Self-disclosure or Small Talk?

Unpacking the Social Explore-Exploit Tradeoff in an Online Chat Room

Abstract

Reframing social decisions in terms of exploration and exploitation – the pursuit of novel ties or familiar connections, respectively–is a promising new avenue of research and theory within social psychology. The current work, through a pilot study (n = 170) and a follow-up (n = 100), used group-level manipulations to alter the pursuit of social exploration and exploitation through an online chat room. Participants engaged in 1-on-1 conversations in a Facebook Messenger type chat room with up to 9 other participants for 30 minutes. In the Pilot study, we asked participants to focus on the *quality* or *quantity* of connections made to examine how exploration and exploitation influence networking strategies. Network density significantly differed between conditions ($t = -9.57$, $p < .001$, $df = 8$) suggesting that we successfully altered their conversation strategies. Next, the main study manipulated the social risk of conversations by using conversation starters created to elicit *small-talk* or *self-disclosure*. Within the main study, the *self-disclosure* condition was perceived as more meaningful ($\beta = .81$, $t = 3.12$, $p = .01$) and psychologically rich ($\beta = 2.41$, $t = 2.05$, $p < .05$) compared with the *small-talk* condition. However, contrary to our predictions, participants did not adjust their social exploration strategy depending on the condition. This suggests that, at least among strangers, people do not prefer to stick with existing conversation partners more when the conversational context involves intimate self-disclosure. This research line lays the foundation for research on this trade-off within social psychology and aids future researchers designing related experiments.

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Imagine you are at a large networking event. Who do you chat with? Friends, or complete strangers? You may decide to focus more on your close ties (Ishiguro, 2016), which is what people at parties tend to do (Ingram & Morris, 2007). Conversely, you may decide that network building is more important, so you seek weak ties instead. This path would not be wrong either, as research indicates that weak ties are beneficial to landing jobs (Grannovetter, 1973).

We can reframe the behavioral trade-off between seeking friends and strangers in terms of the exploration-exploitation trade-off (Addicott et al., 2017). Conversations are an important social behavior, as the pathway to intimate friendship is built from hundreds of hours of intimate conversations (King, 2022). Within this work, we sought to uncover, first through a pilot experiment, if people change how much they explore or exploit their social environment when instructed to do so. After validating our paradigm, our main study manipulated the riskiness of participants' conversations to determine how risky or non-risky conversations influence their willingness to explore (or exploit) their social environment.

Psychology’s relationship with exploration and exploitation is not new, as this framework is often employed in tandem with neurological and biological research to explain how we make decisions (see Addicot et al., 2017, for review). To date, however, no research to the authors' knowledge views how individuals navigate this trade-off *socially*. Thus, this set of studies fills

that gap in the literature. This study also serves to lay a foundation for future experimental work on manipulating exploration and exploitation within social psychology.

Social Exploration and Exploitation

The trade-off between trying something new or choosing an existing option is formally known as the exploration-exploitation trade-off, a multidisciplinary framework that encompasses behavior from information seeking (Berger-Tal et al., 2014;Wilson et al., 2014; Dezza et al., 2021) to foraging for food (Hayden et al., 2011; Mobbs et al., 2018; Heron et al., 2020). Exploration is seeking new stimuli and/or resources, while exploitation is the opposite, and is defined as seeking familiar resources.

The environments we inhabit can influence whether we pursue exploration or exploitation (Chang et al., 2022). When in a new environment, exploration is advantageous because potential rewards are unknown and require navigating unfamiliar environments. During a college student's first day on campus within a community hundreds of miles away from their home, they must explore their social environment to make friends. Conversely, when deciding who to spend time with, a person going to school in their hometown may exploit their existing options and spend time with a familiar friend.

Over time, people's accumulated decisions about whether to exploit existing ties or explore for new connections is not binary, but instead places them on an explore-exploit continuum (Addicott et al., 2017). According to research by McCabe (2016), an ideal socializing strategy for college students is a balance between exploration and exploitation, i.e., gaining new friends while maintaining past friendships. Too much exploration is not optimal. If you spend all

your time searching for new friends, you may develop an excess number of weak ties and these weak ties provide little social support. This will cause you to be stretched “too-thin” and not have adequate social support needed to maintain quality mental health (McCabe, 2016). Spending too much time exploiting relationships, however, can cause you to lose the benefits of weak ties. This lack of weak ties creates redundant information within a social network (Expósito-Lango & Molina-Morales, 2010), reducing the likelihood of finding novel job opportunities (Grannovetter, 1973).

We need people to survive (Beckes and Coan, 2011). People are resources that give information (Cook et al., 2017) and social support (McCabe, 2016). However, there is a dearth of literature on how we explicitly navigate between exploration and exploitation of social environments. While past research on exploration and exploitation have focused on how individuals (see Addicott et al., 2017 for review) and groups (Siciliano et al., 2018, Stadler et al., 2018, Mura et al., 2014) navigate this trade-off,; to the authors knowledge, no extant literature views how we navigate this trade-off within our social world. We define social exploration and exploitation as the trade-off between navigating social resources (i.e., people). Considering the nascent nature of this work, it is necessary to first identify what similarities exist between exploration and exploitation within the social psychological literature.

Psychological Constructs related to Social Exploration

There exists a plethora of constructs relating to the trade-off of exploration and exploitation within psychology, such as (but not limited to) Big 5 personality (Soto, 2017), self-monitoring (Lennox and Wolfe, 1984) , psychological richness (Oishi et al., 2019),

maximization (Turner et al., 2012), sensation seeking (Zimmerman, 1964) , curiosity (Kashdan et al., 2018), social interaction anxiety (Mattick and Clarke, 1998) and perceived relational mobility (Thomson et al., 2018). While these constructs are not one-to-one equivalents to exploration, these traits may increase one's propensity toward one end of the exploration-exploitation continuum versus the other.

Big Five Index

The most recent version of the big five index (BFI), the BFI-2 (Soto & John, 2017), is the gold standard within personality research for conducting empirical research. The BFI is separated into 5 facets, openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. In a review of the BFI and social network structure, Seldon and Goodie (2018) note that agreeable individuals are more likely to span disparate groups, so we expect agreeableness to correlate with social exploration. Openness to experience typifies both intellectual and social curiosity (Soto & John,2017) with those scoring high within this facet being eclectic and enjoying different types of life. Theoretically, those scoring high in openness to experience should also be people who explore their social networks more than those without. Seldon and Goodie (2018) say that those with higher openness to experience have larger networks with newer, non-redundant ties amongst alters. With a proclivity towards new people and things, those high on this trait may be more exploratory than those without. Conscientiousness measures how well one attends to rules and their overall aptitude towards structure and order, a proclivity towards rules and order may necessitate one to have a very ordered network, this could result in a relationship with exploitation and density, more conscientious individuals may prefer to communicate with the same friends repeatedly affording

structure, so exploitation may be more related to conscientiousness, however past research has not found any significant relationships between the two (see Seldon & Goodie, 2018 for a full discussion on social network structure and the BFI).

