

Social Reciprocity: Relationships, Mutuality, and Wellbeing

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INTRODUCTION & OVERVIEW

Introduction

Social relationships are the backbone of society and our lives. Myriad researchers have found that the presence and quality of our social relationships impact our physical health, mental health^{1,2}, and longevity³ in positive (and potentially negative) ways. Although much research has expounded on the benefits of having a strong social network (e.g., longer life span, greater overall life satisfaction, and lower stress levels, to name a few), some researchers have theorized the relative cost associated with having a large social network, such as expending more personal resources to maintain harmony and connectedness in those relationships.

When the COVID-19 pandemic arrived in early 2020, it dramatically altered our social relationships whereby people globally were asked to socially isolate from one another in order to avoid the spread of the coronavirus. This mandate significantly impacted when and how we could safely interact with one another, and a longitudinal study by Lee and colleagues (2023) found that having close social relationships (e.g., romantic partnerships, family, friends) had a stronger effect on personal well-being during and after the COVID-19 pandemic, rather than before it⁴. Arguably, this positive association between social connections and improved mental wellbeing occurred because these relationships became central channels from which to cope with the stress of the pandemic.

With these potential positive and negative effects of social relationships on mental and physical health, alongside the necessary socialization changes brought on by the COVID-19 pandemic, it is important to understand what the full scope of our relationships look like today and the potential they have to improved or impede our mental well-being and physical health.

¹ Cohen, S. (2004). Social Relationships and Health. *American Psychologist*, 59(8), 676–684. <https://doi.org/10.1037/0003-066X.59.8.676>

² Centers for Disease Control and Prevention. (2021, April 29). Loneliness and social isolation linked to serious health conditions. Centers for Disease Control and Prevention. <https://www.cdc.gov/aging/publications/features/lonely-older-adults.html>

³ Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social Relationships and Mortality Risk: A Meta-analytic Review. *PLoS Medicine*, 7(7). <https://doi.org/10.1371/journal.pmed.1000316>

⁴ Lee, S. S., Shim, Y., Choi, J., & Choi, I. (2023). Paradoxical impacts of social relationship on well-being during the COVID-19 pandemic. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, 24(2), 745–767. <https://doi.org/10.1007/s10902-022-00614-2>



Social Relationships

Broadly, “social relationships” are defined as any type of reoccurring interaction between two or more people who mutually place value in the relationship⁵. For example, a single interaction with the receptionist at your doctor’s office would not be considered a social relationship, whereas repeated interactions with a colleague with whom you work closely, would be. Since the 1970s, social scientists have been studying the structure and function of social relationships⁶; however, the most well-known theory was proposed in 1992 by Robin Dunbar. He hypothesized that there was a cognitive limit to the number of relationships a person can successfully maintain⁷. Dunbar suggested that humans can only have around 150 meaningful relationships, which he divided into circles of closeness: loved ones (~ 5 people), good friends (~ 15 people), friends (~ 50 people), and meaningful contacts (~ 150 people)⁸. This became known as Dunbar’s number.

Other researchers have suggested alternative approaches to calculating one’s social circle (e.g., the “scale up” method; a multiplicative value based on the number of social circles one is part of and the number of individuals within each social circle), with estimates ranging from ~69 relationships (Lindenfors, et al., 2021⁹) up to ~290 relationships (Bernard, et al., 1997, 2001^{10,11}). Yet theories regarding an exact number of social connections can be misleading due to the wide variability between individuals (as evidenced by statistically large confidence intervals). This suggests that there really is no consistent numerical threshold upon which to measure the full scope of one’s social relationships. In fact, a recent report by the Pew Research Center found that the majority of Americans (53%) only have between 1-4 close friends (whereas 38% said they had 5 or more), and those who reported having any close friends were largely satisfied with those relationships¹².

But there is a lack of real-time data that goes beyond an assessment of close friendships or immediate family members¹³. Acquaintances, co-workers, and even pets also require evaluation as they help in creating a complete picture of one’s social network, and new data even suggests that pets are considered by many (~50% of all pet owners) as beloved members of the family¹⁴. Moreover, there’s little research to suggest that the actual number of relationships translates to overall relationship satisfaction or any type of positive health outcome (whether physical or emotional). The current research aims to clarify some theoretical discrepancies and take a comprehensive snapshot of ones’ social relationships, including the types, number, frequency of interactions, and quality.

⁵ August, K. J., & Rook, K. S., (2013). Social Relationships. *Encyclopedia of Behavioral Medicine*. 1838-1842. https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1005-9_59

⁶ Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-up Study of Alameda County Residents. (1979). *American Journal of Epidemiology*, 185(11), 1070–1088. <https://doi.org/10.1093/aje/kwx103>

⁷ Dunbar, R. I. M. (1992). “Neocortex size as a constraint on group size in primates”. *Journal of Human Evolution*. 22 (6): 469–493. [https://doi.org/10.1016/0047-2484\(92\)90081-J](https://doi.org/10.1016/0047-2484(92)90081-J).

⁸ Dunbar, R.I.M. (1993). Coevolution of neocortical size, group size and language in humans. *Behavioral and Brain Sciences*.:16(4):681-735. <https://doi.org/10.1017/S0140525X00032325>

⁹ Lindenfors, P., Wartel, A., Lind, J., (2021). “Dunbar’s Number” Deconstructed. *Biology Letters*, 17(5). <https://doi.org/10.1098/rsbl.2021.0158>

¹⁰ Bernard, H.R., Shelley, G.A., Killworth, P., (1987). How Much of a Network Does the GSS and RSW Dredge Up?. *Social Networks*. 9: 49-61. [https://doi.org/10.1016/0378-8733\(87\)90017-7](https://doi.org/10.1016/0378-8733(87)90017-7)

¹¹ McCarty, C., Killworth, P.D., Berndard, H.R., Johnsen, E., Shelley, G.A., (2001). Comparing Two Methods for Estimating Network Size. *Human Organization*. 60(1): 28-39. <https://doi.org/10.17730/humo.60.1.efx5t9gjitmga73y>

¹² Goddard, I. (2023, October 12). What does friendship look like in America?. Pew Research Center. <https://www.pewresearch.org/short-reads/2023/10/12/what-does-friendship-look-like-in-america/>

¹³ Statista Research Department. (2023, June 2). Average family size in the U.S. 1960-2022. Statista. <https://www.statista.com/statistics/183657/average-size-of-a-family-in-the-us/>

¹⁴ Brown, A. (2023, July 7). About half of U.S. pet owners say their pets are as much a part of their family as a human member. Pew Research Center. <https://www.pewresearch.org/short-reads/2023/07/07/about-half-us-of-pet-owners-say-their-pets-are-as-much-a-part-of-their-family-as-a-human-member/>

Relationships and Wellbeing

The link between strong social connections and wellbeing is significant. As far back as the 1970s, researchers have been interested in understanding the impact of relationships on both mental and physical outcomes. One of the first studies to examine this link found that people with a variety of social connections (e.g., spouse, family, friends, social groups) had significantly lower mortality rates over the next nine years¹⁵. A more recent meta-analysis by Holt-Lunstad and colleagues (2010) similarly found that those with a strong social network had a 50% increased likelihood of survival¹⁶, and a 2021 report by the Centers for Disease Control (CDC) also found that social support and longevity were highly positively correlated¹⁷. These data suggest that those with a strong social network live longer than those who do not.

Social isolation, on the other hand, has been linked with higher levels of stress and depression, higher rates of mortality and dementia, longer recovery times from illness, and higher rates of chronic illness¹⁸. And while poor quality social relationships have been associated with increased risk of stroke and heart disease; loneliness is associated with depression, anxiety, suicide, and heart failure¹⁹. Moreover, there is great variability in our ability to connect with others as well as our desire to make and maintain those connections. Segrin (2019) found that people with poor social skills had higher scores on stress and loneliness measures, which in turn have been found to lead to poor mental and physical health²⁰. Taken together, there is considerable evidence that our relationships are a critical element to living a long and contented life.



