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From "love actually" to love, actually: The sociometer takes every kind of fuel

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ABSTRACT

Belongingness needs have generally been thought to be filled through traditional strategies, but recent research suggests that nontraditional strategies (e.g., parasocial relationship partners, TV shows) may work as well. No work has yet examined the comparative importance of these different social behaviors in contributing to social need fulfillment. The current work utilized a visual measure to assess frequency, variety, and degree of contribution to social fulfillment of 17 social behaviors. Overall, the conceptualization of the need to belong as flexible and able to be satisfied by a variety of social behaviors was supported; both traditional and nontraditional social strategies were related to positive outcomes. Results suggest that nontraditional strategies may contribute an added layer of vibrancy to our social lives.

Priya starts her day by waking up with her husband, making breakfast for her two kids, and going for a run around the block with her neighbor. Melissa begins her day by checking the latest celebrity gossip on social media, putting on a concert shirt, and heading out the door. Meanwhile, Tom starts his day by having a breakfast of his comfort food, cinnamon oatmeal, and watching a rerun of his favorite television show. From an outside perspective, it may seem like Priya's morning is filled with social activities, whereas Melissa and Tom's mornings are not. In the current work, we argue that all three of these people are starting their day by filling their need to belong.

The need to belong is one of the strongest and most pervasive of human desires (Baumeister & Leary, 1995; Bowlby, 1973, 1969; Maslow, 1968; McClelland, 1951; Stevens & Fiske, 1995). Humans require connection and inclusion with others similar to how they require physical safety, food, and shelter (Baumeister & Leary, 1995; Williams, 2007). This need to belong can impact both mental health as well as physical health (McAdam, 1986), and successful fulfillment of this need can predict positive life outcomes, including greater happiness (Baumeister & Twenge, 2003; Myers, 2000). In fact, social factors are what separate individuals of average happiness from individuals who report feeling the highest levels of happiness in their lives (Diener et al., 2018). In other words, the happiest people are those who have strong social support systems, suggesting that fulfillment of social needs is ubiquitously associated with well-being across a wide variety of measures.

The vast majority of research on the need to belong has investigated social need fulfillment through traditional strategies such as spending time with close relationship partners (see Haidt et al., 2008 for a discussion). More recent work suggests that social needs can be satiated with nontraditional strategies such as symbolic social bonds (see Gabriel et al., 2016 for an overview). Although work has demonstrated that different kinds of social behaviors have the capacity to fulfill social needs (Hirsch & Clark, 2019), no work has measured the effectiveness of both traditional and nontraditional social strategies simultaneously. The current work seeks to fill that gap by investigating both traditional and nontraditional strategies for filling the need to belong in tandem, and therefore broaden our understanding of how these strategies may similarly or differently lead to life outcomes such as a sense of connection to others and meaning in life.

Traditional fulfillment of the need to belong

Much of the past research on social connection has focused on the impact of dyadic bonds on wellbeing (see Haidt et al., 2008 for a discussion). Indeed, ample work has demonstrated the ability of romantic relationships to fill social needs, relating ties to romantic partners to decreased loneliness (Chen & Feeley, 2014; Ernst & Cacioppo, 1999; Eshbaugh, 2010; Fehr & Perlman, 1985; Hawkley et al., 2008; Lee & Goldstein, 2016; Stack, 1998). But dyadic bonds need not be romantic to be effective in filling the need to belong; past work has also demonstrated the effectiveness of friendships in filling this need (Ernst & Cacioppo, 1999; Martina & Stevens, 2006; Lee & Goldstein, 2016; Stevens et al., 2006; Utz et al., 2013). Unsurprisingly, individuals who perceive themselves as having strong support networks report feeling less loneliness and more belonging (Asher & Weeks, 2014; Chen & Feeley, 2014; Ernst & Cacioppo, 1999; Eshbaugh, 2010; Lee & Goldstein, 2016; Serovich et al., 2001; Shiovitz-Ezra & Leitsch, 2010; Stokes, 1985; Utz et al., 2013). Familial relationships can also lead to a reduction in loneliness (Jones, 1981; Perlman, 1988; Serovich et al., 2001; Utz et al., 2013).

Other research suggests that social connection is not limited to dyadic bonds but can also include larger collectives (e.g., Asher & Weeks, 2014; Brewer & Gardner, 1996; Cacioppo et al., 2015; Hawkley et al., 2005). The importance of affiliation with larger groups can be traced back to our evolutionary beginnings, when inclusion in the group was necessary for survival (Caporael & Brewer, 1995; Wilson, 1978). The benefits of belonging to a group remain prevalent in modern society, as individuals experience pleasure (such as increased life satisfaction and positive affect) from collective affiliation (Meyers, 1992). Thus, memberships in larger groups can lead to social need fulfillment and subsequent positive life outcomes.

Non-traditional fulfillment of the need to belong

Groups do not need to be sources of identity and friendship in order to fill the need to belong. Research on collective effervescence suggests that all that is needed is immersion in a crowd (Gabriel et al., 2020). Collective effervescence describes the feeling of social connection and sensation of sacredness that individuals experience when they are a part of a crowd, such as being at a music concert, sporting match, or other large group event (Gabriel et al., 2016). Originally described by Emil Durkeim to describe religious gatherings (Hochschild, 2016), collective effervescence has since been argued by Durkeim as well as

other scholars to be nonsecular and linked to many non-religious group gatherings, including dance parties (Berkers & Michael, 2017), watching movies, and everyday activities such as waiting in line with others or riding a bus with strangers (Gabriel et al., 2019). Collective effervescence has been related to a plethora of positive outcomes, including life satisfaction, having more meaning in one's life, and decreased anxiety and depression (Gabriel et al., 2016). In other words, individuals can fill their need to belong and reap the positive impacts of being in a collective group even in circumstances when they do not have preexisting connections to anyone in the group.