Extraverted individuals are social butterflies, typified as being both assertive and gregarious. Those ranking high in extraversion would be social explorers, as research shows that extraverts gain and lose friends quickly, thus are unable to form densely connected groups with most friends occupying the outer rather than inner regions of their network (Ishiguro, 2016). Those ranking high in neuroticism have a greater proportion of friends occupying the inner distribution of their network (Ishiguro, 2016), however given that negative traits often spread throughout the network (Schaefer, 2011) and there is a preference of people to avoid others deemed negative, their networks may be smaller yet more connected reminiscent of social exploitation.

Self-Monitoring

Self-monitoring can be split into two facets, acquisitive and protective self-monitoring (Lennox and Wolfe, 1984). Protective self-monitoring refers to the ability to avoid social disapproval, while those high in acquisitive self-monitoring actively seek social approval. These facets can be combined into a general self-monitoring score, which would measure one's ability to alter their personality in the presence of others. A high self-monitor would be able to conform to many different groups, thus could explore their environment compared with a low-self-monitor, whose ability to alter their personality in the face of new connections may be low, this could diminish their ability to gain weak ties, thus low self-monitors may prefer an

exploit strategy over exploration. Breaking it down by facets, those with high acquisitive self-monitoring may be able to maintain larger more disconnected networks, however there is a lack of research on the network correlates of self-monitoring to determine what strategy acquisitive versus protective self-monitors would prefer. This study will provide much needed evidence regarding the connection between self-monitoring and position on the explore-exploit continuum.

Psychological Richness

Psychological richness is a relatively new self-report measure created by Oishi and colleagues (2019) that typifies one's preference towards the "psychologically rich life", characterized by a pursuit of novelty that is distinct from a good or meaningful life. After studying abroad, individuals report higher levels of psychological richness compared with those who don't (Oishi et al.,2020), thus exposure to novel experiences increases one's desire to live a psychological rich life. Within the explore-exploit continuum, a preference towards exploration over exploitation may relate to psychological richness, such that exploring affords access to a wide arrange of people, granting different types of information and experiences. While over-exploring has its consequences, such as decreased belonging (McCabe, 2016), a psychological rich life is marked by not representing a happy or good life, and so a person high in psychological richness may over explore their network.

Maximization

The maximization inventory (Turner et al., 2012) has 3 separate facets of maximization: decision difficulty, alternative search, and satisficing. Alternative search refers to the tendency to

always select the best option out of a list rather than settling for anything. This tendency relates loosely to exploration, such that those ranking high in this facet would always search for something new and consequently have a more exploratory, less dense, social network. Satisficing would be the tendency to settle for the most available option. High satisficers may be over-exploiters, those possessing more tight-knit networks than their counterparts because of the tendency not to search for the best option. While decision difficulty is a facet of the maximization index, it does not map well onto the exploration-exploitation continuum.

Curiosity

Curiosity can be defined broadly as "… the recognition, pursuit, and desire to explore novel, uncertain, complex, and ambiguous events" (Kashdan et al., 2018). Kashdan and his team (2018) isolated 5 unique constructs of curiosity from factor analyses: deprivation sensitivity, social curiosity, thrill seeking, joyful exploration, and stress tolerance. Deprivation sensitivity refers to the disdain of lapsing gaps within information, the desire to close gaps in knowledge. Social curiosity refers to the degree individuals are curious about their social environment. High thrill seeking suggests that a person is willing to undergo significant risk to attain positive emotion or affect. Joyous exploration is the prototypical curiosity measure, it measures how well someone values "self-expansion over security" and actively seeks novel stimuli and experiences within their daily life. Stress tolerance refers to the ability to handle negative situations that could be perceived as stressful.

Each dimension relates to the capacity of an individual to actively explore their social environment for novel stimuli, however the joyous exploration facet of Kashdan and colleague's

5DC maps perfectly onto the concept of exploration, the tendency to seek novel stimuli, while social curiosity theoretically relates to the social network piece. Kashdan et al. (2018) notes that individuals who are high in social curiosity are often low in connectedness, meaning they have many ties, however these ties are weaker suggesting that their networks may look sparse like Sisciano's (2018) conception of an exploratory academic network. Deprivation sensitivity may refer to an intellectual curiosity and may reflect individual differences outside of the explore-exploit trade-off. Those high in thrill seeking should also have sparse networks, as thrill seekers seek novel stimuli at risk of potentially harmful consequences. This may map onto social exploration as we have loosely defined, however thrill seeking is not inherently social and relates to Zuckerman's (1964) conception of sensation seeking.

Relational Mobility

A relatively new socio-ecological construct, relational mobility refers to the ease at which people feel they can move in and out of their social network (Thomson et al., 2018). Relational mobility has not been viewed within an individual level as of this writing. Individuals who perceive their environment as more relationally mobile may be more likely to self-disclose (Thomson and Ito, 2012) as evinced by a study viewing the subjective differences between Japanese and American social network sites. Individuals within environments perceived as more relationally mobile had more friends, but less commitment to friends on the sites compared with the Japanese network sites. Relational mobility in consequence may act as "oil" to friendships, with higher levels of relational mobility, individuals may feel less committed their friendships

thus contributing the ease of moving in and out of relationships, akin to oiling a door so that it can withstand more friction (i.e., friendship churn).

Social Interaction Anxiety

Individuals with increased levels of social interaction anxiety tend to avoid social interactions more than those without (Goodman et al., 2021b) but they do derive some positive affect when they do have conversations (Goodman et al., 2021a). Social interaction anxiety may serve to inhibit exploratory behaviors, and while there is a lack of research on the social network correlates of social interaction anxiety, their networks should be more constrained and less sparse since they experience heightened levels of anxiety from social interactions.

Hypothesized Consequences of Social Exploration/Exploitation

One hypothesized consequence of exploration and exploitation is different types of social capital. Social capital, a term coined by Pieree Bordeau (1986), denotes the importance of ties we have to others in our community. Robert Putnam, in his book “Bowling Alone” defines social capital as “the connections between individuals - social networks and norms of reciprocity and trustworthiness that arise from them” (Putnam, 2000, pg.19). Social capital varies, and Putnam coined two types of social capital, bridging and bonding capital. Bridging capital, is a type of social capital that refers to connections that bridge disparate groups. Putnam refers to this type of capital as a “sociological WD40” because the weaker connections make it easier to bridge networks and take advantage of the strength of weak ties. Conversely, bonding capital is the sociological “superglue” that bonds people together into meaningful communities. The type

of capital within one's social network thus may vary, as people may have a network composed of strong ties, or bonding capital while others have more weak ties that serve as bridging capital.

Successful engineers balance the explore-exploit tradeoff by alternating between the strategies in phases of idea development, rather than sticking to one strategy (Pentland, 2014). Kelly (1999) within her study on star engineers reported that the best or "star" engineers followed a strategy where they first brainstormed with weaker ties, then after "weeding out" the bad ideas, they spent time engaging with their core network.