¹⁵ Social Networks, Host Resistance, and Mortality: A Nine-Year Follow-up Study of Alameda County Residents. (1979). *American Journal of Epidemiology*, 185(11), 1070–1088. <https://doi.org/10.1093/aje/kwx103>

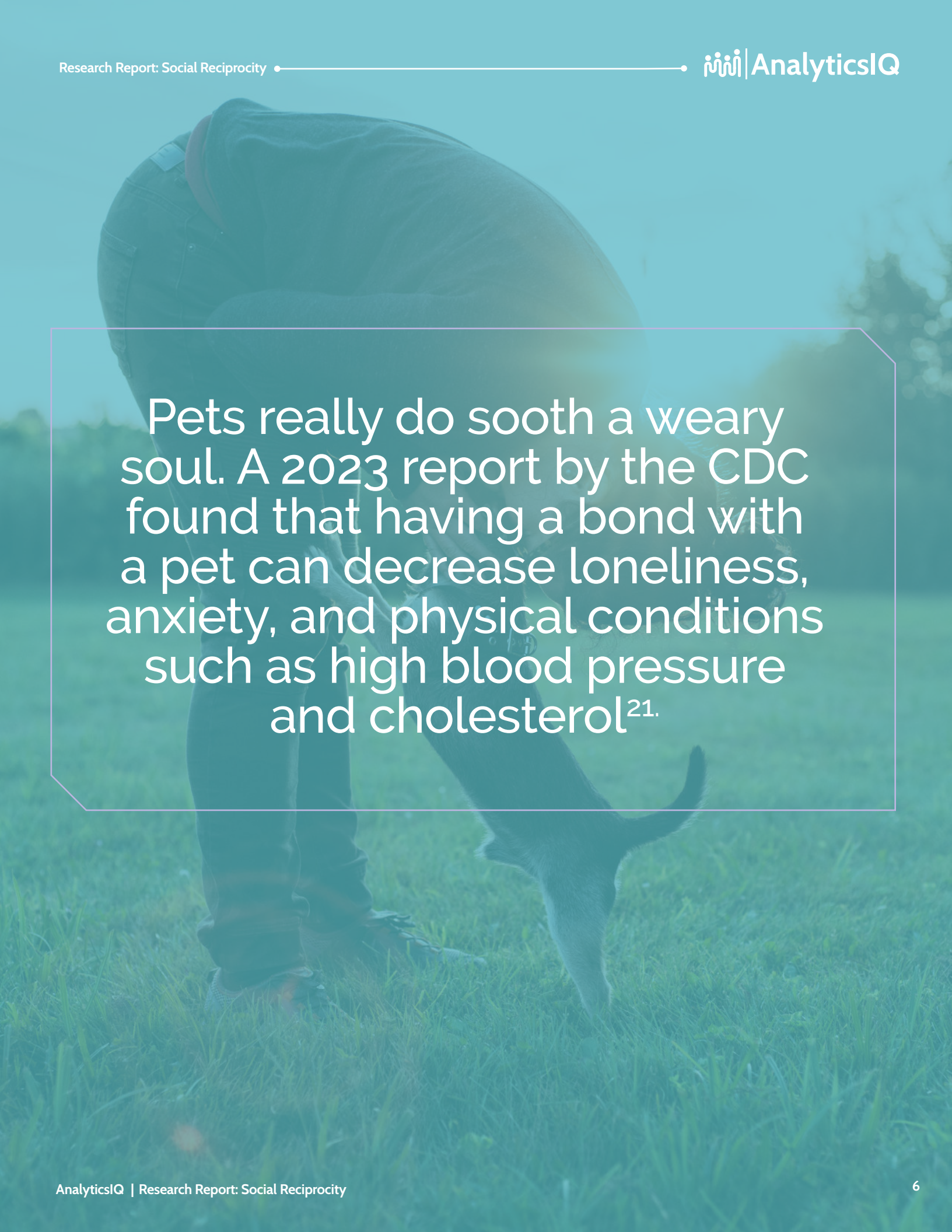
¹⁶ Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social Relationships and Mortality Risk: A Meta-analytic Review. *PLoS Medicine*, 7(7). <https://doi.org/10.1371/journal.pmed.1000316>

¹⁷ Centers for Disease Control and Prevention. (2021, April 29). Loneliness and social isolation linked to serious health conditions. Centers for Disease Control and Prevention. <https://www.cdc.gov/aging/publications/features/lonely-older-adults.html>

¹⁸ Cohen, S. (2004). Social Relationships and Health. *American Psychologist*, 59(8), 676–684. <https://doi.org/10.1037/0003-066X.59.8.676>

¹⁹ Centers for Disease Control and Prevention. (2021, April 29). Loneliness and social isolation linked to serious health conditions. Centers for Disease Control and Prevention. <https://www.cdc.gov/aging/publications/features/lonely-older-adults.html>

²⁰ Segrin, C., (2019). Indirect Effects of Social Skills on Health Through Stress and Loneliness. *Health Communication*, 34(1):118–124. <https://doi.org/10.1080/10410236.2017.1384434>

A person is shown from the back, bending over to pet a dog in a grassy field. The scene is overlaid with a teal tint. The text is centered within a white-bordered box.

Pets really do sooth a weary soul. A 2023 report by the CDC found that having a bond with a pet can decrease loneliness, anxiety, and physical conditions such as high blood pressure and cholesterol²¹.

However, despite all the positive benefits of a strong social network, relationships themselves can be taxing on an individual's mental and physical resources. Song and colleagues (2021) refer to relationships as a "double edged sword", highlighting the social cost of having many and varied connections, such as exposure to loud noises while socializing (particularly in public), increased vulnerability to light, air, and other pollutions, and the personal time and energy spent planning and engaging in social interactions themselves²². Arguably, these costs will increase if the quality of our relationships is disrupted or unharmonious, likely leading to effortful reparation, the disappointment of separation, or a state of healing.

Is our overall wellbeing primarily impacted by the number of social connections, the quality of those connections, our own personal need for (and skillset within) those relationships, or some combination of these? With so many questions hanging in the balance, the current study aims to fill in theoretical gaps, take a comprehensive approach to assessing the full scope of social relationships, alongside metrics assessing relationship satisfaction, interpersonal skillset, as well as physical and emotional wellbeing. In doing so, we hypothesize that relationship quality (e.g., satisfaction, reciprocity) and interpersonal skills will predict number of social connections one has, as well as self-reported physical and emotional wellbeing²³.

Overview of the Current Research

In June of 2023, a large, random, representative sample of the US population was collected by the Cognitive Sciences research team at AnalyticsIQ to assess the current state of their social relationships and impact of their social network on various health outcomes. These data were collected via a voluntary online survey, and all participants were compensated for their time. Survey respondents who agreed to the informed consent²⁴ were then asked to provide demographic information²⁵ (e.g., age, race, gender, education) followed by a series of questions regarding their social relationships (number, types, frequency of interactions, satisfaction, presence of social support (i.e., reciprocity), interpersonal skills), and finally they responded to self-report metrics of physical and emotional wellbeing. See the Assessment Tools section below for more information.



²¹ How Does Social Connectedness Affect Health? (2023, May 8). Centers for Disease Control and Prevention. <https://www.cdc.gov/emotional-wellbeing/social-connectedness/affect-health>.

²² Song, L., Pettis, P. J., Chen, Y., & Goodson-Miller, M. (2021). Social cost and health: The downside of social relationships and social networks. *Journal of Health and Social Behavior*, 62(3), 371–387. <https://doi.org/10.1177/00221465211029353>

²³ How Does Social Connectedness Affect Health? (2023, May 8). Centers for Disease Control and Prevention. <https://www.cdc.gov/emotional-wellbeing/social-connectedness/affect-health>.

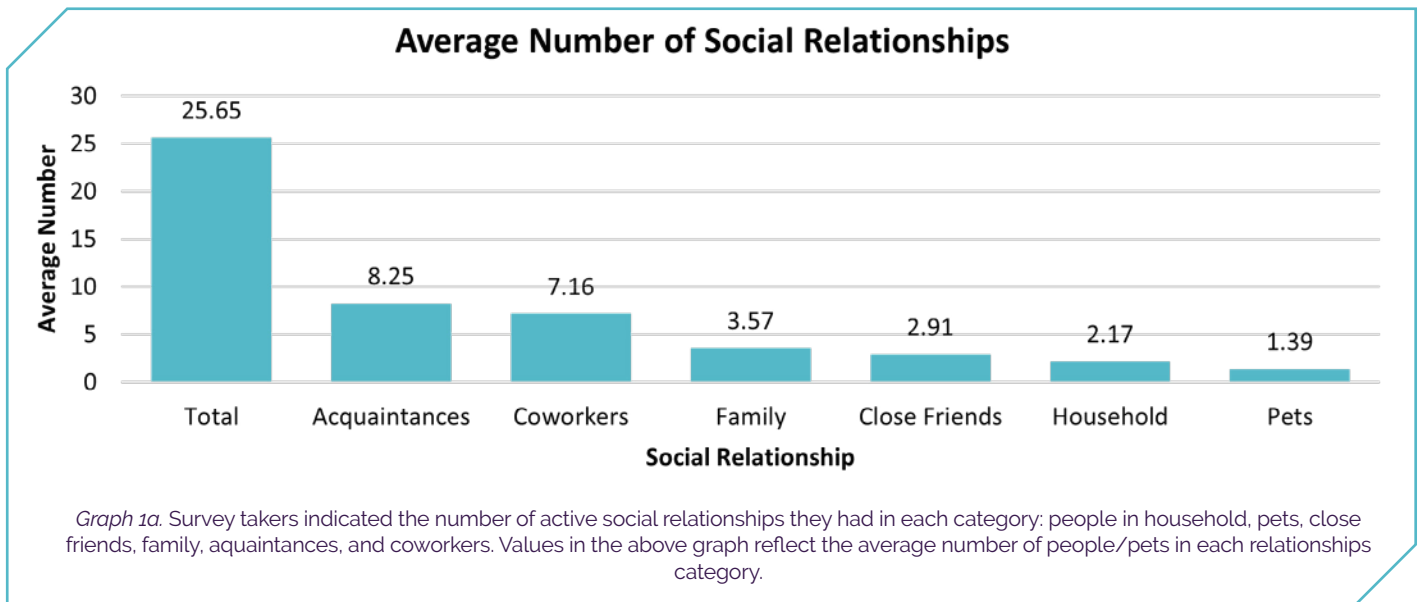
²⁴ All respondents were presented with an informed consent prior to beginning our survey which outlined the scope of the survey questions they'd be asked and how their data would be used. All data presented in this report are reflective of those respondents who agreed to opt into our survey under the parameters outlined in the informed consent.