People can also fulfill their need to belong with nontraditional strategies that do not seem outwardly social, such as watching television or eating a comfort food. We refer to these as symbolic social bonds[1] because the sense of connection occurs without another person (or group) present but instead within the mind of the individual. There are three subtypes of symbolic social bonds. First, symbolic social bonds can be the social worlds of fictional characters, such as television characters (Derrick et al., 2009; Greenwood & Long, 2009) or book characters (Gabriel & Young, 2011). Second, symbolic social bonds can be nonhuman objects, such as comfort foods (e.g., Troisi & Gabriel, 2011) or photographs and letters (e.g., Gardner et al., 2005), that remind us of others. Third, symbolic social bonds can be real people with whom an individual has a one-sided relationship, such as celebrities and their fans (Derrick et al., 2008; Gabriel et al., 2018; Hartmann, 2016, 2016). Despite being symbolic, these relationships feel psychologically real to the individual experiencing them (Derrick et al., 2008; Hartmann, 2016). Furthermore, research suggests that they fulfill social needs in ways similar to traditional strategies, including buffering against loneliness, isolation, and rejection (Gabriel et al., 2017; Greenwood & Long, 2009) and helping individuals to feel supported and connected (Gabriel et al., 2016; Greenwood & Long, 2009; Hartmann, 2016).

In summary, there is evidence that the need to belong is a fundamental human need, and people can fill belongingness needs through a plethora of traditional and non-traditional strategies beyond dyadic connections. However, no work, to date, has examined the combinations and comparative abilities of the strategies that individuals are using to successfully fill (or not fill) their social needs. Broadly, more work needs to be done to understand what strategies individuals employ to satiate their social needs; how effective these strategies are in filling social needs; and if these strategies can predict important life outcomes.

A new need to belong measure: The social fuel tank

In order to concurrently assess the various means that individuals use to fill their belongingness needs, we developed a measure inspired by Leary et al. (1995) sociometer theory of self-esteem. The sociometer theory of self-esteem posits that self-esteem is a meter, or measure, of how accepted an individual feels in their social world. When individuals feel accepted, their meter is "full" and they are high in self-esteem. When individuals feel as if they are not accepted, their meter is relatively emptier and they are low in self-esteem. What this suggests is that the meter is a gauge of a "tank" of connectedness (Leary & Guadagno, 2011). When individuals have enough connection, the tank is full and they feel content. When individuals do not have enough connection, the tank is largely empty and that causes distress. Our measure is designed to assess not only how full this social fuel tank is, but also what it is filled with. The social fuel tank can be filled by various social

strategies, such as dyadic bonds, collective bonds, and symbolic social bonds. What remains empty in the social tank is the individual's felt loneliness.

The current work

Purpose and hypothesis

We created the "Social Fuel Tank," a visual measure that described one's social need fulfillment as a fuel tank which could be filled fully, partially to any degree, or not at all (see Figure 1). The tank could be filled with all different types of "fuel"- social strategies such as spending time with family, watching TV, or being in a large group. Furthermore, the tank could be filled with differing amounts of each type of fuel. In other words, each social strategy could be uniquely adjusted to symbolize how effective they were in satiating an individual's social needs. This measure, therefore, can not only demonstrate how much an individual feels socially satiated, but also can describe the multitude of strategies an individual uses to feel satiated as well as how much each strategy contributes to that sense of belonging. In supplying this level of detail, the measure provides information regarding traditional vs nontraditional social strategies that can be used to understand if different social strategies predict different life outcomes.

Using this measure, we were able to explore three hypotheses about the Need to Belong:

H1: Individuals will employ many types of strategies, including both traditional and non-traditional, to fill their need to belong.
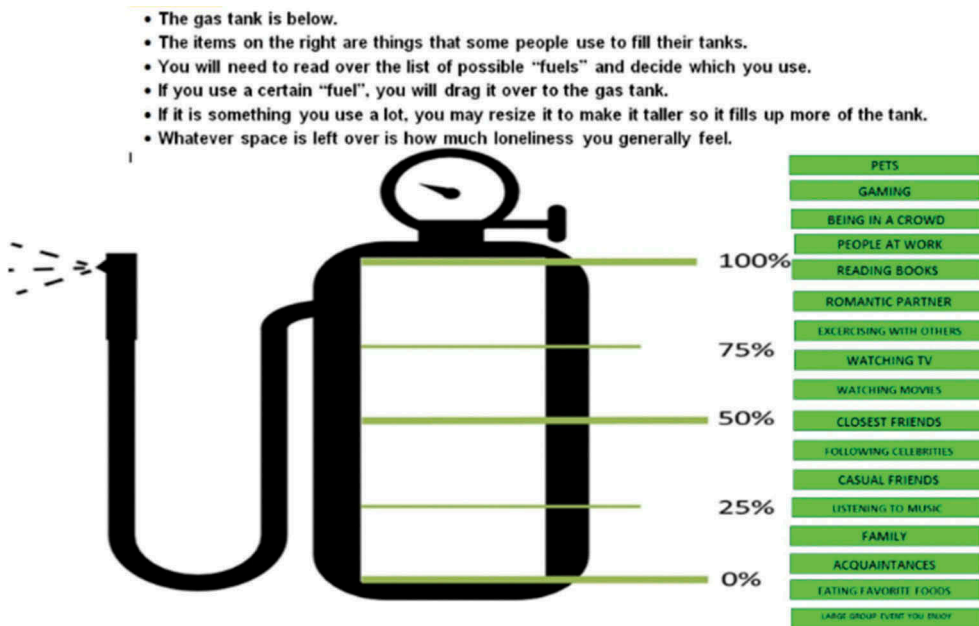

Figure 1. The Social Fuel Tank Measure of Belonging.