Exploration and exploitation can have differential effects on the structure or shape of a person's social network. Within academic networks, Stadler and team (2018) find that when academics practice exploration, they have more new ties within the network, creating a sparse network with few connections amongst alters or peers; on the other hand, more exploitative networks are densely connected to one another. Scientists in exploratory networks submitted more grant applications and journal articles, while those in exploitative networks *received* more grant awards and grant dollars (Siciliano et al.,2018). Stadler and team (2018), in addition to Siciliano and colleagues (2018) only view their networks from a correlational standpoint, thus we cannot determine whether people's networking strategies (versus situational effects) drove individual differences in social networks . Accordingly, Stadler and team (2018) ask "How does the intention to explore or exploit shape social networks?" This study seeks to alter the intention to either explore or exploit in a short-term laboratory social network.

McCabe (2016) and King (2022) with their books "Connecting in College" and "Social Chemistry", respectively, denote both a sociological (McCabe, 2016; King, 2022) and psychological (2021) perspective on how people explore or exploit their individual social

networks through their analysis of the pros and cons of various network topologies. McCabe's typologies include Tight knitters, Compartmentalizers and Samplers, each occupying a unique position on the explore exploit trade-off continuum.

Tight knitters represent an overly exploitative network, with a dense well-connected network, resembling a ball of yarn. These networks are marked by having high density, but low modularity. While this exploitative is beneficial for social support, doubly so for first-generation students, it can be detrimental to academic success.. These dense networks do not allow for new information to flow in, and with first-generation students in particular, bad habits may easily permeate this network spreading to everyone. Because the network is tight knit, people often conform rather than not, because not conforming could eject a person from the group. McCabe notes that individuals with tight-knit networks often perform worse academically and are more likely to be first-generation compared with the other typologies. One caveat: for people with what McCabe deems multiplex ties, or ties that serve multiple purposes, for instance eating out, partying, and studying with the same group of friends, overly exploitative networks are not detrimental to success. It is often people who are a part of sororities or fraternities that have overly exploitative networks with multiplex ties.

Compartmentalizers occupy the mid-point within the explore exploit trade-off, they exhibit an optimal balance of exploration and exploitation. Compartmentalizers have a network that resembles 2 to 3 distinct clusters connected to the ego, compared with 1 distinct cluster for a tight knit network. This network typology is also marked by having moderate modularity and moderate density, compared with the other typologies. Individuals with this balanced typology tend to be non-first-generation students, and they also have higher GPAs than the tight knitters,

while also maintaining high levels of social support and belonging. This further reiterates the optimality of this network type, because they are not overly dependent on one group for support, they can benefit from the access to weak ties to that having a diverse network affords. They have access to diverse amounts of information from their separate groups, thus increasing the information flow and decreasing information redundancies that are so problematic for tight knitters. This balanced type of network simultaneously protects against academic and social deficiencies by segmenting the network into distinct groups that serve social purposes, while the other group(s)may strictly be for academics.

Samplers, the most modular and least dense of McCabe's typologies, and exist on the opposite side of the explore exploit continuum from the tight knitters representing over-exploration of a social network. Samplers have relatively high GPAs compared with tight knitters, but lower social support than both compartmentalizers and tight knitters. Over exploration affords them access to weak ties, thus samplers are often successful within their academic pursuits, but this over exploration comes at a cost, they are not able to build the social support networks engender belongingness. Having many loosely connected friends elicits weak social bonds, but the samplers blossom academically. After college, McCabe mapped the social network structures of participants that she studied and found that those with a sampler type tended to regret having this specific type of network in college, and after college their networks tended to gravitate towards the more balanced compartmentalizer typology. In short, McCabe's network typologies exemplify unique positions on the explore exploit continuum, with samplers over-exploring and tight knitters over exploring, and with compartmentalizers balancing between exploration and exploitation, reaping benefits from both strategies.

Current Work

The proposed studies seek to answer Stadler and colleagues' (2018) question about how the intent to explore or exploit can shape how we network. Specifically, we ask whether people adjust their networking strategy in response to the riskiness of social interactions. In non-social domains, as environmental risk increases, exploration tends to decrease. We hypothesized the same would happen in a social setting.

First, using a pilot study, we sought to validate our experimental paradigm, namely that it is possible to manipulate the exploration and exploitation trade-off within social networks. As a next step, we wanted to understand how the riskiness of conversations impacts our networking strategy. Within both studies, we also included a battery of psychological self-report measures thought to be affected by exploratory versus exploitation strategies based on prior literature. Based on the literature reviewed above, we propose the following hypotheses:

H1: People can adjust their social networking strategy to be more exploitative or exploratory.

H2: Emotionally intense conversations will cause people to be more exploitative.

Pilot Methods

Participants

We recruited 200 undergraduate students from the University of Virginia's undergraduate psychology participant pool. 30 participants were removed due to errors within the chatrooms, with the total usable sample being 170 undergraduates. All participants were given course credit

upon completion of the experiment. We had no a priori expectations of the power needed to obtain an effect, thus no sample size estimation was completed**.**

Demographics

The analyzed sample was 61.5% female, the rest identified as male (44%). Majority of the sample self-identified as white (70.1%) with the rest of the sample being Asian (20.7%), Black (4.9%), or other (4.3%). The sample was composed of individuals with families making: under 35,000$ (4%), between 35,000 and 49,999 (1%), 50,000 and 64,999 (3%) ,65,000 and 79,999 (2%), 80,900 and 94,999 (6%), 95,000 and 109,999 (8%), 110,000 and124,999 (12%), 125,000 and $139,999 (5%) , 155,000 and 169,999 (8%), 170,000 and 184,999 (5%), 185,000 and 199,999 (5%), 200,000 and 214,999 (8%), 215,000 and 229,999 (3%) , 230,000 and 249,999 (5%), and more than $250,000 (23%). Family income was rounded to the nearest whole percent and was measured using USD. All the participants were aged between 18 and 21.

Procedure

This study consisted of a pre-experiment Qualtrics questionnaire, which upon completion, automatically redirected students to the main study website where 10 anonymous participants interacted with each other in one-on-one text-based conversations for 30 minutes. After completing the chatroom, participants were redirected to the post experiment questionnaire on Qualtrics. Unique random subject IDs were preserved from the pre-experiment through to the post-experiment to merge data found on Qualtrics.

Pre-Experiment

Participants were sent an email link to their school email, and joined a Zoom link, where at least 1 research assistant was present. Then, they were given a link to the pre-experiment Qualtrics, which included the SPANE (Scale of Positive and Negative Experiences; Diener et al., 2009). After completing the informed consent, participants completed the SPANE (Diener et al., 2009). Once the survey was completed, the participants were automatically redirected to the experiment's website.

Chat Room

The chat room was created and hosted by SoPHIE Labs (Hendriks, 2012). Participants spent approximately 30 minutes inside the chat room. Each chat room consisted of a group of 10 participants who were identifiable through randomly assigned avatars. The experimental manipulation occurred at the group level, so each group was randomly told to focus on the "quality" (exploit) or "quantity" (explore) of connections made within the chatroom. A research assistant was present within the chat room to assist with any technical difficulties. All messages were saved, as well as anonymous data on both the sender and receiver of the messages. These messages were then used to create a social network of each chatroom (see Figure 1 for an example). Participants who have not communicated with each other will appear disconnected. .

