autonomy. Likewise, -.619 was the direct correlation between Autonomy and Stress.

Above the bottom arrow -.224 is the direct correlation between Variation and Stress, but the part *r* below shows that relationship is reduced to nonsignificance (-.046) when controlling for Autonomy. The  $\beta$  values show similar information as *r* and part *r*, except the values for the independent and dependent variables are standardized. Stated differently, the values above the bottom arrow represent

**Table 2. Bivariate Correlations among Key Variables in the Study**

	Variation	Strength	Happiness	Stress	Autonomy	Introversion	GPA
Variation	1						
Strength	.458**	1					
Happiness	.568**	.344**	1				
Stress	-.224**	-.156**	-.648**	1			
Autonomy	.318**	.202**	.704**	-.619**	1		
Introversion	-.561**	-.202**	-.472**	.158**	-.254**	1	
GPA	.129*	.168**	.206**	-.172**	.070	.011	1

\*  $p < .01$

\*\*  $p < .001$

**Table 3. Multiple Regression of Happiness**

	<i>B</i>	$\beta$	Partial	Part <i>r</i>	<i>t</i>	Significance
(Constant)	81.132				7.510	.000
Introversion	-1.157	-.238	-.237	-.195	-3.805	.000
Variation	.438	.432	.406	.355	6.917	.000

Note. Dependent variable = Happiness

$R^2 = .361$

Adjusted  $R^2 = .356$

$R = .601$

**Table 4. Introversion Moderates the Relationship between Variation and Happiness and Variation and Stress**

Level of Introversion	Association ( <i>r</i> ) between	
	Variation and Happiness	Variation and Stress
High	.288	-.126
All levels	.568*	-.224*

\*\*  $p < .001$

total effect, and the direct effect with the effect of the mediator removed is shown below the bottom arrow. The same is true for the values in Figure 2.

Hypotheses 10(a) and 10(b) were supported: Personality moderates (a) the relationship between Variation and Happiness and (b) Variation and Stress; Variation only predicts high levels of Happiness and low levels of Stress in people who are not highly introverted. Introverted individuals may not need as varied or strong a social network to be happy, as shown in Table 4.

As shown in Table 5, female participants reported higher social network Variation and social network Strength than did male participants. Female participants also reported higher levels of Stress than males did. No other gender differences were statistically significant.

### General Discussion

#### Hypothesis 1: Variation in Social Networks is Positively Correlated with Happiness

The data showed strong support for Hypothesis 1. Variation in one's social network (SNVS) was positively correlated with Happiness (OHQ). The premise of the study was that it feels good to have friends on whom one can call to participate in a variety of activities.

Hypothesis 1 was supported; people with higher levels of Variation in their social network are more likely to be able to do whatever they want whenever they desire, and as a result are happier people in general.

#### Hypothesis 2: Strength in Social Networks is Positively Correlated with Happiness

The data showed strong support for Hypothesis 2. Strength of one's social network (SNSS) was positively correlated with Happiness (OHQ). Strength in social networks is critical because it can provide a channel for assessing meaning of self, reality, and validation; increase self-efficacy; reduce levels of stress, anxiety, and depression; and help people overcome problems (Chan & Lee, 2006).

#### Hypothesis 3: Variation in Social Networks is Negatively Correlated with Stress

The data strongly supported Hypothesis 3. Variation in social networks (SNVS) was negatively correlated with Stress (PSS). It may be stressful to have a homogenous social network because the same things may be done or talked about day after day. Thus, one may become bored by a repetitive lifestyle if one does not have the option to undertake and experience a variety of interests and activities. Devotion to a single activity (e.g., gaming, drinking) may interfere with other