H2: The total amount of social need fulfillment (how much of the fuel tank is full) will predict felt social connection and wellbeing, whereas the number of strategies used will not matter.

H3: Both traditional and non-traditional strategies will predict positive life outcomes.

Participants

We recruited 173 (103 female) undergraduate students from a large state university who were diverse in ethnicity (20 African/African American, 39 Asian/Asian American, 9 Hispanic/Hispanic American, 98 European/European American, and 7 Other) with an average age of 18.79 ($SD = 1.16$). Students were recruited as partial fulfillment of a course requirement in a psychology course. After indicating their willingness to participate in the study, participants completed the survey on the external website Qualtrics as well as Google Docs.

Design

First, participants completed basic demographic measures. Next, they were asked to complete a variety of social needs measures as well as life outcome measures. Seven measures of interest were presented in random order to the participants.[2] Finally, participants were asked to complete a new measure of social fulfillment, referred to as the "Social Fuel Tank" measure, detailed below. After this was completed, participants were debriefed and left the lab.

Materials

All materials were presented in random order, except the Social Fuel Tank measure, which was always presented last. Materials are organized below by construct for organizational purposes; they were not divided this way in the presentation of the study to participants.

Social fuel tank measure

### Overall social need fulfillment and strategies for fulfillment

Participants' strategies for filling their social needs overall were measured using our Social Fuel Tank measure. For this measure, participants were instructed, "Psychologists have found that all people connect to others [...] to some degree or another. We all need different levels of social connection. Some of us need more, some need less. Regardless of how much we need, when we each don't feel as connected as we want, we feel lonely. You can think of it as a gas tank that you can fill with different ways to feel 'not lonely.' Your tank can be 'full' or 'empty' or somewhere in between. You can be the kind of person who keeps loneliness at bay with just one or two methods (e.g., fills your gas tank with just one or two things) or you can be someone who fills your tank with a lot of different things. There are no right or wrong ways to do this." Participants were then given examples of the measure completed in a variety of ways (see Figure 2).

Here is someone who fills their tank just a few ways but has a pretty full tank (in other words, rarely feels lonely).

You can see how they resized each item to make it take up more room:
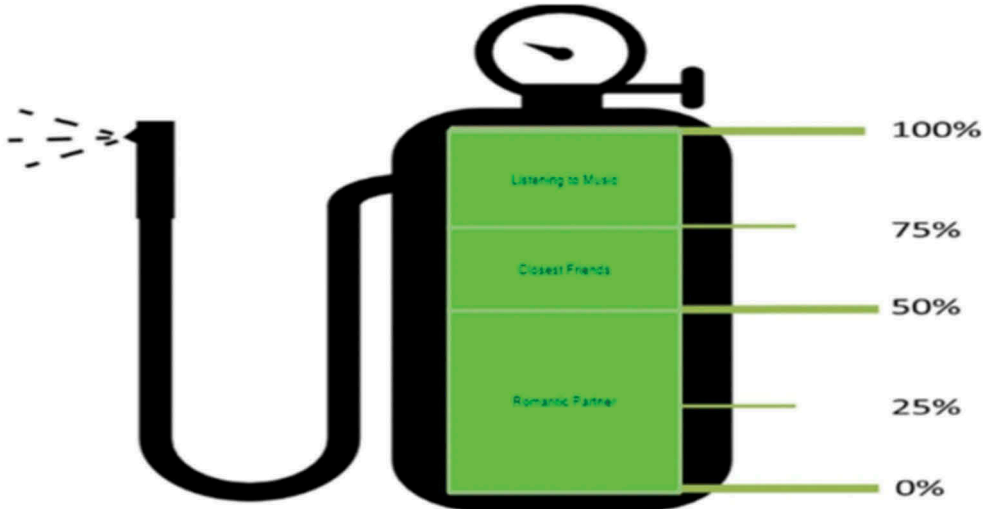
Here is someone who has a lot of different ways to fill their tank, but still feels lonely a lot (Notice the empty space at the top):
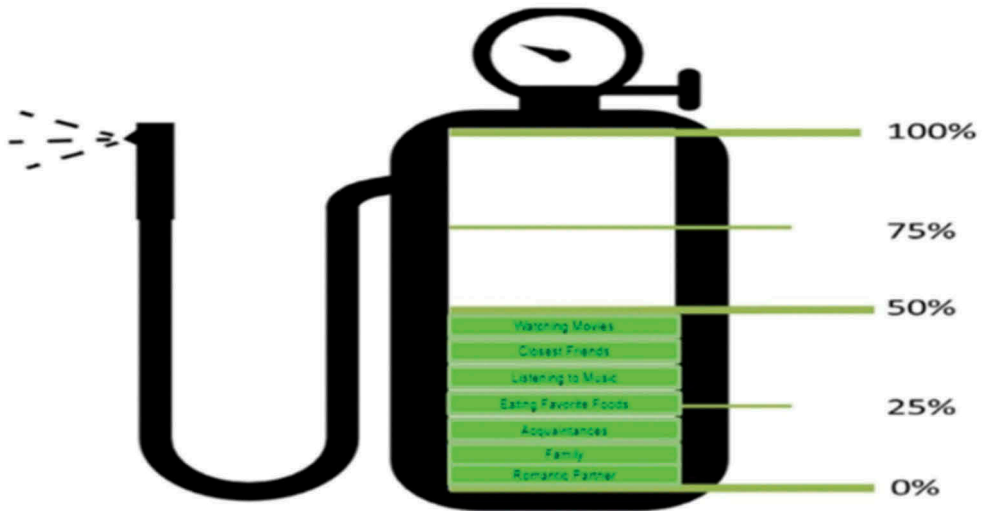
They were then directed to an individual Google Doc where they completed the measure themselves. This measure had an empty tank along with 17 different options for strategies to fill the tank.[3] Participants could drag as many or as few options into their tank as they wanted. They could then adjust the height of the chosen option so that it filled the tank in the amount they felt best represented how much that strategy helped them to feel socially fulfilled. Each participant's total feeling of general social