²⁵ These survey takers included a representative sample of gender (52% female, 47% male), race (Black/African American 10%, AAPI 5%, White 73%, Latinx 8%, Native American 1%, Multi-racial 2%), and age (Gen Z 7%, Millennial 32%, Gen X 28%, Baby Boomer 33%) for US adults.

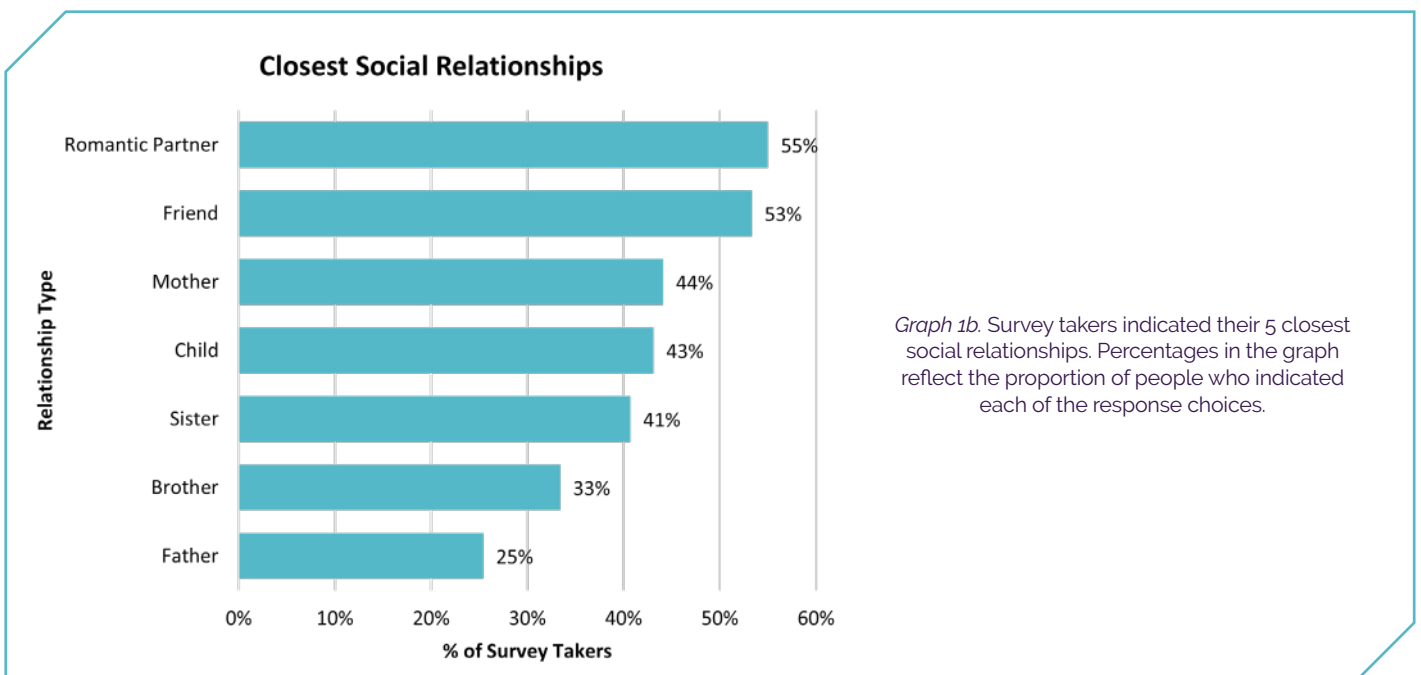
DESCRIPTIVE ANALYSES

Actual Social Relationships

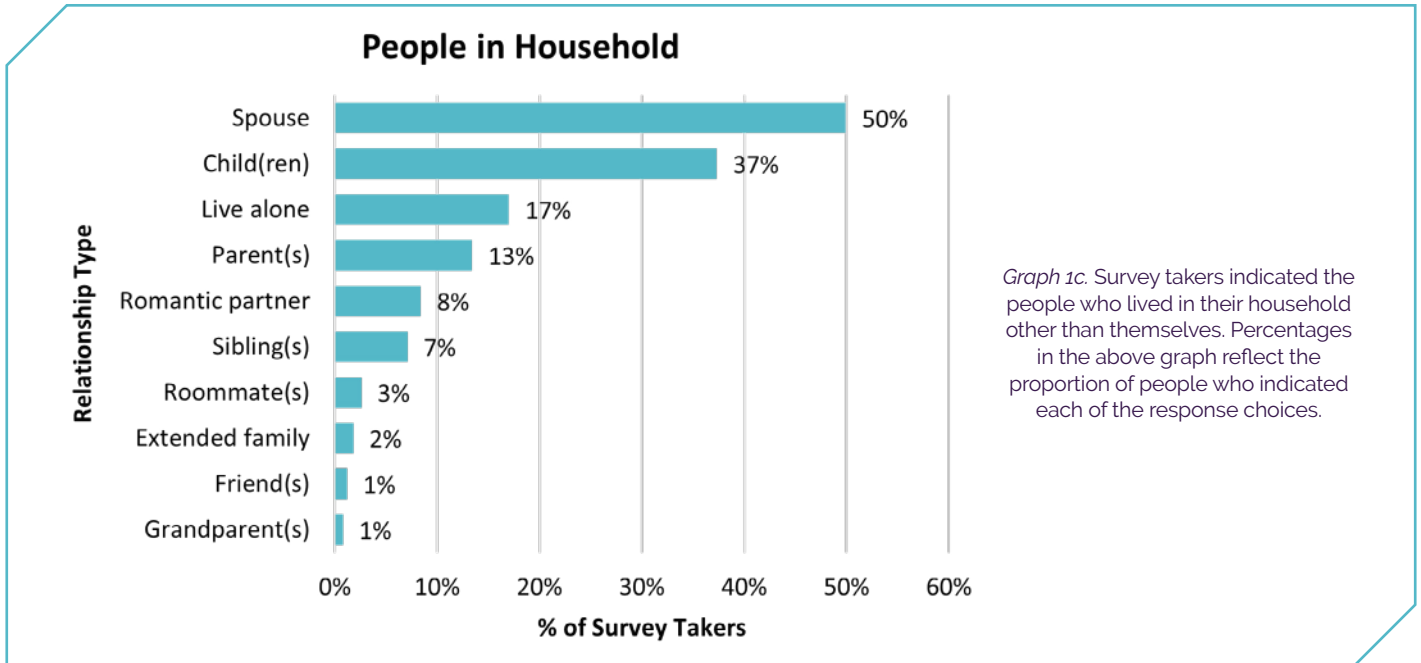
Respondents were first asked about the number of active social relationships they had, including those living in their household, family members, close friends, pets, acquaintances, and coworkers. The average number of all social relationships was 25.65 ($SD = 12.56$). The highest average number of social relationships were those in the acquaintance category ($M = 8.25, SD = 7.57$) and the lowest average number of social relationships were those in the close friends ($M = 2.91, SD = 2.60$), household ($M = 2.17, SD = 1.46$), and pets groups ($M = 1.39, SD = 1.61$). See Graph 1a.



Of these relationships, respondents were also asked to identify the five people closest to them. The most common responses were romantic partner (55%), friend (53%), mother (44%) and child (43%). See Graph 1b.