To incentivize participation, participants in the exploration group were told that the person with the most connections (out of the entire experimental condition, not group) would receive a 10$ Amazon gift card. Those in the exploitation group were told that the most liked participant would receive a gift card. After the chatroom phase ended, participants reported their

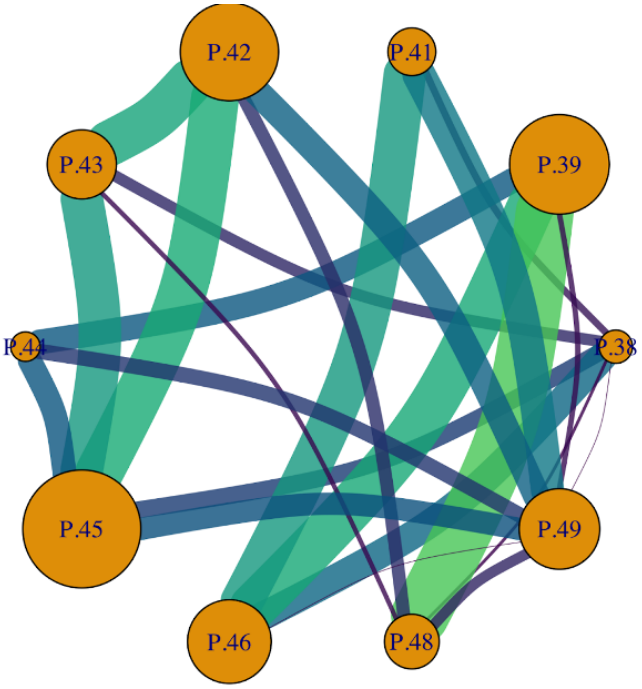
favorite avatar to communicate with and the person with the most votes out of 60 participants received a gift card.

Post-Experiment

After completing the chatroom, participants were automatically redirected to a post-experiment Qualtrics. This post-experiment survey included modified versions (see measures for modifications) of the: (1) social connectedness scale (Lee & Robbins, 1995), (2) relational mobility scale (Thomson et al., 2018), (3) Scale of Positive and Negative Experiences (SPANE; Diener et al., 2009), (4) Meaning in Life Questionnaire (MLQ; Diener et al., 1985), (5) Satisfaction With Life Scale (SWLS; Diener et al., 1985), and (6) Psychological Rich Life Questionnaire (PLRQ; Oishi et al., 2019).

Figure 1

Example Chatroom Social Network



Note. Yellow circles indicate the participants. Thickness of the lines represents the number of messages sent between participants.

Measures

Scale of Positive and Negative Affect (SPANE)

To assess affect both pre- and post-experiment, we included the original 12-item SPANE (Deiner et al., 2009). Positive affect scores during the pre-test ranged from 6 to 36 (M = 24, SD = 6) and negative affect ranged from 6 to 31 (M = 16, SD = 5). Positive (α = .93) and negative (α = .85) affect were found to be internally consistent. During the post-experiment questionnaire, participants were given a modified version of the SPANE which asked, “During the chatroom

how often have you felt the following emotions". Positive affect scores ranged from 11 to 36 (M = 26, SD = 5) and negative affect ranged from 6 to 24 (M = 8, SD = 3). Positive (α = .86) and negative (α = .88) affect were both internally consistent.

Meaning

We included a modified version of the MLQ (Deiner et al., 1985). This scale was modified to be relevant to the chatroom with questions like "The chatroom was meaningful". The modified MLQ was not found to be reliable (α = .56), perhaps the modified questions were not capturing the same phenomena measured, as the MLQ usually has an alpha above .90 (Diener et al., 1985).

Satisfaction With Life

We included a modified version of Diener and colleagues' (1985) SWLS to assess chatroom satisfaction. The scale was modified to be relevant to the participants' experience within the chatroom, with questions like "The chat was pleasant." Scores ranged from 2.4 to 7 (M = 5.68, SD = .80) and the SWLS demonstrated moderate reliability (α =.73)

Psychological Richness

We included a modified version of Oishi and colleagues (2019) PRLQ; a 10-item measure to assess one's preference of a psychologically rich life, distinct from a happy or a meaningful life. The scale was modified to be relevant to the participants' experience within the chatroom, with questions like "The chatroom was novel". Scores ranged from 1 to 7 (M = 4.90, SD = 1.2) PRLQ demonstrated strong reliability (α =.81)

Relational Mobility

To measure how relationally mobile participants felt within the chatroom, we measured relational mobility (Thomson et al., 2018). 1 question was removed from the study due to irrelevance within the chatroom. The 11 questions included were modified to be relevant to the chatroom, with questions like “If they did not like their current conversation, they could leave for better ones.” Scores ranged from 2.4 to 5.1 ($M = 4$, $SD = .4$). The questionnaire demonstrated poor reliability ($\alpha = .52$).

Social Connectedness

After the chatroom portion of the experiment, we assessed social connectedness using a modified version of Lee and Robbins (1995) measure of social connectedness which consists of 14 questions (e.g., ‘how connected to your peers do you feel?’) assessed on a 1 (not much) to 7 (very much) Likert scale. It was modified to only include questions relevant to the chatroom such as “Even among participants that I liked, there was no sense of togetherness”. On average participants felt connected to others within the chatroom ($M = 5.3$, $SD = 1.1$) and the scale was found to have strong reliability ($\alpha = .92$)

Social Networks

Social network density of the chatrooms was computed using R.3.0.1 (R Core Team, 2022) and the igraph package (Csardi & Nepusz, 2005). Density is calculated as the proportion of total ties divided by the number of actual ties by each person. Density scores range from 0 to 1, 1 representing a completely dense or connected network where everyone has spoken to each

other at least once. On average, the chat rooms were moderately connected to each other, with an average score of .5 (n = 10, SD = .2).