Here is someone who fills their tank just a few ways and still feels lonely a lot:

Here is someone who has a lot of different ways to fill their tank and has a pretty full tank

(In other words, rarely feels lonely):
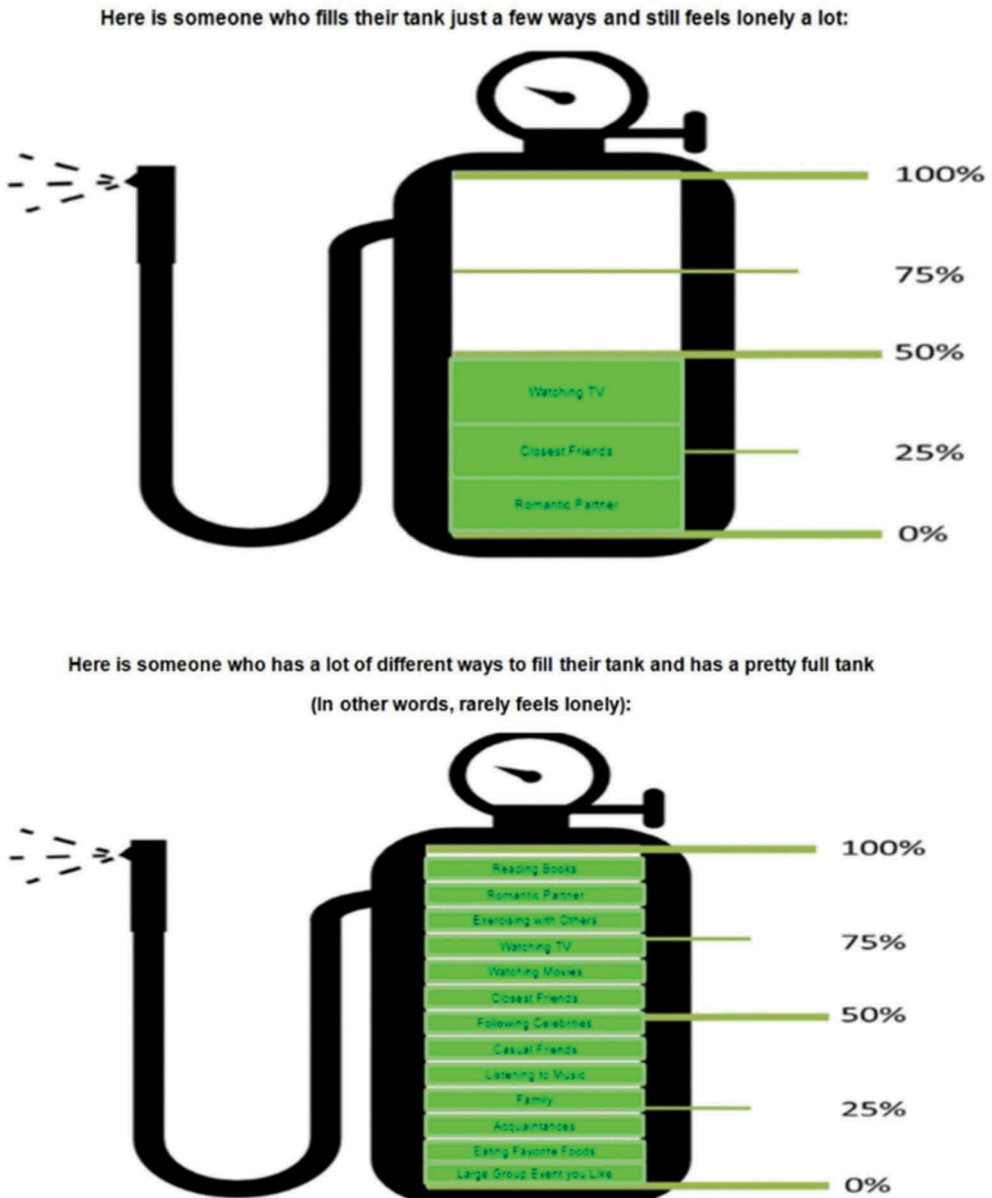
Figure 2. Examples of The Social Fuel Tank measure given to participants during the instructional period to demonstrate various ways they could complete the measure.

fulfillment was measured by the total percentage of the tank that is occupied by social strategies (i.e., not left empty). The use of each social strategy was coded in two ways: (1) whether or not the strategy was represented in the fuel tank, and (2) the percentage of the fuel tank taken up by this strategy. All coding was done by multiple research assistants (minimum 2 per item), and the minor discrepancies in coding were resolved by a primary investigator.