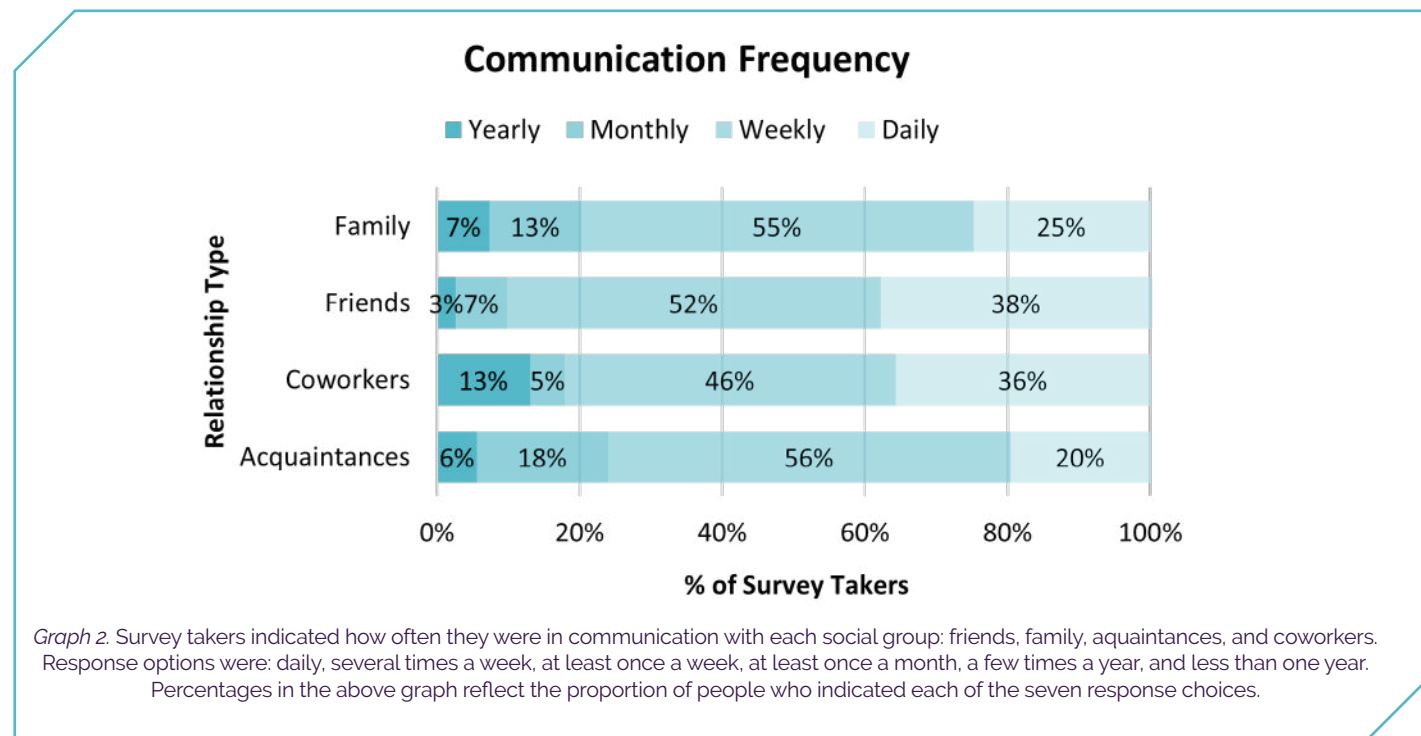


Additionally, respondents were asked questions about who lived in their household. The average number of people in the household other than the respondent was 2.17 ($SD = 1.46$). The majority of respondents cohabitated with people, and only 17% indicated that they lived alone. The most common persons in the household were spouse (50%) or child (37%). See Graph 1c.



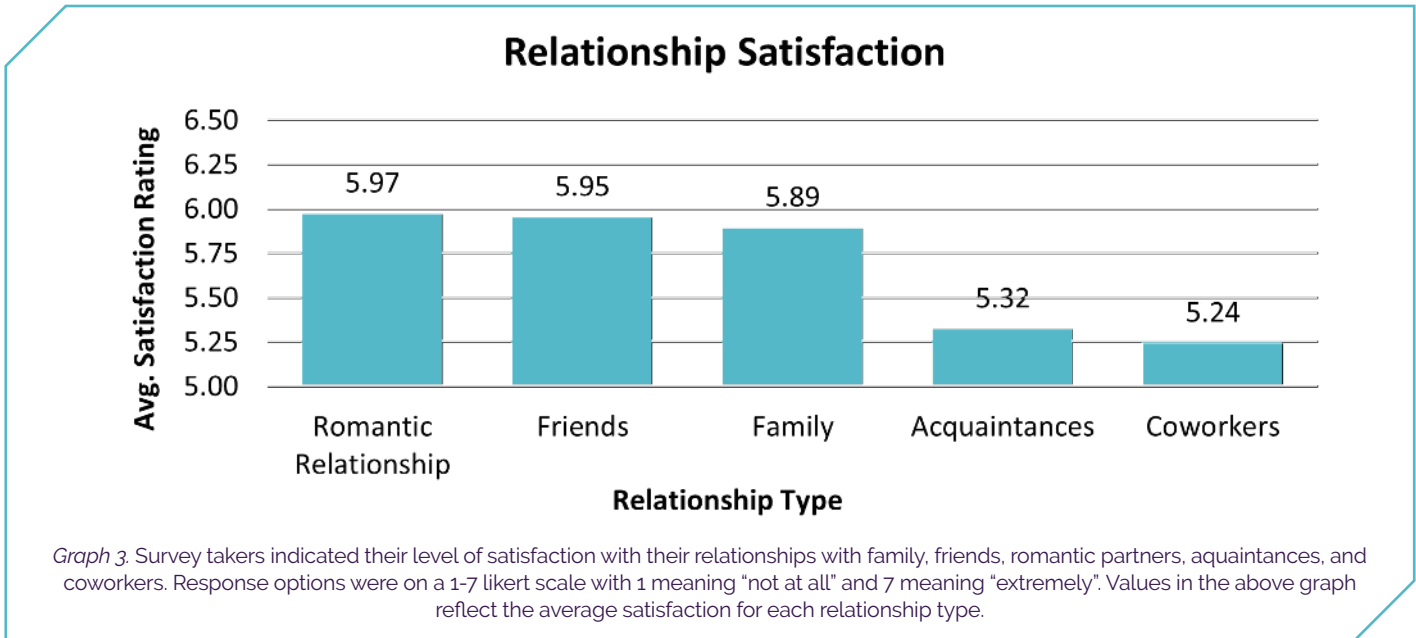
Communication Frequency

Respondents were asked how frequently they communicated with their family, friends, acquaintances, and coworkers. The majority of communication with social connections of any kind occurred at least once a week and was most frequently with friends. See Graph 2.



Satisfaction

Respondents were then asked to rate how satisfied they were with their relationships with family, friends, acquaintances, and coworkers. The highest relationship satisfaction was reported for romantic relationships ($M = 5.97$), followed by friends ($M = 5.95$) and then family ($M = 5.89$)²⁶. See Graph 3.



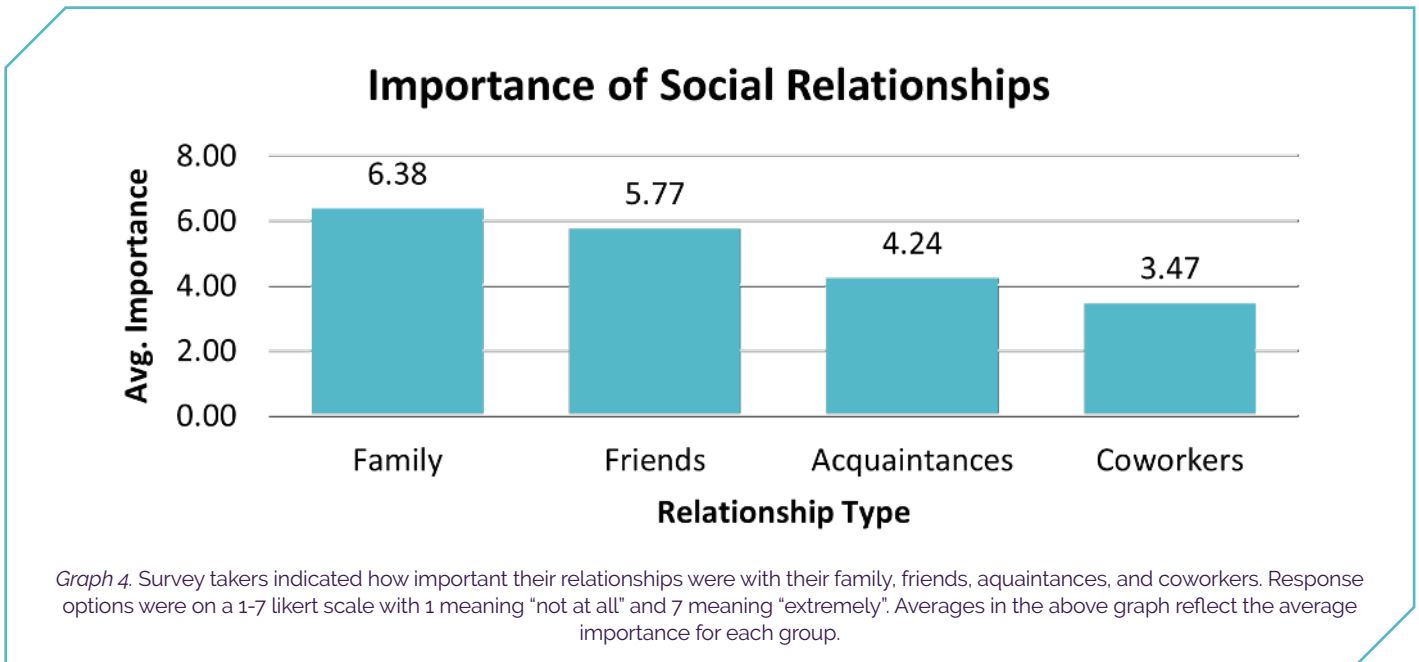
²⁶ An analysis of variance (ANOVA) was conducted to assess potential mean differences in satisfaction by social group (i.e., friends, family, acquaintances, and coworkers). There was a significant main effect of social group on relationship satisfaction ($F(4, 29758) = 495.83, p < .001; \eta^2 = 0.06$). Post hoc analyses revealed that relationships satisfaction with romantic partners ($M = 5.97, SD = 1.29$) was significantly higher than that with family ($M = 5.89, SD = 1.14$), acquaintances ($M = 5.32, SD = 1.21$), and coworkers ($M = 5.24, SD = 1.45$). Relationship satisfaction with friends ($M = 5.95, SD = 1.29$) was significantly higher than that with acquaintances ($M = 5.32, SD = 1.21$) and coworkers ($M = 5.24, SD = 1.45$). Relationship satisfaction with family ($M = 5.89, SD = 1.14$) was significantly higher than with acquaintances ($M = 5.32, SD = 1.21$) and coworkers ($M = 5.24, SD = 1.45$). Lastly, relationship satisfaction for acquaintances ($M = 5.32, SD = 1.21$) was significantly higher than with coworkers ($M = 5.24, SD = 1.45$).