Pilot Analysis and Results

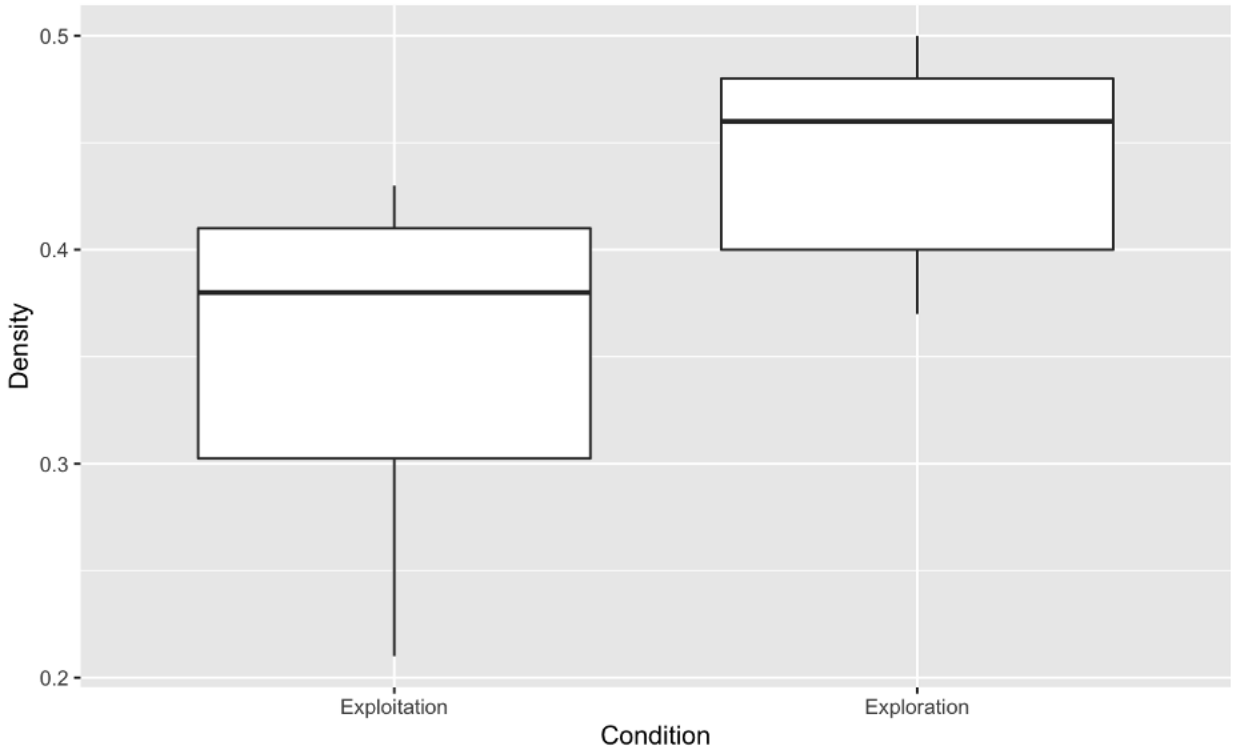
First we tested our hypothesis that manipulating the intent to explore or exploit would alter the structure of our social network. We also explored group differences in the self-report measures. We used base R.3.0.1 (R Core Team, 2022) to conduct independent samples t-tests.

Effect of Manipulation on Network Density

In line with our first hypotheses, we did find a significant difference between conditions on density ($t = -9.57$, $p < .001$, $df = 8$, see Fig.2) such that the exploration group was denser than the explore group.

Figure 2

Boxplot of Condition and Network Density



Effect of Condition on Self-Report Variables

To assess the differences among conditions on self-report variables, we conducted independent samples t-tests in R.3.0.1 (R Core Team, 2022).

No significant difference existed between conditions for the perceived psychological richness of the chatroom ($t = .297$, $p = .767$, $df = 167$), relational mobility ($t = -.400$, $p = .690$, $df = 167$), meaning ($t = 1.383$, $p = .169$, $df = 167$) or satisfaction with life ($t = .797$, $p = .767$, $df = 167$). There were no group-differences between pre and post experiment on the change in positive ($t = -1.18$, $p > .05$, $df = 167$) and negative affect ($t = -.821$, $p > .05$, $df = 167$) . Social

connectedness differed significantly between the conditions ($t = 2.23$, $p = .0023$, $df = 167$), such that individuals felt more socially connected in the exploit condition.

Discussion

The results of our pilot study supported our hypothesis that altering individuals' networking goals would change the structure of the group at large. To the researcher's knowledge, this is the first time the structure of a laboratory social network structure has been successfully manipulated. Much of the research within exploration and exploitation either views this trade-off from an individual perspective, viewing how individuals choose between exploration or exploitation; or, if they examine groups, they treat the group as the deciding agent (Pentland, 2014; Siciliano et al., 2018). This pilot validated that you could manipulate exploration and exploitation on a group level by altering networking strategies. Our manipulation was direct: people were simply told to focus on the quality or quantity of their connections made within the chatroom. After demonstrating that people can switch their networking strategies in novel social contexts among strangers, we will ask if they do so when the riskiness of those social interactions is manipulated.

Main Study

To test our main hypothesis, that the social riskiness of a conversation would influence conversation strategies, we conducted a second, pre-registered (https://aspredicted.org/66P_RQT) study. We hypothesized that altering the emotional intensity of the conversations would alter perceptions of overall situational risk, and that a risky social context would lead to fewer–but deeper–social connections. We also pre-registered hypotheses

viewing the effect of the condition on chatroom satisfaction, psychological richness, and positive affect.

Methods

Participants

Sample Size

Our pre-registration targeted 300 participants, but due to time constraints, we ultimately recruited 206 from the psychology department's participant pool. In order to ensure that each group has at least 10 participants, we recruited participants in groups of 15. In total, 110 participants were included in the study after 96 were excluded due to over recruitment. A miscommunication within the chatroom resulted in the removal of one group (n = 10) from analysis, bringing the total number of usable participants to 100. Course credit was awarded to all participants regardless of whether they completed the main experiment or a different study.

Demographics

The sample was composed of people identified as female (56%), Male (44%) and 1% identified as non-Binary. Majority of the sample self-identified as white (70%) with the rest of the sample being Asian (21%), Black (5%), or other (4%).The sample was composed of individuals with families making: under 35,000$ (5%), between 35,000 and 49,999 (5%), 50,000 and 64,999 (7%) ,65,000 and 79,999 (6%), 80,900 and 94,999 (3%), 95,000 and 109,999 (5%), 110,000 and 124,999 (7%), 125,000 and $139,999 (5%) , 155,000 and 169,999 (4%), 170,000 and 184,999 (2%), 185,000 and 199,999 (8%), 200,000 and 214,999 (7%), 215,000 and 229,999 (5%) , 230,000 and 249,999 (7%), and more than $250,000 (24%). Family income was rounded

to the nearest whole percent and was measured using USD. All the participants were aged between 18 and 21.

Procedure

Participants were first given an electronic consent form within a Qualtrics form. Any participants not 18 years of age were asked not to consent. After completing the consent form, they were automatically redirected to the study's website to chat with up to 9 other participants for 30 minutes. Following the completion of the chatroom, participants were automatically redirected to the post-experiment Qualtrics where they completed the social connectedness measure and demographics. We employed the same experimental procedure in the pilot study (see Pilot Study for more information) from SoPHIE Labs (Hendriks, 2012).

Experimental Manipulation of Social Risk

During the chatroom, participants were given access to the conversation starters they were instructed to use as guides during their conversations. Groups were randomly assigned to either the "small-talk" or "meaningful" conditions, with the former containing questions intended to elicit self-disclosure and vulnerability. Research assistants (RAs) created 100 conversation starters per condition, totaling 200 total conversation starters. Each question was independently rated by three RAs on subjective meaningfulness using a scale of 1-5. We selected the top 50 most meaningful for the self-disclosure condition and the bottom 50 least meaningful questions to be used in the small talk condition (see Tables 1.1 and 1.2 in the appendix for a full the conversation starters used). Conversation starters in the self-disclosure condition include questions like "When is the last time you cried and why?" and "What would you say at the

funeral of the family member you cared most about?" Conversation starters in the small-talk condition include questions such as: "What is the weather like today?" and "Is a hotdog a sandwich?"