Social needs measures

Perceived social inclusion

To assess participants' feelings of being accepted by others, participants completed the 9-item inclusion scale, which was developed to reflect how much an individual is liked or accepted by others (Mahadevan et al., 2016; α =.94). An example item from this scale includes, "Most of the time I feel that people like me as a person."

Social connectedness

To assess participants' sense of social belongingness and general need for social reassurance, the 8-item two factor Social Connectedness and Social Assurance Scale (Lee & Robbins, 1995) was used (α = .94). An example item from the Social Connectedness factor includes, "I feel disconnected from the world around me." An example item from the Social Assurance factor includes, "I feel more comfortable when someone is constantly with me."

Loneliness

To assess participants' loneliness, the Revised UCLA Loneliness scale developed by Russel et al. (1980) was used (α = .95). This scale includes 20 items which participants rate from 1 (strongly disagree) to 7 (strongly agree). Several items on this scale include "*No one really knows me well,*" and "*There are people who really understand me*" (RS).

Life outcomes measures

Meaning in life

To assess the search for and presence of participants' meaning in life, the 10-item Meaning in Life Questionnaire (Steger et al., 2009) was used (α = .75). An example item from this scale includes, "I understand my life's meaning."

Satisfaction with life

To assess subjective life satisfaction, the 5-item Satisfaction with Life Scale (Diener et al., 1985) was used (α = .86). An example item from this scale includes "In most ways my life is close to my ideal."

Self-certainty

Participants completed three items assessing their certainty with their self (Gabriel et al., 2007; α = .84). For each question, participants indicated on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale how certain and comfortable they felt with their self (e.g., "Right now, I feel very comfortable with who I am"). Higher scores indicated higher self-certainty and comfortability with the self.

Ideal self measure

Participants were presented with a modified version of the Inclusion of Other in the Self Scale (Aron et al., 1992) to measure the similarity of the actual self to the ideal self. Seven sets of overlapping circles were presented. One circle was labeled "Actual Self" and the other circle was labeled "Ideal Self." Participants selected the set of circles that they felt best represented how close their actual self currently was to their ideal self.

Demographics

General demographics, including age, gender, and race, were collected at the beginning of the survey.

Results

H1: Individuals will employ many types of strategies, including both traditional and non-traditional, to fill their need to belong.

Overall, participants selected between 2 and 17 ways to fill their tanks, $M = 7.71$, $SD = 2.46$. The median for the number of ways they filled their tanks was 7. In other words, participants reported using a variety of strategies in their lives to fill their social needs. Furthermore, a majority of participants reported using both traditional and non-traditional strategies (see Table 1). For example, for traditional strategies, over half reported spending time with a romantic partner, and over 85% reported spending time with family and with close friends. For nontraditional strategies, 75% of the participants reported listening to music and over half reported watching TV. This supports the hypothesis that individuals employ many strategies, including both traditional and non-traditional, to fill their social needs.

H2: The total amount of social need fulfillment (how much of the fuel tank is full) will predict the level of social connection and wellbeing, but the number of strategies used will not.

In order to examine this hypothesis, we ran a regression analysis predicting loneliness (see Table 2). This regression included how many strategies an individual chose, the amount of empty space used in the tank, and the interaction of strategies chosen and the amount of space used in the tank to predict loneliness. This analysis revealed that the amount of space in an individual's tank predicted feeling less lonely, $\beta = -5.12$, $t(164) = -6.25$, $p < .001$, but

Table 1. Average use of social strategies and average percent of fulfillment from each strategy.

Strategy	Reported use of strategy N (% of total sample)	Percent of tank the strategy filled M (SD)
Traditional strategies		
Close friends	159 (91.9%)	18.19 (8.50)
Family	153 (88.4%)	15.93 (9.60)
Romantic Partner	87 (50.3%)	19.82 (11.77)
Nontraditional Strategies		
Listening to music	130 (75.1%)	10.01 (6.60)
Casual friends	98 (56.6%)	7.64 (3.86)
Watching TV	89 (51.4%)	8.38 (4.47)
Large group events	84 (48.6%)	8.19 (4.16)
Exercising with others	72 (41.6%)	8.77 (4.97)
People at work	67 (38.7%)	7.70 (3.62)
Watching movies	66 (38.2%)	7.89 (3.99)
Eating favorite foods	65 (37.6%)	7.71 (5.14)
Pets	52 (30.1%)	9.84 (5.17)
Gaming	47 (27.2%)	7.82 (4.99)
Acquaintances	44 (25.4%)	5.33 (1.82)
Reading books	43 (24.9%)	7.78 (3.97)
Being in a crowd	27 (15.6%)	7.57 (4.74)
Following celebrities	20 (11.6%)	7.76 (5.41)

Table 2. Regression coefficients for models of amount of space left in tank and number of strategies used to fill tank in predicting various outcomes.