**Table 5. Gender Differences for Variables in the Study**

	Males ( <i>SD</i> )	Females ( <i>SD</i> )	t	df	Effect size	Significance (two-tailed)
Variation	<i>M</i> = 128.90 (19.86)	<i>M</i> = 135.00 (18.86)	-2.541	275	.31	.012
Strength	<i>M</i> = 30.82 (15.28)	<i>M</i> = 35.88 (16.70)	-2.673	315	.31	.007
Happiness	<i>M</i> = 124.75 (20.28)	<i>M</i> = 128.64 (18.24)	-1.637	274	.20	.113
Stress	<i>M</i> = 36.92 (6.65)	<i>M</i> = 39.14 (7.23)	-2.560	286	.31	.009
Autonomy	<i>M</i> = 38.92 (5.77)	<i>M</i> = 38.35 (6.42)	.751	297	.09	.439
Introversion	<i>M</i> = 11.02 (4.19)	<i>M</i> = 11.04 (3.84)	-.037	312	.00	.971

*Note.* Equal variances assumed

aspects of academic life causing more stress. This is a question for future research. Without Variation, the individual may be less likely to be able to escape a stressful situation and participate in a different activity.

**Hypothesis 4: Strength in Social Networks is Negatively Correlated with Stress**

The data showed strong support for Hypothesis 4. Strength in social networks (SNSS) was negatively correlated with Stress (PSS). People rely on others in times of stress for comfort, emotional validation and support, and simply to take their mind off problems. It seems obvious that people with a strong social network will be less stressed. Emerging adults moving to college are thrust into highly stressful novel situations where they explore an overflow of possible life directions in love, work, and worldviews (Arnett, 2000). Thus, they need close or strong friends with whom to navigate their thoughts, feelings, and the physical world.

**Hypotheses 5, 6, and 7: Autonomy is Positively Correlated with Variation and Happiness and Negatively Correlated with Stress**

The data showed strong support for Hypotheses 5, 6, and 7. Regarding Hypothesis 5, Autonomy (SDS) was positively correlated with Variation (SNVS) because Variation gives people the autonomy to do whatever they desire whenever they desire. Because a varied social network grants individuals the freedom to choose from a wide variety of activities and topics to discuss, people will then have higher perceived levels of autonomy. Regarding Hypothesis 6, it then makes intuitive sense that Autonomy (SDS) was correlated with Happiness (OHQ). If Variation grants people autonomy, that autonomy should predict happiness. Regarding Hypothesis 7, it also makes intuitive sense that Autonomy (SDS) was negatively correlated with Stress

(PSS). Not having the option to escape a stressful social climate or a repetitive routine may create stress.

**Hypothesis 8: Autonomy Mediates the Relationship between (a) Variation and Happiness and (b) Strength and Happiness**

The data did not provide support for Hypothesis 8. Autonomy (SDS) did not mediate the relationship between Variation (SNVS) and Happiness (OHQ) or Strength (SNSS) and Happiness (OHQ).

**Hypothesis 9: Autonomy Mediates the Relationship between (a) Variation and Stress and (b) Strength and Stress**

However, we found that Autonomy (SDS) *did* mediate the relationship between (a) Variation and Stress and (b) Strength and Stress. This suggests that Variation alone is insufficient to decrease stress. If unassertive individuals have high variation it may not buffer against stress, because they are excessively dependent upon their social groups. They need to feel a sense of autonomy or separation to experience the stress-buffering impact of Variation. Results are shown in Figures 1 and 2.

**Hypothesis 10: Introversion–Extraversion Moderates the Relationships between (a) Variation and Happiness and (b) Variation and Stress**

The data showed strong support for Hypothesis 10. Personality moderated the relationships between (a) Variation and Happiness (OHQ) and (b) Variation and Stress; Variation only predicts Happiness in individuals who are not highly introverted. This may be because highly introverted individuals may not prefer to be around a variety of people. Similarly, introverts prefer to spend time alone reading, gaming, or relaxing in solitude. They tend to have a small number of very close friends,

sticking to an organized, predictable lifestyle (Larsen & Kasimatis, 1990). Introverts prefer to be alone in the amity of their own solitude (Larsen & Buss, 2018, p. 437). Thus, being around a variety of people in a variety of situations may be stressful and overwhelming to highly introverted individuals.