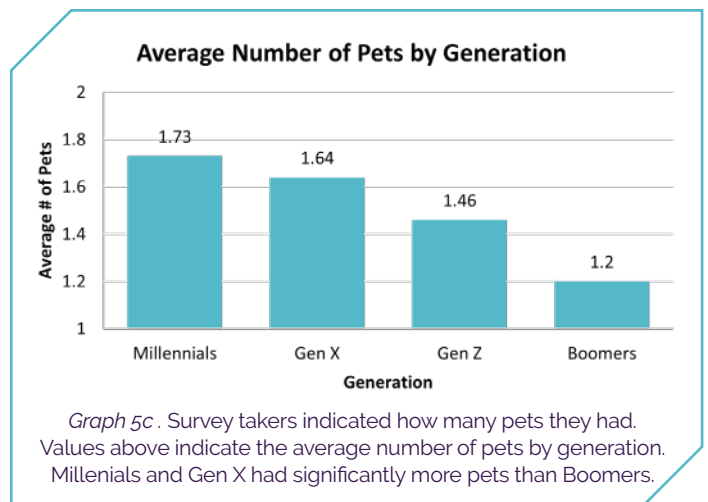
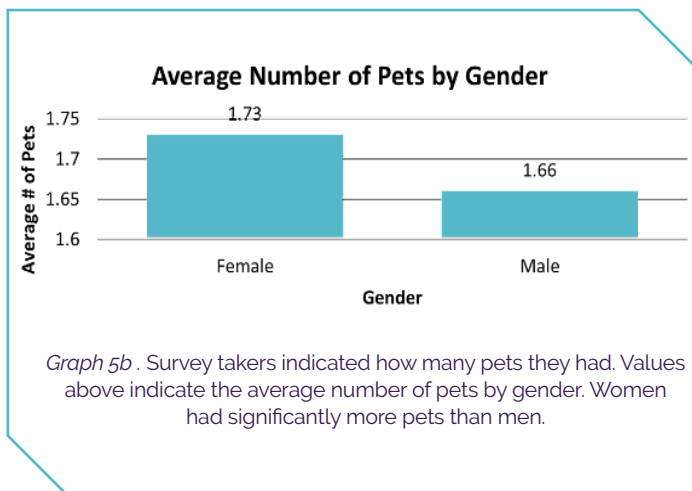
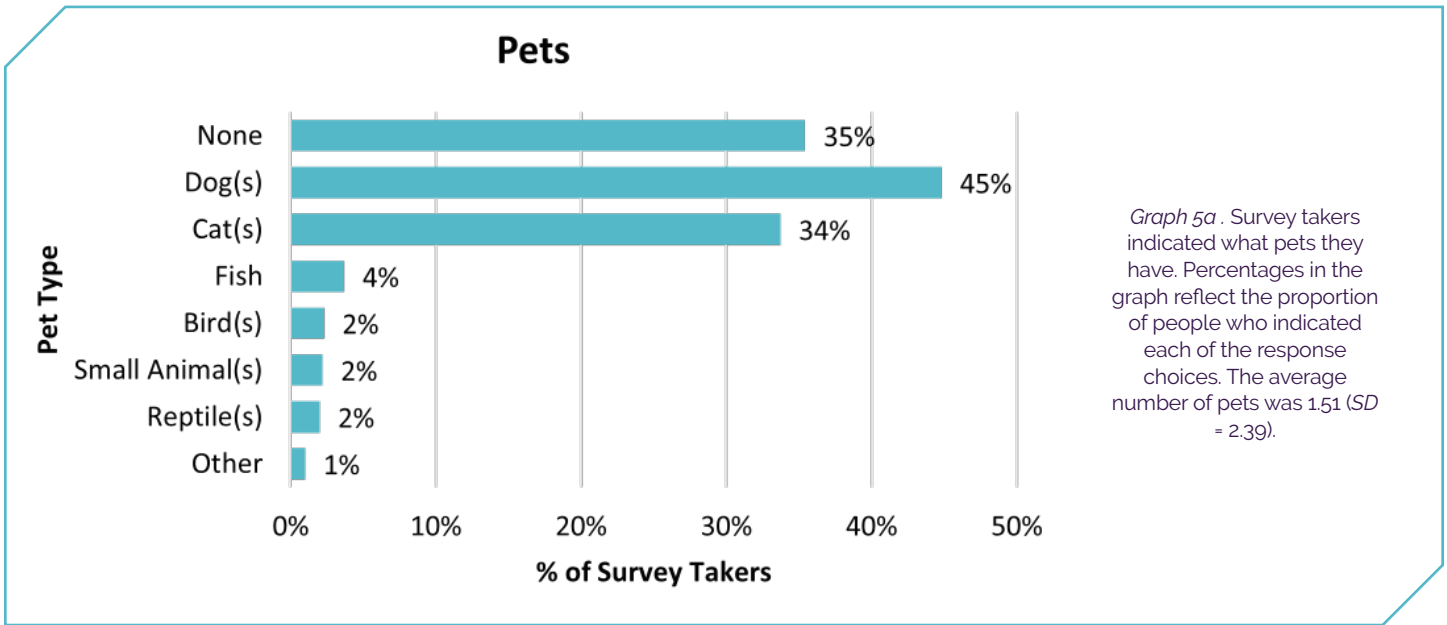
Importance

Respondents were asked how important their relationships were with their family, friends, acquaintances, and coworkers. Respondents considered their relationships with their family as the most important ($M = 6.38$, $SD = 1.23$), followed by friends ($M = 5.77$, $SD = 1.44$), acquaintances ($M = 4.24$, $SD = 1.53$), and then coworkers ($M = 3.47$, $SD = 2.29$). See Graph 4.



Pets

The majority of the current sample reported having at least one pet (65%), with the most popular pets being dogs (45%) and cats (34%). The average number of pets per person was 1.51 ($SD = 2.39$). Women reported having significantly more pets ($M = 1.66, SD = 2.54$) than men ($M = 1.35, SD = 2.22$)²⁷. Millennials on average had the most pets ($M = 1.73, SD = 2.86$) followed by Gen X ($M = 1.64, SD = 2.34$), with both groups reporting significantly more than Baby Boomers ($M = 1.20, SD = 1.96$)²⁸. See Graph 5a-5c.