Dependent variable	B	t	p
Outcome measure: loneliness			
Filled space in tank	−.51	−6.25	.001***
Number of strategies used	.05	.58	.56
Interaction term- Space*Strategies	.07	.83	.41
Outcome measure: connection to others			
Filled space in tank	.48	5.74	.001***
Number of strategies used	−.04	−.40	.69
Interaction term- Space*Strategies	−.07	−.75	.45
Outcome measure: perceived social inclusion			
Filled space in tank	.39	4.42	.001***
Number of strategies used	−.01	−.11	.91
Interaction term- Space*Strategies	−.04	−.45	.66
Outcome measure: self certainty			
Filled space in tank	.34	3.77	.001***
Number of strategies used	−.05	−.53	.60
Interaction term- Space*Strategies	.00	.01	.99
Outcome measure: life satisfaction			
Filled space in tank	.39	4.35	.001***
Strategies used	−.14	−1.56	.12
Interaction term- Space*Strategies	.03	.27	.79
Outcome measure: Ideal vs Actual IOS			
Filled space in tank	.43	4.83	.001***
Strategies used	−.16	−1.71	.09
Interaction term- Space*Strategies	.02	.21	.83
Outcome measure: meaning in life			
Filled space in tank	.15	1.56	.12
Strategies used	.10	1.01	.31
Interaction term- Space*Strategies	.05	.53	.60

***$p < .001$; *$p < .05$

the number of strategies used did not, $\beta = 0.049$, $t(164) = .58$, $p = .56$, and neither did the interaction, $\beta = 0.072$, $t(164) = .83$, $p = .41$. In other words, having a full social fuel tank predicted feeling less lonely, but the number of strategies used to fill the social fuel tank was not important. A similar pattern emerged with other outcome variables (see Table 2), including social connection, perceived social inclusion, self-esteem, life satisfaction, and the feeling closer to the ideal self. Across every variable examined (other than meaning in life), how full the social fuel tanks were predicted all of the positive outcomes, but the number of ways that the social fuel tanks were filled was unimportant. For meaning in life, neither measure was predictive. Thus, our second hypothesis was supported: in no cases did it matter how the gas tank was filled.

H3: Both traditional and non-traditional strategies will predict positive life outcomes.

Although we found that participants used both traditional and nontraditional means to fill their social fuel tanks, it could be that only the traditional ones predicted social and emotional wellbeing. To examine this, we ran a regression analysis that included traditional social needs fulfillment strategies (e.g., close friends, family, and romantic partner), nontraditional social needs fulfillment strategies (e.g., listening to music, watching TV, large group events, acquaintances; see Table 1 for full list), and the interaction term of these two strategies to predict loneliness (see Table 3). This analysis revealed that both

Table 3. Regression coefficients for models of traditional and nontraditional strategies used to fill tank in predicting various outcomes.

Dependent variable	B	t	p
Outcome measure: loneliness			
Nontraditional strategies	−.43	−5.39	.001***
Traditional strategies	−.74	−8.47	.001***
Interaction term- Nontraditional*Traditional	−.14	−1.84	.067
Outcome measure: connection to others			
Nontraditional strategies	.39	4.67	.001***
Traditional strategies	.65	7.02	.001***
Interaction term- Nontraditional*Traditional	.15	1.86	.064
Outcome measure: perceived social inclusion			
Nontraditional strategies	.35	3.90	.001***
Traditional strategies	.47	4.80	.001***
Interaction term- Nontraditional*Traditional	.07	.80	.42
Outcome measure: self certainty			
Nontraditional strategies	.26	2.82	.01**
Traditional strategies	.35	3.44	.001***
Interaction term- Nontraditional*Traditional	.00	.03	.98
Outcome measure: life satisfaction			
Nontraditional strategies	.21	2.37	.02*
Traditional strategies	.49	4.97	.001***
Interaction term- Nontraditional*Traditional	.11	1.34	.18
Outcome measure: Ideal vs Actual IOS			
Nontraditional strategies	.30	3.45	.001***
Traditional strategies	.55	5.69	.001***
Interaction term- Nontraditional*Traditional	.17	2.08	.04*
Outcome measure: meaning in life			
Nontraditional strategies	.20	2.09	.04*
Traditional strategies	.15	1.45	.15
Interaction term- Nontraditional*Traditional	.03	.31	.76

***$p < .001$; **$p < .01$; *$p < .05$

traditional, $\beta = -0.740$, $t(164) = -8.468$, $p < .001$, and nontraditional, $\beta = -0.426$, $t(164) = -5.387$, $p < .001$, strategies uniquely predicted feeling less lonely. However, the interaction term did not, $\beta = -0.137$, $t(164) = -1.842$, $p = .067$. A similar pattern emerged for our other outcome variables, including feeling connected to others, accepted by others, certain of the self, and satisfied with life (see Table 3).