The 50 questions were sent to the groups according to their condition. To view the conversation starters, a researcher sent a link to the conversation starters via Zoom prior to the start of the chatroom session portion of the experiment. We used Qualtrics to deliver conversation starters. A subset of 5 conversation starters randomly presented at a time to prevent participants from seeing the same questions. They were able to refresh the link to change the questions presented.

Measures

SPANE

We included the original 12-item SPANE (Deiner et al., 2009) within the pre-test, and a modified version within the post-test. Positive affect scores during the pre-test ranged from 6 to 34 (M = 25, SD = 5) and negative affect ranged from 6 to 30 (M = 15, SD = 4). Positive (α = .84) and negative (α = .79) affect were found to be internally consistent. During the post-experiment questionnaire, participants were given a modified version of the SPANE. Positive affect scores ranged from 9 to 36 (M = 25, SD = 5) and negative affect ranged from 6 to 26 (M = 9, SD = 3). Positive (α = .83) and negative (α = .84) affect were both internally consistent.

Meaning

We included a modified version of the meaning in life questionnaire (MLQ; Deiner et al., 1985). This scale was modified to be relevant to the chatroom. Scores ranged from 2.4 to 7 (M =

5.4, SD = .8) The modified MLQ was not found to be reliable (α = .56), perhaps the modified questions were not capturing the same phenomena measured, as the MLQ usually has an alpha above .90 (Diener et al., 1985)

Psychological Richness

We included a modified 5 items of Oishi and colleagues (2019) psychologically rich life questionnaire (PRLQ); a measure to assess one's preference of a psychologically rich life, distinct from a happy or a meaningful life. The scale was modified to be relevant to the participants' experience within the chatroom. Scores ranged from 1.6 to 7 (M = 5.23, SD = 1.18) and the PRLQ demonstrated strong reliability (α =.90)

Satisfaction With Life

We included a modified version of Diener and colleagues (1985) Satisfaction with Life Scale (SWLS), a measure to assess one's satisfaction with the chatroom. The scale was modified to be relevant to the participants' experience within the chatroom. Scores ranged from 2.4 to 7 (M = 5.68, SD = .80) and the SWLS demonstrated poor reliability (α =.67)

Social Connectedness

After the chatroom portion of the experiment, we assessed social connectedness using a modified version of Lee and Robbins (1995) measure of social connectedness scale which consists of 14 questions assessed on a 1 (not much) to 7 (very much) Likert scale. Questions were removed or modified to be relevant to the chatroom. Scores ranged from 6 to 32 (M = 14.78, SD = 6.24). The scale was found to be internally consistent (α = .91).

Emotional Meaningfulness

To test the effectiveness of our manipulation, we used LIWC22 (Pennebaker et al., 2021) to assess the emotional meaningfulness of the words, and the number of words used within the sample. We initially pre-registered using emotional intensity, but the authors discovered that Ratner and colleagues' (2021) well-being LIWC22 dictionary assesses the linguistic meaning of words, so we included that. An example of a meaningful text is “I’m not religious.” while a non-meaningful text would be “Sorry, I saw your message late”. Scores ranged from 0 to 4.71 (M = 1.32, SD = .96). A 0 represents that none of the words used within the conversations were coded as meaningful. A score of 3, for instance, means that 3% of the words used within their messages were meaningful.

Word count, message count, and partner count

Average Word count was calculated using LIWC22 (Pennebaker et al., 2021). This score represents the average amount of words sent per message. Word count ranged from 2 to 40 words per message (M = 9, SD = 5). The number of messages sent between pairs ranged from 1 to 48 messages (M = 9, SD = 7). The number of incoming partners ranged from 0 to 9 partners (M = 3, SD = 2) and the number of outgoing partners ranged from 0 to 9 partners (M = 3, SD = 2). The number of total partners (both incoming and outgoing) ranged from 3 to 9 partners (M = 7, SD = 1).

Shannon Entropy

To quantify how predictable participants' time allocation was in the chatroom, we calculated Shannon Entropy in R with the DescTools package (Andri et al., 2022), using the following equation:

EQ1: $I(x) \ = \ - \ log \ P \ (x)$

Entropy was based on the number of messages sent to the 9 other participants. Entropy scores ranged from 1 to 3.1 (M = 2.5, SD = .4). Low scores suggest that the conversation partners were not varied; higher scores suggest that they more equally distributed their messages across conversation partners. A person who spent all their time messaging one partner would be lower in entropy, while a person who messaged everyone equally would be high in entropy.

Social Networks

To create the social networks, we used the igraph package (Csardi & Nepusz, 2005) in R.3.0.1 (R Core Team, 2022). Networks were generated for each group (n = 10), based on the number of messages sent and received. Network density–the total amount of actual connections divided by the total amount of possible connections–was calculated. A completely dense network means that each person sends a message to everyone within their group. Network density ranged from .68 to .91 (M = .82, SD = .08). Note that network density is calculated at the group level, resulting in 10 unique scores in the present study.

Analysis and Results

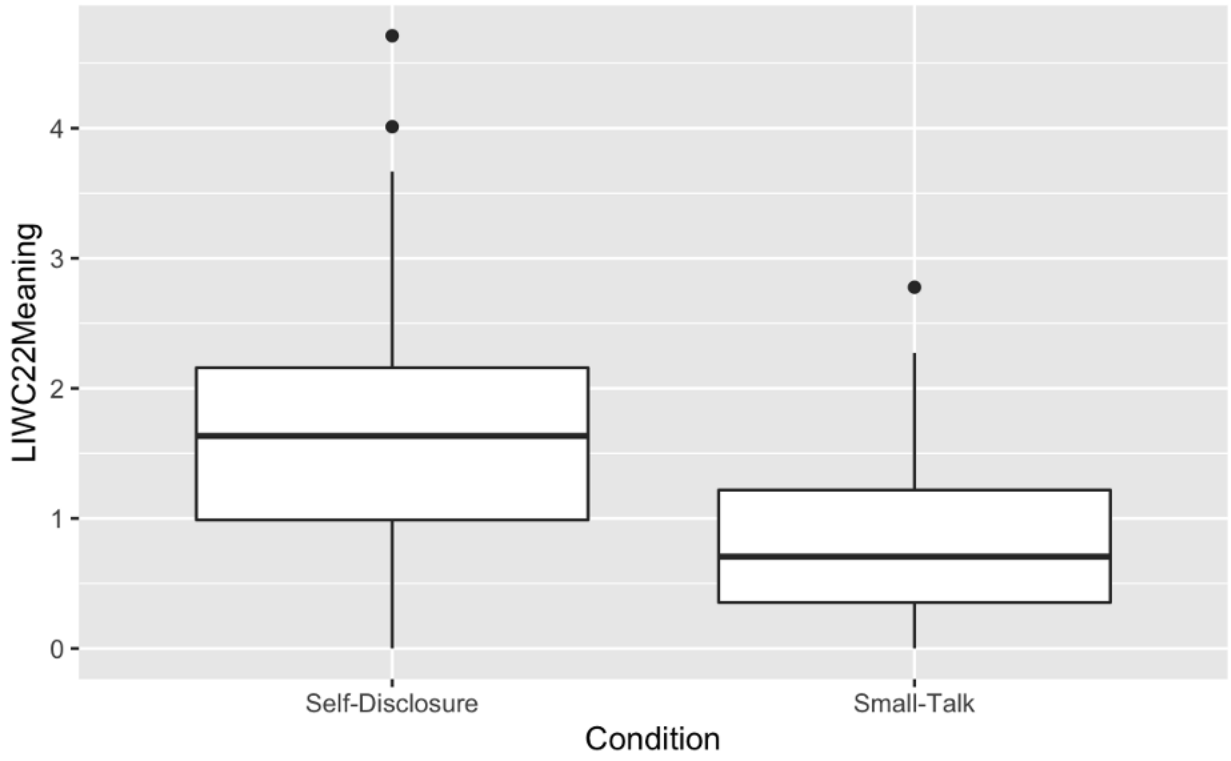
Manipulation check: Conversational meaningfulness