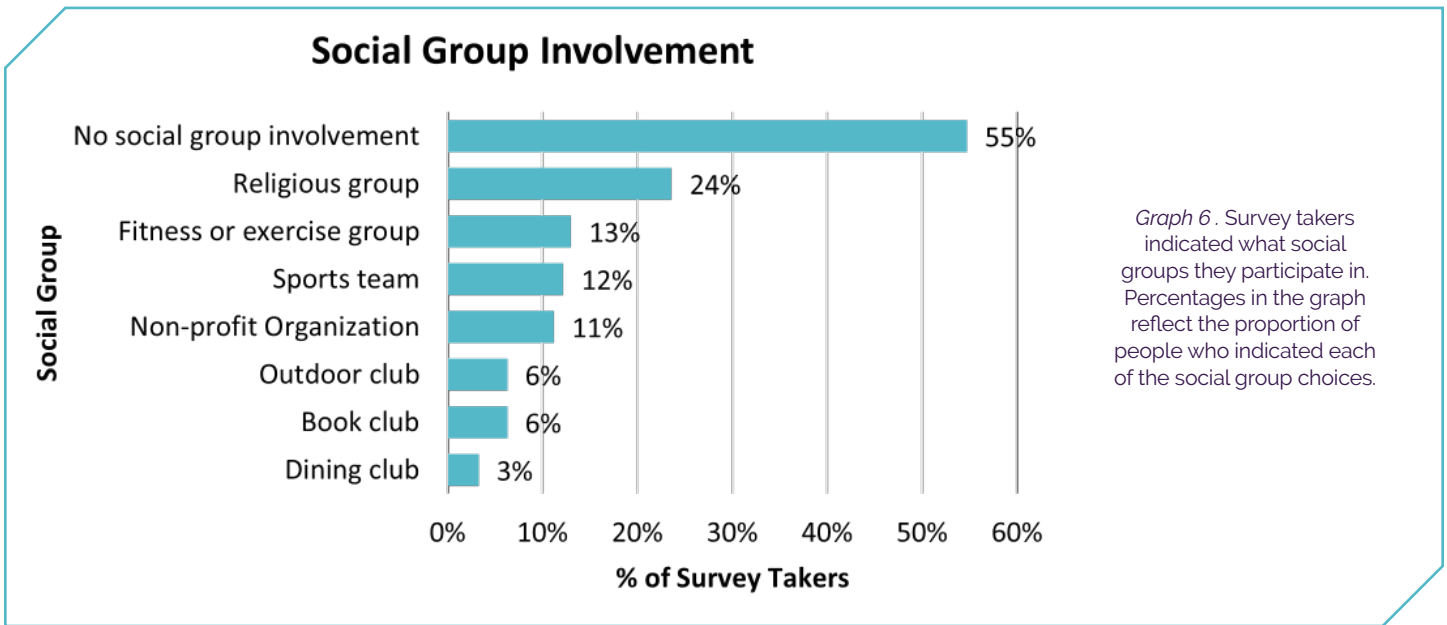


²⁷ $t(7752.5) = 5.69, p < .001$

²⁸ $F(3, 7849) = 23.89, p < .001; \eta^2 = .01$

Social Groups

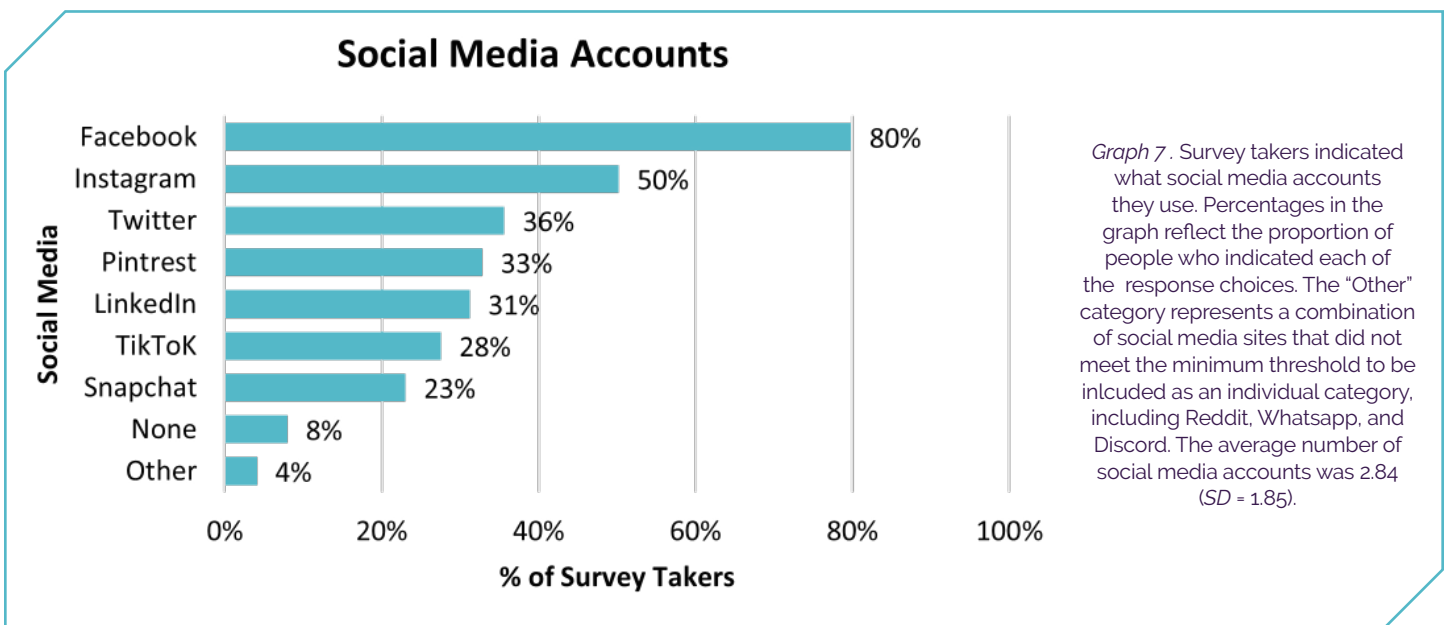
Respondents were asked if they were a member of any social groups (e.g., religious groups, dining clubs, sports teams, etc.). Just under half of the respondents reported being a part of some sort of social group (45%). The most popular social group was religious gatherings (24%), followed by fitness groups (13%) and sports teams (12%). See Graph 6.



Graph 6. Survey takers indicated what social groups they participate in. Percentages in the graph reflect the proportion of people who indicated each of the social group choices.

Social Media

The vast majority of our sample had at least one social media account, with only 8% reporting no social media presence. The most popular social media site was Facebook (80%), followed by Instagram (50%) and X (formerly Twitter) (36%). The average number of social media accounts was 2.84 (SD = 1.85). See Graph 7.



Graph 7. Survey takers indicated what social media accounts they use. Percentages in the graph reflect the proportion of people who indicated each of the response choices. The "Other" category represents a combination of social media sites that did not meet the minimum threshold to be included as an individual category, including Reddit, Whatsapp, and Discord. The average number of social media accounts was 2.84 (SD = 1.85).

ASSESSMENT TOOLS

Social-Behavioral Skill

Social-Behavioral Skill was assessed using a subset of the Zoanetti and Young's (2019)²⁹ measure of social abilities, including relationship maintenance, and included three items (e.g., "I respond to hints or indirect cues in conversation"; $\alpha = .66$). All items were rated on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

Ability to Connect

Ability to Connect was also assessed using a subset of the Interpersonal Relationships³⁰ measure and included three items (e.g., "I have a good relationship with my parents and most family members"; $\alpha = .82$). All items were rated on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

Social Reciprocity

Social Reciprocity was assessed using a subset of 8-items from the Social Relationship Item Bank ($\alpha = .87$)³¹ which relates to giving and receiving social support (e.g., "Overall, I am satisfied with the support I give to others", "Overall, I am satisfied with the support I get from my friends"). All items were rated on a 1 (strongly disagree) to 7 (strongly agree) Likert scale.

Overall scores on all three assessments were calculated by taking the sum of the items, with higher scores indicating higher social behavioral skill, ability to connect, and social reciprocity.

²⁹ Social-Behavioral Skills and Interpersonal Relationships Questionnaires, Zoanetti & Young, (2019) from Brewer, N., Zoanetti, J., & Young, R. L. (2019). Convergent Validity of the A-ToM (Adult Theory of Mind) Test for Individuals with Autism Spectrum Disorder. *Journal of Psychoeducational Assessment*, 37(6), 797-802. <https://doi.org/10.1177/0734282918787433>

³⁰ Social-Behavioral Skills and Interpersonal Relationships Questionnaires, Zoanetti & Young, (2019) from Brewer, N., Zoanetti, J., & Young, R. L. (2019). Convergent Validity of the A-ToM (Adult Theory of Mind) Test for Individuals with Autism Spectrum Disorder. *Journal of Psychoeducational Assessment*, 37(6), 797-802. <https://doi.org/10.1177/0734282918787433>

³¹ Items taken from the Social Relationship Item Bank to Measure Health-Related Quality of Life by Kwan and colleagues (2019) from Kwan, Y. H., Fong, W., Woon, T. H., Phang, J. K., Png, K., Lau, J. Q., Leung, Y. Y., Tan, C. S., Østbye, T., & Thumboo, J. (2022). Development of an Item Bank for a Health-Related Quality of Life Measure in Spondyloarthritis. *The Journal of rheumatology*, 49(9), 1006-1011. <https://doi.org/10.3899/jrheum.210980>



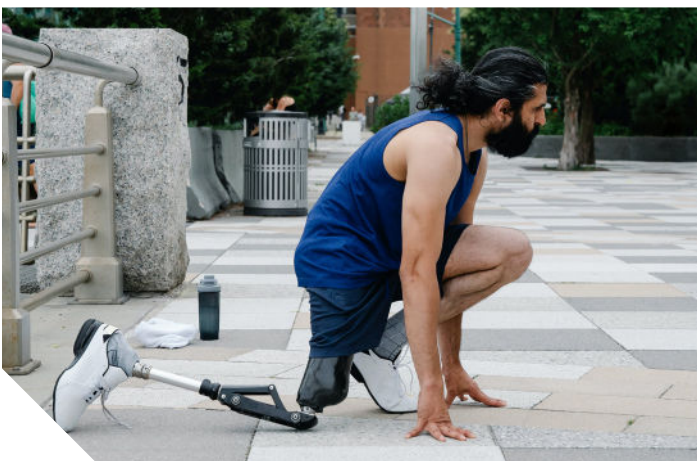
Mental Health

Mental health outcomes were measured using psychological assessments of stress, anxiety, depression, and social isolation.