Only one variable, the similarity of the actual self to the ideal self, showed an interaction between traditional and nontraditional strategies (see Figure 3). Two main effects indicated that both traditional social strategies, $\beta = 0.55$, $t(163) = 5.69$, $p = .001$, as well as nontraditional social strategies, $\beta = 0.30$, $t(163) = 3.45$, $p = .001$, independently predicted feeling more similarity between the actual and ideal self; in other words, both of these types of social strategies predicted liking oneself more. This is not only consistent with the hypothesis that both traditional and nontraditional strategies predict positive life outcomes; it is also consistent with sociometer theory that posits that our gauge of our social connection with others is strongly related to our feelings about ourselves (Leary et al., 1995). The interaction effect complements these main effects by suggesting using *both* traditional and nontraditional social strategies predicts an even larger overlap between the actual and ideal self. This suggests that utilizing both traditional and nontraditional social strategies in tandem leads individuals to feeling even better about themselves than simply using only traditional or only nontraditional strategies.
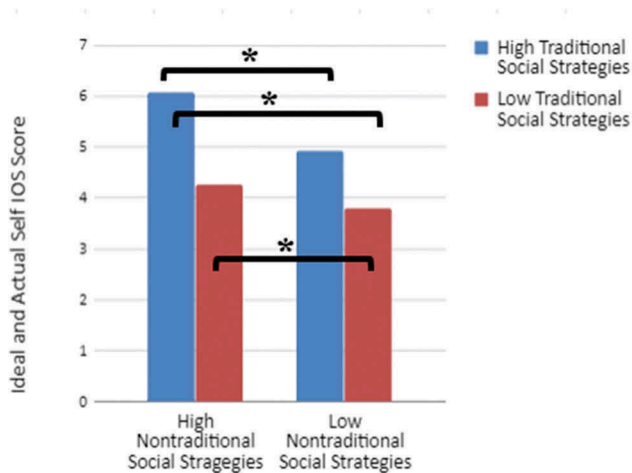
Figure 3. Interaction of Traditional and Nontraditional Social Strategies in predicting Actual and Ideal Self Overlap. Asterisks indicate significant differences.

All of the variables examined showed that both nontraditional and traditional social connections uniquely predicted social connection and wellbeing except for meaning in life. Interestingly, only nontraditional strategies predicted increased meaning in life. Although this one nonsignificant effect should be interpreted with caution, it might suggest that although both traditional and nontraditional social strategies can enhance an individual's life, nontraditional strategies seem to add extra meaning and depth to the human experience.

Exploratory analyses: Relative use of pathways

Although both nontraditional and traditional social connections predicted most of the wellbeing measures, traditional measures were stronger predictors in each case (aside from meaning in life; see Table 3). Thus, although the data are highly consistent with our argument that nontraditional means of social connection add to a sense of wellbeing, the data might also be interpreted to suggest that traditional means are more important than nontraditional. In other words, perhaps nontraditional means are useful as an extra bonus of feelings of connection, but real connectedness needs have to be filled by traditional strategies.

If that was the case, then we would expect people who primarily fill their needs through nontraditional means to have lower wellbeing as compared to those who fill their needs primarily through traditional means. If traditional and nontraditional pathways have the exact same effect on wellbeing, then we would expect no relationship between the balance between traditional and nontraditional pathways and wellbeing. Finally, traditional and nontraditional means of connecting may each bring their own unique benefits and their own unique risks. For example, a traditional relationship partner may help an individual move, but may also break their heart, whereas a nontraditional relationship partner (such as a television show character that someone has a parasocial relationship with) cannot cook the individual dinner after a long day of work, but will also never reject them. If that is the case, then we would expect a curvilinear relationship in

which people who have a balance between the two kinds of relationship would demonstrate the highest wellbeing, whereas those who use mostly just traditional or mostly just nontraditional pathways would show relatively worse outcomes.

In order to test these hypotheses, we computed a measure of the balance between traditional and non-traditional means by dividing the number of traditional pathways used by the number of nontraditional pathways used. Then, that ratio was standardized into a Z score for further analyses such that a score of 0 represents a perfect balance between the number of traditional and nontraditional pathways used, a score greater than 0 indicates more traditional than nontraditional pathways used, and a score less than 0 indicates more nontraditional than traditional pathways used.

First, we sought to test the hypothesis that greater use of traditional over nontraditional strategies predicts greater wellbeing by running regression analyses with the ratio variable predicting the wellbeing outcomes while controlling for the amount of empty space left in the tank. We did not find a significant relationship between the ratio variable and any of the wellbeing measures (Table 4). Therefore, there is no reason to believe that using a relatively greater amount of nontraditional or traditional pathways is particularly more advantageous.

Finally, to test the hypothesis that having a balance between the two kinds of pathways is more beneficial than relative greater use of nontraditional or traditional pathways, we ran several hierarchical polynomial regressions on the outcome variables that were significantly linearly related to the ratio variable (life satisfaction, loneliness, connection to others, and Actual vs Ideal IOS). In the first step of each regression, the ratio variable was entered as a predictor of each outcome variable. In the second step, the squared value of the ratio variable was entered as an additional predictor and the change in R^2 was evaluated for significance (Aiken et al., 1991). In each model, the amount of empty space left in the gas tank was also included as a control. In each case, neither the linear relationship nor the curvilinear relationship between the ratio variable and the outcome variable were statistically significant while controlling for empty space. However, for life satisfaction and closeness to an ideal self, even while controlling for both the amount of empty space and the linear relationship, the curvilinear ratio term was marginally significant (Table 5). Although these analyses are exploratory, and the findings only

Table 4. Regression coefficients for models of ratio between traditional and nontraditional strategies used predicting various outcomes while controlling for the amount of empty space left in tank.

Dependent variable	B	t	p
Outcome measure: life satisfaction			
Ratio variable	.13	1.72	.09
Empty space in tank	−.32	−4.13	.001***
Outcome measure: loneliness			
Ratio variable	−.11	−1.67	.10
Empty space in tank	.52	7.53	.001***
Outcome measure: connected to others			
Ratio variable	.08	1.09	.28
Empty space in tank	−.48	−6.77	.001***
Outcome measure: Ideal vs Actual IOS			
Ratio variable	.10	1.32	.19
Empty space in tank	−.33	−4.34	.001***

***$p < .001$.

Table 5. Regression coefficients for empty space and linear and quadratic models of ratio between traditional and nontraditional strategies used predicting outcomes.