### Summary and Theoretical Formulation

Although drastic variation exists among the lives of emerging adults, one thing that may universally improve their lives is developing varied social networks, with the exception of highly introverted people. Having autonomy and not feeling the need to follow one particular group seems like it would benefit individuals in a number of ways. Considering the stress emerging adults face, healthy, supportive friendships should help prevent psychological disorders because of their stress-buffering effects (Krackhardt, 1992). Thus, future researchers could investigate the relationships among relationship strength and variation and common psychological issues in emerging adults, such as depression and anxiety. Emerging adults often live away from their family and childhood friends for the first time (Ahmed & Brumbaugh, 2014). McKee, Harrison, and Lee (1999) posit that friendships in college provide a channel for assessing meaning of self and reality, an avenue for the experience of different perspectives and viewpoints, and an opportunity for growing through interdependency. Emerging adults often lose immediate access to support from their parents and hometown friends when they move to college, so they need to make friends on their college campus. However, the present research suggests that having a homogenous network may hinder one's ability to participate in a variety of activities and blind one to alternate perspectives. Thus, a varied social network should provide numerous angles from which to approach and resolve issues,

leading to a greater capacity for growth through interdependency, less stress, and increased happiness. Higher variation in interests and activities is positively correlated with Happiness, as suggested by the social network variation hypothesis.

In a sense, a social network is not just a part of one's life. Rather, it *is* one's life. One cannot do things as simple as get lunch with someone, have a meaningful discussion, or play a game without a social network. Variation may provide autonomy because it avails people to enlist in a wide variety of activities, and it may act as a buffer against stress because one can seek support from people with varied perspectives and diverse ability to provide social support. Everything from seeking comfort in a time of stress to going fishing with a partner depends on the variation and strength of one's social network.

A good mix of stronger and weaker ties (i.e., closer, personal friends and more distant, professional-type acquaintances) is part of what makes a person's social network successful and rewarding. Additionally, weaker ties should help provide a bridge between individual and social networks (Granovetter, 1983). Acquaintanceship with individuals from various backgrounds and social groups should aid navigation of the social structure of college; it can help introduce an individual to different groups and thus explore different options. This supports the notion that people may become stuck in a single cluster of interests and activities if they only "belong" to a single group. If individuals have more than one social group, they have more options available for structuring their time. Consequently, we found a strong positive relationship between both social network variation and social network strength, supporting the social network variation hypothesis.

An essential component of our hypothesis that Variation would be correlated with Happiness and negatively correlated with Stress

was the notion that the relationship would be mediated by a perceived sense of autonomy (Lin et al., 2014; Madanagopal & Thenmozhi, 2015). Similar to the manner in which the work setting might constrain autonomy, we hypothesized that a restrictive social network may also limit autonomy. Self-determination is a critical factor in psychological health (Bandura, 1977), leading us to surmise that perceived competency to participate with any group of people would be a correlate of happiness. Deci and Ryan (1985) argue that people must feel autonomous and self-determined in their daily lives to feel capable, happy, and enjoy optimal psychological health, thus supporting the social network variation hypothesis; people who choose to do whatever they desire whenever they desire should be happier in general. We further assert that feeling pressured into an activity may lead to stress. In sum, the present study shows that having a large network of varied social ties predicts a stronger sense of independence (i.e., autonomy) because the person is not reliant solely on a limited social circle. If some friends wish to engage in an undesired activity, a person with a more varied social network will have alternative choices among friends and activities.