- Depression was assessed using a 4-item subset from the Depression Anxiety Stress Scale³² (e.g., “I feel that life is meaningless”, $\alpha = .93$). All items were rated on a 1 (never) to 5 (always) Likert scale, and overall scores were calculated by taking the sum of all the items, with higher scores indicating more frequent depression symptoms.
- Anxiety was assessed using a 4-item subset from the Depression Anxiety Stress Scale (e.g., “I find myself getting agitated”, $\alpha = .77$). All items were rated on a 1 (never) to 5 (always) Likert scale, and overall scores were calculated by taking the sum of all the items, with higher scores indicating more frequent anxiety symptoms.
- Stress was assessed using a 4-item subset from the Depression Anxiety Stress Scale (e.g., “I feel I am close to panic”, $\alpha = .83$). All items were rated on a 1 (never) to 5 (always) Likert scale, and overall scores were calculated by taking the sum of all the items, with higher scores indicating more frequent stress symptoms.
- Social Isolation was measured using the 3-item, Social Isolation Scale by Cotten and colleagues (2013)³³ (e.g., “How often do you feel isolated from others?”, $\alpha = .91$). All items were rated on a 1 (Never) to 5 (All of the Time) Likert scale, and overall scores were calculated by taking the sum of all items.

Physical Health

Physical health was measured using three unique items developed for the purposes of this study and included several positive health behaviors (e.g., “I exercise regularly”, $\alpha = .78$). These items were rated on a 1 (strongly disagree) to 7 (strongly agree) Likert scale and an overall Positive Health Behaviors score was calculated by taking the sum of all items. All health outcome variables were significantly related to one another as well as some demographic factors, see Appendix A.



³² Depression Anxiety Stress Scales, Lovibond & Lovibond (1995) from Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, 33(3), 335-343. [https://doi.org/10.1016/0005-7967\(94\)00075-u](https://doi.org/10.1016/0005-7967(94)00075-u)

³³ Social Isolation Scale, Cotten, Anderson, & McCullough (2013) from Cotten, S. R., Anderson, W. A., & McCullough, B. M. (2013). Impact of internet use on loneliness and contact with others among older adults: cross-sectional analysis. *Journal of Medical Internet Research*, 15(2), e39. <https://doi.org/10.2196/jmir.2306>

PREDICTIVE ANALYSES

Considering the established relationship between social relationships and health outcomes in the literature, the goal of the current series of analyses was to further assess the predictive relationships among social connections, interpersonal skills, social support (via reciprocity), and their impact on wellbeing. First, we hypothesized that interpersonal skills (social-behavioral, ability to connect) would have a positive relationship to respondents' number of social connections. In other words, greater skills should lead to a larger social network. Second, we hypothesized that interpersonal skills (social-behavioral, ability to connect), social support (via reciprocity) and number of social connections would have a positive predictive relationship on overall relationship satisfaction. In other words, having stronger social skills, greater social support, and more connections should lead to greater relationship satisfaction. Finally, we hypothesized that social support (via reciprocity) would mediate the relationship between interpersonal skills and physical health, as well as mental health, outcomes. In other words, having strong interpersonal skills should facilitate social reciprocity which should then facilitate positive health outcomes (e.g., higher ratings of exercise and preventative behavior alongside lower ratings of stress, depression, anxiety, and social isolation). The following sets of analyses aim to test these predictions.

Predictors of Social Connections

First, a linear regression analysis was conducted to examine the effect of interpersonal skills (social-behavioral skill and ability to connect) on the total number of social connections³⁴. Scores on the social-behavioral skill ($B = 0.43, p < .001$) and ability to connect ($B = 0.41, p < .001$) assessments had a significant positive relationship on survey respondents' total number of social connections. These findings indicate that those who have strong social-behavioral skills and a strong ability to

connect with others reported significantly more social relationships.

Predictors of Relationship Satisfaction

Next, a linear regression analysis was next conducted to examine the hypothesis that interpersonal skills (social-behavioral, ability to connect), social support (via reciprocity), and number of social connections predict overall relationship satisfaction³⁵. The analysis shows that social-behavioral skill ($B = 0.02, p < .001$), ability to connect ($B = 0.01, p < .001$), and social support (i.e., reciprocity) ($B = 0.06, p < .001$) all have a significant positive relationship with satisfaction. This means that people with strong interpersonal skills, along with strong social support (reciprocity) in their relationships, experience greater overall relationship satisfaction than those with weak interpersonal skills and/or low social support. Importantly, the number of social connections was *not* significantly related to relationship satisfaction ($p = ns$), meaning that relationship satisfaction is more so a function of quality, not quantity.



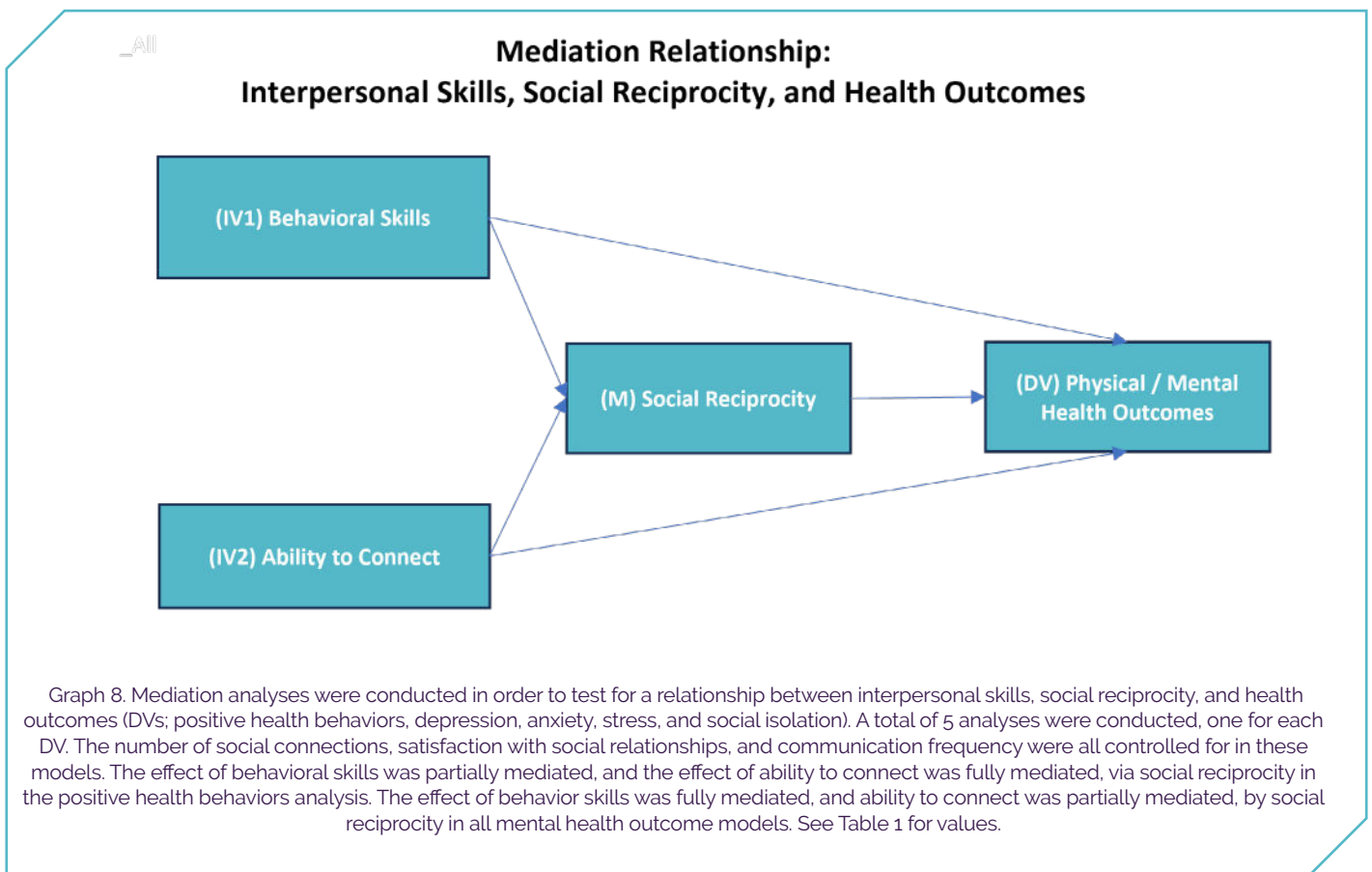
³⁴ $F(2, 3508) = 79.69, p < .001, R^2 = .04$

³⁵ $F(4, 3506) = 397.7, p < .001, R^2 = .31$

Predictors of Physical Health

To test our final prediction, a mediation analysis was conducted to evaluate the relationship between social-behavioral skill (IV1), ability to connect (IV2), and social reciprocity (M³⁶) on positive health behaviors (DV). This analysis first resulted in a significant total effect between social-behavioral skill and ability to connect on positive health behaviors. Moreover, the paths from social-behavioral skill and ability to connect to social reciprocity, and the path from social reciprocity to positive health outcomes, were all significant (see Table 1). An ACME³⁷ test conducted on this analysis was significant at $p < .001$, indicating the presence of a mediation relationship, in this case a partial mediation for social-behavioral skills and full mediation for ability to connect. See Graph 8.

These results show that the combined effect of social-behavioral skill and ability to connect predict positive health behaviors via social reciprocity. In other words, stronger interpersonal skills (social-behavioral and ability to connect) lead to increased social reciprocity, and increased social reciprocity then facilitates an increase in positive health behaviors. These results are consistent even when controlling for the number of social connections a person has, their satisfaction with those social connections, and the frequency of communication with those social connections.