To test our manipulation, we first removed the conversation starters from analyses. Then, we conducted an independent sample t-test to determine differences among conditions in conversational meaningfulness. We found significant differences ($t = 6.19$, $p < .001$) in the chat rooms on the linguistic meaningfulness of the chatrooms. As expected, individuals in the self-disclosure condition used language that was more meaningful than the small-talk condition (see Figure 3).

We then conducted a linear mixed effects model with self-reported meaningfulness as the dependent variable and experimental condition as the independent variable. We found a significant large effect ($\beta = .61$, $t = 3.50$, $p < .001$). Individuals in the small talk condition perceived the chatroom as less meaningful than those in the self-disclosure condition.

Figure 3

Boxplot of Condition and Linguistic Meaning



Effect of Condition on Network Density

To test our second hypothesis, that the emotional intensity of the group would alter networking strategies, we ran another linear mixed effect model. We used density as a dependent variable and condition as an independent variable and added a random effect for the group. Contrary to our expectations, the effect of condition on density was non-significant ($\beta = .03$, $t = 1.45$, $p = .345$).

Effect of Condition on Shannon Entropy

There was no significant effect of condition on the entropy of participants' message distributions ($\beta = .03$, $t = .243$, $p = .814$).

Effect of Condition on Number of Conversation Partners

As another instantiation of hypothesis 2, we used the number of ingoing and outgoing conversation partners as dependent variables. Results showed no effect of condition on outgoing partners ($\beta = .0.125$, $t = .216$, $p = .829$). There was no significant effect on incoming partners ($\beta = .125$, $t = .246$, $p = .806$). This suggests that the chatroom had no effect on the number of conversation partners.

Effect of Condition on Subjective Measures

Social Connectedness

We conducted a linear mixed effects model to determine if social connectedness would be higher in the self-disclosure condition. Contrary to our second hypothesis, we found non-significant results ($\beta = .03$, $t = .243$, $p = .814$).

Psychological Richness

With psychological richness as the dependent variable, we found significant ($\beta = 2.41$, $t = 2.05$, $p < .05$) results, such that the self-disclosure condition perceived their chat room as more psychologically rich than the small-talk condition.

General Discussion

Social exploration and exploitation are behavioral strategies for networking with other people (Siciliano et al., 2018). To our knowledge, this study is the first study to unpack how the intent to explore or exploit causally influences the structure and experience of a group interaction setting. The goal of this research was to determine if we could manipulate the intent to explore or exploit, and if altering the riskiness of the conversations would decrease social exploration. Within the pilot study, we found support for the first hypothesis, that the intent to explore and exploit influences the structure of our social network. This intent was manipulated by instructing participants to either focus on the quality or the quantity of their connections within the chatroom. When told to focus on the quantity (exploration) of their social ties, individuals networked with a greater proportion of the chatroom than those told to focus on quantity (exploitation).

Our second hypothesis, that the emotional costliness of conversations can influence networking strategies, was not supported by the main study. This was evident by the null effect of the condition on network density, number of conversation partners, and the Shannon entropy of how people distributed their time across partners. This suggests that the conversation starters did not successfully influence the intent to explore and exploit. Future work will need to examine whether this was because a) meaningful conversations are not perceived as risky/costly or b) people (in anonymous chat rooms) do not adjust their networking strategies in response to risk/cost.

The self-disclosure condition increased the subjective meaningfulness and the linguistic meaningfulness (assessed via LIWC). We also found support that the manipulation influenced psychological richness. People in the self-disclosure condition felt the chatroom to be more psychologically rich. Perhaps the self-disclosure chatroom allowed them to experience and connect on a deeper level with their peers, and this experience, like studying abroad (Oishi et al., 2020), increased in psychological richness.

This study has its limitations, one being the largely WEIRD (Heinrich et al.,2010) sample, which prevents generalizability outside of largely upper class, female, and white college students. Furthermore, this study has low external validity. The enclosed nature of the networks of 10 participants reverse the theoretical link between network density and exploration. In the real world, exploratory individuals would have larger, more sparse networks and individuals who exploit would have a denser network. Our interpretations need to be reversed for our study, as individuals who explored formed dense, saturated social networks, while those who exploited had less dense social networks (within the pilot study).

Our conversation starters may not have effectively manipulated emotional costliness and social risk. Coding the questions on meaningfulness may not have been the best tool to assess emotional costliness. Future iterations of this study should ask independent coders to rate the questions based on “how stressful would it be to initiate a conversation like this with a stranger, on a scale of one to five?”, for example.

The present analyses do not account for the dynamic nature of the conversations. For instance, did momentary changes in the emotional intensity (e.g., measured via LIWC) of a

conversation cause people to change partners? Disentangling questions like this may require more advanced statistical approaches, such as a Monte Carlo Markov Chain (MCMC; Andrieu, 2003) algorithm. This method of analysis would allow us to utilize the absolute time to determine (1) how often people switch partners and (2) when they switch partners and what other factors influenced people changing partners, like the number of words used within the conversation, or the length of the conversation. Secondary analyses should analyze the text data within the chatroom to determine the number of topics that participants strayed from and/or the number of questions they used from researchers.

Since our core manipulation within the main study failed, future chat room studies utilizing SoPHIE are necessary to uncover what, besides the explicit intent to explore or exploit, can influence how people switch strategies. For instance, would making the conversations more political instead of meaningful, yet largely uncontroversial, influence our social strategies, and would these effects vary based on the perceived political orientation of the chatroom? Future experimental research should ask questions like these.

While this work views exploration and exploitation within a closed laboratory social network, the dynamic, longitudinal nature of social exploration and exploitation has yet to be explored. The current research cannot conclude, if, when engaging in social exploration and exploitation longitudinally, stronger connections or weaker connections are formed because of one's preference. Future work should combine experience sampling and personality measures to test the hypothesis that perceived social risk leads to more exploitative network structures.