Outcome	Predictor	B	$R^2(\Delta R^2)$	Significance of F Change
Outcome measure: life satisfaction	Step 1			
	Empty Space	−.35***	.12 (.12)	$p < .001$
	Linear	.01		
	Step 2			
	Empty Space	−.32***	.14 (.02)	$p = .054$
	Linear	.41		
	Quadratic	−.42		
Outcome measure: Ideal vs Actual IOS	Step 1			
	Empty Space	−.36***	.13 (.13)	$p < .001$
	Linear	−.08		
	Step 2			
	Empty Space	−.33***	.15 (.02)	$p = .051$
	Linear	.32		
	Quadratic	−.43		

$N = 164$. ***$p < .001$.

marginally significant, this suggests that if a relationship does exist between a preference for traditional relationships over nontraditional ones and positive outcomes, it may be better described as curvilinear rather than linear. In other words, those who use a mix of both traditional and nontraditional kinds of pathways to belonging may generally be better off than those who primarily use one or the other.

Discussion

Previous research has established that the need to belong can be fulfilled through dyadic bonds (Baumeister & Leary, 1995; Leary et al., 2013; Sternberg, 1986) and collective bonds (Caporael & Brewer, 1995; Haidt et al., 2008). More recent research suggests that non-traditional strategies, such as symbolic social bonds, can also be effective in filling social needs (Derrick, 2012; Gabriel et al., 2017; Hartmann, 2016). However, little has been done to investigate how commonly used traditional and nontraditional social strategies are, and if they are both predictive of positive life outcomes.

We conceptualize the need to belong as broad and flexible, and therefore posited that it could be successfully filled using a multitude of strategies. In other words, we hypothesized that many kinds of fuel would work in the social fuel tank. We found consistent support for our hypotheses. Overall, participants reported using a wide range of social strategies to fill their need to belong fuel tanks – an average of seven different social strategies. This suggests that, in line with our hypothesis, the need to belong is flexible and can accommodate a variety of strategies. In addition, it was how full the tank was, and not how many items that were filling it, that predicted social and emotional wellbeing.

We hypothesized that these strategies (both traditional and nontraditional) would predict more need fulfillment and positive life outcomes. Melissa, who spends her mornings by herself but surrounded by important reminders of others and engaged in para-social relationships, may be thought of by some as having a less social, and therefore less fulfilling, life compared to Priya, who spends most of her time with her husband, children, and friends. However, the current work suggests that both Melissa and Priya are using different social strategies during their day to fulfill their social needs. The current research suggests that these different kinds of social "fuel" are both important for feeling less

lonely, more connected to others, more accepted by others, more satisfied with life, and more similar to an ideal self. Moreover, the use of nontraditional social strategies was found to uniquely predict increased meaning in life. This suggests that these nontraditional avenues for social fulfillment may add a special nuance to one's life, contributing a unique spice to everyday social interactions, which more traditional social connections do not.

The Social Fuel Tank measure introduced in this study adds to existing measures of social connectedness by allowing individuals to specify how they are filling their social needs, as well as to what degree each strategy contributes to their need fulfillment. Future work will be necessary to further validate this measure. Future research may want to consider randomizing the order of the measure among other measures to remove any possibility or order or priming effects from other measures. In addition, future work should test the measure with a non-undergraduate student sample. Finally, future studies may want to examine whether there are additional options (beyond the 17 presented to our participants) that can be used to fill the need to belong (e.g., social networking sites, specifying different types of large group events, such as concerts, sporting events, and work conferences).

Overall, this work contributes to our understanding of the need to belong as a flexible, adaptable, and pervasive fundamental human need. It also increases the legitimacy of nontraditional bonds in filling the need for social connection. Although nontraditional methods of connectedness have also been found to be associated with fulfilling social needs and positive outcomes (Epley et al., 2008; Gabriel et al., 2017, in press; Mar & Oatley, 2008), they have often been considered to be less legitimate or powerful than traditional means (Frey et al., 2007; Furlong, 2008). However, the current work suggests that both traditional and nontraditional social behaviors are important in fulfilling social needs and contributing to positive life outcomes. Indeed, individuals report using many of these strategies to fill their social fuel tanks, and in successfully doing so, they feel more satisfied with their lives, more accepted by others, and more in line with their ideal selves.

These results have important implications for individuals who may feel stigmatized for pursuing nontraditional social strategies, such as individuals who are single or childless or who prefer reading a book to a night on the town (DePaulo & Morris, 2006; Johnson et al., 2009), and for individuals for whom traditional strategies are unavailable or inaccessible, such as those with chronic illnesses or who have experienced traumatic events (Alpass & Neville, 2003; Gabriel et al., 2018). The current work suggests that nontraditional strategies can predict a satisfying life much like traditional social strategies. Indeed, these nontraditional strategies may even add an extra layer of meaning to one's life, making them uniquely useful to creating a fulfilling existence lined with rich and colorful social experiences.

Notes

1. We used to refer to symbolic social bonds as social surrogates. We are no longer doing so because we the term social surrogates implies that the social connection gains its power by standing in for a "real" social connection. We have come to believe that this is undervaluing the impact and importance of these connections and have thus switched to referring to them as symbolic social bonds.

2. Several other measures were also included in this study that are not relevant to the current work and therefore are not discussed further in this manuscript. They are available upon request of the authors.
3. These 17 options were created by the three primary investigators after consulting with the lab group of 13 undergraduate research assistants and 6 graduate students. Options can be seen in Table 1.

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No potential conflict of interest was reported by the authors.

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