³⁶ IV1 = Independent Variable 1, IV2 = Independent Variable 2, M = Mediator Variable, DV = Dependent Variable

³⁷ Average Causal Mediated Effect (ACME) test measures the indirect effect of the IV on the DV,

Predictors of Mental Health

Four additional mediation analyses were conducted to evaluate the relationship between social-behavioral skill (IV1), ability to connect (IV2), and social reciprocity (M) on each self-reported mental health outcome (DVs). These analyses resulted in significant total effects between social-behavioral skill and ability to connect on each DV (social isolation, stress, depression, and anxiety). Furthermore, the paths from social-behavioral skill and ability to connect to social reciprocity, and the paths from social reciprocity to each DV, were all significant (see Table 1). ACME tests conducted on all analyses were significant at $p < .001$, indicating the presence of mediation relationships, in this case full mediation for social-behavioral skills and partial mediation for ability to connect. These results indicate that social-behavioral skill and ability to connect have an inverse relationship with mental health outcomes via social reciprocity. In other words, an increase in interpersonal skills leads to an increase in social reciprocity, which then facilitates a decrease in self-reported feelings of stress, anxiety, depression, and social isolation. See Graph 8.

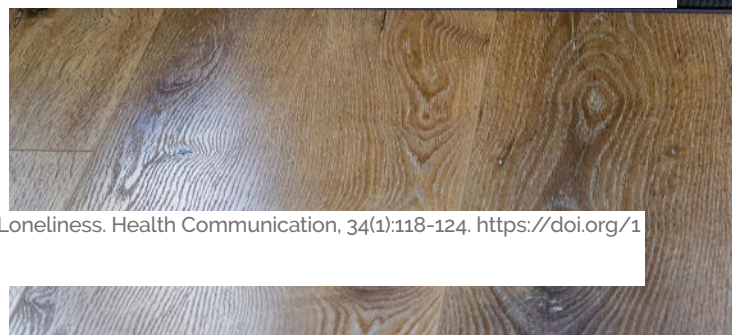
These results are consistent even when controlling for the number of social connections a person has, their satisfaction with those social connections, and the frequency of communication with those social connections. These data also confirm with those reported by Segrin (2019)³⁸, who also found that social skills had an indirect effect on mental health outcomes such as depression.



Mediation Relationship Among Behavioral Skills (IV1), Ability to Connect (IV2), Social Reciprocity (M) and Health Outcomes (DVs)

Table 1	Physical			Depression			Anxiety			Stress			Social Isolation		
	B	SE	t	B	SE	t	B	SE	t	B	SE	t	B	SE	t
IV1 → M	0.54***	0.04	14.65	0.54***	0.04	14.65	0.54***	0.04	14.65	0.54***	0.04	14.65	0.54***	0.04	14.65
IV2 → M	0.37***	0.02	16.51	0.37***	0.02	16.51	0.37***	0.02	16.51	0.37***	0.02	16.51	0.37***	0.02	16.51
IV1 → DV	0.06***	0.01	7.87	0.04	0.02	1.76	0.05	0.02	2.32	0	0.02	0.38	0.01	0.02	4.23
IV2 → DV	0.01	0.01	1.76	-0.29***	0.01	-22.18	-0.23***	0.01	-18.74	-0.26***	0.01	-22.81	-0.21***	0.01	-22.20
M → DV	0.04***	0	10.87	-0.12***	0.01	-12.17	-0.03**	0.01	-2.85	-0.04***	0.01	-4.69	-0.10***	0.01	-14.05
R ²	0.29			0.36			0.28			0.31			0.38		

Note. * = $p < .05$, ** = $p < .01$, *** = $p < .001$



³⁸ Segrin, C., (2019). Indirect Effects of Social Skills on Health Through Stress and Loneliness. *Health Communication*, 34(1):118-124. <https://doi.org/10.1080/10410236.2017.1384434>

SUMMARY & CONCLUSIONS

The purpose of this research was to examine the current state of social relationships, relationship quality, interpersonal skills, and their connection to mental health outcomes and physical health behaviors. Based on the data reported here we conclude the following:

There is wide variability in the number of social connections people have, the level satisfaction they feel with those connections, and the frequency of communication as a function of the type of social connection (e.g., friends, family, acquaintances, coworkers).

- The average number of total social relationships was ~26 people,
- The closest social relationships were those with romantic partners (55%), followed by friends (53%) and mothers (44%),
- Outside of family and friends, social media (92%), pets (65%), and social group involvement (45%) are significant sources of socialization,
- The most common pets were dogs (45%) and cats (35%), with fish, reptiles and small animals only accounting for 10% of all pets owned,
- Relationship Satisfaction and Importance both varied based on the type of relationship.

Interpersonal skills (social-behavioral, ability to connect) significantly positively predicted the number of relationships a person reported having, as well as their satisfaction in those relationships. This indicates that those who have better interpersonal skills and strong social support (via reciprocity) have more relationships overall and are more satisfied in those relationships. Unexpectedly, the number of social relationships a person has did not predict relationship satisfaction, nor did it have an impact on physical health behaviors or mental health outcomes as previous literature suggested.

Physical health behaviors (e.g., exercising regularly, engaging in preventative medical care) and mental health outcomes (e.g., symptoms of depression, anxiety, stress, and social isolation) were impacted

by interpersonal skills and social reciprocity, such that greater interpersonal skills (as measure by assessments of social-behavioral skills and the ability to connect) lead to an increase in positive physical health behaviors and a decrease in negative mental health symptoms, through social reciprocity. This means that engaging in reciprocal social support in our relationships (i.e., give and take) is not only a critical differentiator but is also a necessary conduit for understanding how social abundance (versus isolation) impacts our mental and physical wellbeing.



IMPLICATIONS, LIMITATIONS, & FUTURE RESEARCH

The data reported here provide a comprehensive overview of the current state of social relationships in the U.S. and fill the gaps in previous literature regarding the types of foundational relationships in people's lives in order to present a holistic view of the variability in real-life social networks. Second, this research intended to evaluate individual differences in interpersonal skillsets and relationship quality (i.e., satisfaction, reciprocity) in order to evaluate their influence on both physical and mental wellbeing. In doing so, the data reported here, 1) confirm that the number of social connections a person has influences their relationship satisfaction but not their physical or mental health, 2) advance our understanding of the factors which lead to feelings of social isolation (namely, interpersonal skills and social support in relationships), and 3) critically highlight the importance of assessing the presence of reciprocity in one's relationships, as this factor uniquely buffers against negative emotional experiences (e.g., stress, anxiety, depression, isolation) even when controlling for the number of relationships a person reports. In other words, the quality of our relationships has a greater impact on our wellbeing, happiness, and longevity, than the quantity.

There are several noteworthy limitations to the current data. First, all data presented came from self-report metrics rather than any type of objective data (e.g., actual medical records or diagnoses, psychophysiological measures). Future research should aim to validate our findings by using DSM-approved assessments of mental health outcomes or medical records to confirm physical health outcomes of interest (e.g., family disease history, blood pressure, cortisol levels, claims data, etc.). Second, the physical health behaviors assessment could be expanded upon to include a more comprehensive list of healthy lifestyle behaviors

and factor analyses conducted to confirm the interrelationship among those behaviors. Finally, future research could focus specifically on outcomes as they relate to those who live alone and / or are among older populations to identify the presence of social vulnerabilities and opportunities to enhance social engagement.



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APPENDIX A

The average scores on all health outcome metrics are: depression 7.68 (*SD* = 4.14), anxiety 7.81 (*SD* = 3.46), stress 9.72 (*SD* = 3.40), social isolation 7.39 (*SD* = 3.24), and physical health 4.63 (*SD* = 1.38). The mental health outcome scores were all moderately correlated with one another and negatively correlated with the positive health behavior score. See Table 2.

Table 2.	Depression	Anxiety	Stress	Social Isolation	Positive Health
Depression	1.00				
Anxiety	0.55**	1			
Stress	0.56**	0.54**	1.00		
Social Isolation	0.69**	0.49**	0.54**	1	
Positive Health	-0.29**	-0.25**	-0.22**	-0.28**	1.00

In this sample, men and women reported similar rates of depression³⁹. However, women reported significantly more anxiety⁴⁰ ($M = 8.11, SD = 3.52$), stress⁴¹ ($M = 9.92, SD = 3.42$) and social isolation⁴² ($M = 7.57, SD = 3.19$) than men (Anxiety: $M = 7.42, SD = 3.34$; Stress: $M = 9.45, SD = 3.36$; & Social Isolation: $M = 7.14, SD = 3.25$). Meanwhile, men ($M = 4.72, SD = 1.39$) reported significantly more positive physical health behaviors⁴³ than women ($M = 4.56, SD = 1.36$).

³⁹ $t(7743) = 0.92, p = ns$

⁴⁰ $t(7806) = 8.92, p < .001$

⁴¹ $t(7779) = 6.19, p < .001$

⁴² $t(7728.7) = 5.83, p < .001$

⁴³ $t(7779.5) = -5.30, p < .001$

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