Oishi and Kessiber's (2012) study found that based on income and residential mobility, people benefit more or less from weak ties. If we can alter how people connect, we can tailor networking functions to best suit individuals and their unique contexts. Research by McCabe (2016) suggests that first-generation students prefer more tight-knit social networks compared to their non-first counterparts. On the other hand, at a networking conference where the goal is to facilitate connections among CEOs, one may prefer an approach more focused on quantity (i.e., explorative) that focuses on meeting many people faster, thus facilitating the development of weak ties.

Understanding exploration and exploitation is paramount to untangling the nature of how we form social connections. By laying the foundation here, we can begin to formulate other studies to better understand how people form social networks and to ultimately influence the connections that people make in the real world.

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Appendix

Table 1.1

Meaningful ratings of 50 Small Talk Questions

Questions	Rating 1	Rating 2	Rating 3	Average
Do you have any pets?	1	1	1	1
Do you like cinnamon?	1	1	1	1
Do you prefer comedies or dramas?	1	1	1	1
Do you prefer hiking or picking apples?	1	1	1	1
Do you prefer pancakes or waffles?	1	1	1	1
Do you prefer salty or sweet foods?	1	1	1	1
Hot or iced drinks?	1	1	1	1
How many times a day do you brush your teeth?	1	1	1	1
What app on your phone do you use the most?	1	1	1	1
What is the best length of time for a nap?	1	1	1	1
What is the best way to cook eggs?	1	1	1	1

What is your favorite breakfast food?	1	1	1	1
What's the best way to cook a potato?	1	1	1	1
What's your favorite kind of bread?	1	1	1	1
What's your favorite flavor of ice cream?	1	1	1	1
What's your favorite sport?	1	1	1	1
What's your go-to coffee order?	1	1	1	1
What's your least favorite snack?	1	1	1	1
Between a robot and a dinosaur, who would win in a fight?	1	1	2	1.33
Do you have a lucky number?	2	1	1	1.33
Do you prefer board games or card games?	2	1	1	1.33
Do you prefer to shop online or in a store?	2	1	1	1.33
Do you prefer to take notes on paper or on your computer?	2	1	1	1.33
Do you prefer watching sports on TV or in-person?	2	1	1	1.33
Do you think pineapple should go on pizza?	2	1	1	1.33

Do you usually schedule classes in the morning, afternoon, or night?	2	1	1	1.33
Have you been to a concert?	1	1	2	1.33
How do you drink your coffee or tea?	2	1	1	1.33
Marvel or DC?	2	1	1	1.33
What is the longest drive you've ever done?	1	1	2	1.33
What is your favorite meal of the day?	2	1	1	1.33
What is your workout routine?	1	2	1	1.33
What is your zodiac sign?	2	1	1	1.33
What was your favorite subject in high school?	1	2	1	1.33
What's your favorite holiday?	1	1	2	1.33
What's your favorite weather?	2	1	1	1.33
What's your go-to comfort food?	1	1	2	1.33
Who's your favorite singer or musician?	1	1	2	1.33
Windows or Mac?	2	1	1	1.33
Are you a good cook?	2	2	1	1.67

Are you a morning person or a night person?	2	2	1	1.67
Cats or dogs?	2	2	1	1.67
Do you enjoy thriller movies?	2	1	2	1.67
Do you have any siblings?	2	2	1	1.67
Do you listen to old songs?	2	1	2	1.67
Have you ever been to Disneyland?	2	1	2	1.67
If you could only eat one meal for the rest of your life, what would it be?	2	1	2	1.67
Is there any type of music you don't like listening to?	3	1	1	1.67
Tell me a lame joke.	2	1	2	1.67
What is the best concert you have ever been to?	2	1	2	1.67

Table 1.2

Meaningful ratings of 50 Self-Disclosure Questions

Questions	Rating 1	Rating 2	Rating 3	Average
When have you been happiest in your life?	4	5	3	4

Can you share 5 positive things about yourself?	4	5	4	4.33
Do you believe humans are fundamentally good or evil?	5	4	4	4.33
Do you have an ideal type of lover?	5	3	5	4.33
Do you think the world is a just place?	5	3	5	4.33
How are your world views shaped by religion?	4	5	4	4.33
How do you cope when things aren't going your way?	4	5	4	4.33
If you could speak to your child self, what would you say?	4	4	5	4.33
Is it possible to alleviate suffering in the world?	4	4	5	4.33
What are you most afraid of, and why?	4	5	4	4.33
Based on our conversation so far, what do you think of me?	4	5	4	4.33
What has been the most formative experience of your life?	4	5	4	4.33
What makes you feel optimistic about the world around you?	4	4	5	4.33
What was the best phase of your life? Why?	4	5	4	4.33
What was the worst phase of your life? Why?	4	5	4	4.33
What worries you most about the future?	4	5	4	4.33
What's something you wish others knew about you?	4	5	4	4.33
What's something you've given up on?	4	5	4	4.33

What's the biggest sacrifice you've ever made for someone else?	5	5	3	4.33
What's your deal breaker in a relationship? Why?	4	5	4	4.33
What's your greatest weakness?	4	5	4	4.33
Which do you think is most valuable: love, time, or money? Why?	5	4	4	4.33
Will people's comments shape your own identification with yourself?	4	5	4	4.33
Do you believe in a universal morality?	5	4	5	4.67
Do you feel your childhood was happier than most other people's?	4	5	5	4.67
Do you think people place too much value in material objects?	5	5	4	4.67
Imagine your closest family member passed away, what would you say at their funeral?	5	4	5	4.67
What do you think is too serious to be joked about?	4	5	5	4.67
What do you wish more people knew about you?	4	5	5	4.67
What is something you wish you'd done in the past?	4	5	5	4.67
What is the most fatal flaw a human being can have?	5	5	4	4.67
What is your purpose in life?	4	5	5	4.67

What's one personality trait you'd change about yourself, and why?	5	4	5	4.67
What's something you must do before you die?	4	5	5	4.67
Who in your life are you closest with right now?	4	5	5	4.67
Who in your life do you feel sorry for right now?	4	5	5	4.67
Who are you closest to in your family and what makes them different from everyone else in your family?	5	5	5	5
Are there any circumstances where it would be acceptable to kill another human being?	5	5	5	5
Are you being true to yourself? Why or why not?	5	5	5	5
Could you ever see yourself cheating on a partner?	5	5	5	5
Do you think people can really understand each other?	5	5	5	5
Do you wish your parents raised you any differently than they did?	5	5	5	5
Have you experienced the type of love that made your life more meaningful?	5	5	5	5
How is the "public you" different from the "private you"?	5	5	5	5
Is happiness the ultimate goal in life, if not, what is?	5	5	5	5
Can you describe what love feels like to you?	5	5	5	5

What is an insecurity you feel comfortable sharing?	5	5	5	5
What three things do you value most in life?	5	5	5	5
What's the most important thing you want to do before you die, and why?	5	5	5	5