Because variety in interests and activities in social networks is linked to higher levels of Happiness and lower levels of Stress, change in the way people view friendship groups may be warranted. People could be advised to make an effort to engage with people from different kinds of backgrounds and with varied interests. Colleges and universities could be advised to offer different services for facilitating the process of college students meeting a variety of people. Individuals should not associate solely with people who share the most direct interests with them; they should have a circle of close friends, with a broader network of weaker connections in multiple facets of their college

or greater community. Broadly speaking, people benefit from variation in social interaction. Focusing one's time and energy on building valuable relationships should be a priority, which will likely leave lasting impacts in numerous aspects of well-being.

### **Limitations and Future Directions**

The sheer length of the survey is a potential limitation of the study. It took up to 30 minutes to complete, so response fatigue may have been an issue. We did not include questions to check for respondent fatigue. Because of the length of the survey, participants may have responded accurately to questions at the beginning of the survey, but not at the end.

Because the survey was administered on a small, predominantly White, liberal arts college campus, the results may not be generalizable to the general population. We were unable to survey people who attend large public universities, community colleges, or people who did not attend college. Our sample size is within the recommendations for adequate statistical power.

The fact that the measures for variation and strength in one's social network are completely new is significant. We developed the scales specifically for the study because there was nothing in the extant literature that captured the essence of what we wanted to measure. This is an exciting new direction for future research. It will be interesting to see if different measures replicate these findings and whether the researcher-developed scales work in different settings or contexts. This is the first study to utilize these scales to study variation in social networks in general. We encourage future researchers to study these scales and the specific area in general. It would also be interesting to study variation and strength in social networks in an experiment.

Future research should be conducted on the importance of social media friends. They are not necessarily readily available

and present in individuals' everyday lives. However, some (e.g., Manago, Taylor, & Greenfield, 2012; Miczo, Mariani, & Donahue, 2011) argue that social media friends are beneficial in that they facilitate emotional disclosure — the key feature of intimacy — through status updates and so on. Van Zalk, van Zalk, Kerr, and Stattin (2013) found that shy adolescents may benefit from exclusively online friends and that those online friendships may increase self-esteem. That self-esteem, in turn, may facilitate the formation of offline friendships. It is possible that online friends may serve similar functions as face-to-face acquaintances, so it would be interesting to replicate this study to include — or be limited to — online friends.

Another avenue for future research would be regarding the potential differences between individualistic and collectivistic cultures (see Arménio & Cunha, 2009, for a review of cultural differences regarding happiness and satisfaction). Ferguson, Kasser, and Seungmin (2011) found that people from individualistic cultures report higher well-being than those from collectivistic cultures, possibly because of a perceived sense of autonomy. Thus, the notion that autonomy is necessary for happiness is supported. However, there are seemingly infinite variables to be considered in this area of study. Social network variation could predict different things in different cultures. Because autonomy is valued differently across cultures, it would be interesting to see if social network variation predicts happiness in collectivistic cultures.

The present study did not take ethnicity into account. Specifically, it would be informative to find out if ethnically diverse social

networks serve different or additional purposes to social networks with variation in interests and activities. This study sampled from college campuses enrolling nearly 80% White students. It would also be interesting to study whether ethnic minorities need different sorts of social networks than do White individuals.

Finally, it would be interesting to examine the need for social network variation in childhood, adolescence, and throughout adulthood. There are a number of potential wrinkles researchers may tease out in this regard: (a) whether young children need to play with nonfamily members, (b) whether adolescents need to socialize outside of the home, (c) whether there is a difference in the needs of married adults versus those who are not, and (d) whether older adults need the same varied social networks to be happy as emerging adults do (i.e., socioemotional selectivity). There are numerous smaller segments of society that would be fascinating to investigate; single adults with children versus childless single adults, for example. People may have very different needs depending on their particular stage of lifespan development.

In sum, the present study showed that variation and strength of social networks in emerging adulthood were related to Happiness (positively) and Stress (negatively). Investigations of the generalization of these findings to different cultures and ethnic groups would also be helpful. Finally, it would be interesting to know whether online social networks provide variation and strength. The creation of two reliable and valid measures of social network variation and strength in the present study has provided a solid foundation for future research.

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