

All the Lonely People?  
A Belongingness Perspective on the Stigmatization and Well-Being of Single People

by

Alexandra N. Fisher  
B.Sc., University of Victoria, 2014  
M.Sc., University of Victoria, 2015

A Dissertation Submitted in Partial Fulfillment  
of the Requirements for the Degree of

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**Supervisory Committee**

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## Abstract

Due to the cultural preoccupation with romantic love and marriage, little is known about single people (i.e., *singles*) except that they tend to be stigmatized and to exhibit worse well-being relative to married people. However, these conclusions are largely based on research which has centered the experiences of married people, not singles. Consequently, it remains unclear to what extent singles are actually suffering—that is, to what extent they feel like members of a stigmatized group, as well as to what extent the absence of a romantic bond is responsible for singles' relatively poorer well-being. Thus, the purpose of this dissertation is twofold: 1) to determine the extent to which singles feel as though they belong to a stigmatized group, and 2) to determine the extent to which singles' interpersonal relationships may buffer their sense of belonging and well-being. Given the negative cultural attitudes towards singles, I expect that most singles will have a relatively low level of group belonging. Yet, at the same time, I expect that some singles will still be able to meet their belongingness needs through their close interpersonal relationships (i.e., friendships), and that these bonds may support their well-being during singlehood. Consequently, I propose that, on average, singles may exhibit poorer well-being compared to married people, not necessarily because they lack a sense of interpersonal belonging but because they lack a sense of group belonging. Obtaining a more accurate account of singles' experiences of stigmatization and well-being is essential for identifying the factors that lead to both vulnerability and resiliency in this population. By centering singles' experiences and applying a belongingness perspective, my research will illuminate multiple pathways to well-being.

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**Dedication**

For Mom.  
Where you lead, I will follow.

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## Chapter 1: Introduction

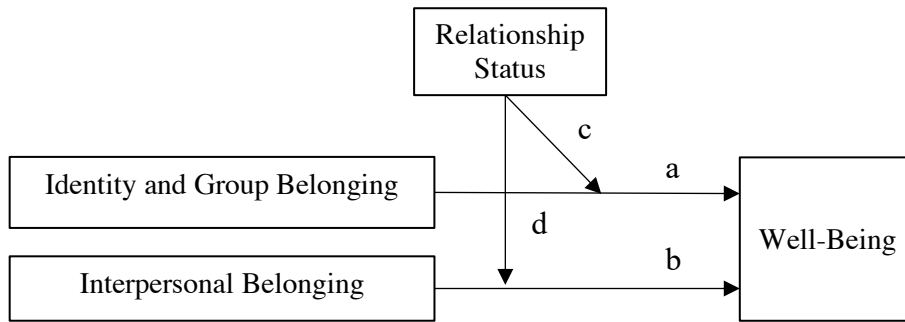
Married people often report that they are happier, healthier, and generally more satisfied with their lives than those who are not married (Diener, Gohm, Suh, & Oishi, 2000; Gove & Shin, 1989; Gove, Hughes, & Briggs Style, 1983; Luciano & Orth, 2017). This well-being gap between married and single people (i.e., *singles*) is often attributed to the fact that the latter group lack a close, supportive marriage bond (e.g., Gove & Shin, 1989). Although it is true that close, supportive bonds are tremendously beneficial for health and well-being (Cohen, 2004; House, Landis, & Umberson, 1988; Uchino, 2006), these bonds need not necessarily be romantic. Nevertheless, somewhere along the way, ‘close, supportive bond’ became synonymous with the ‘marriage bond.’ Indeed, the general public and scholars alike tout the marriage bond as the most important and beneficial type of close relationship (Finkel, 2017; Fingerman & Hayes, 2002). Some have even deemed marriage to be the *most* powerful predictor of mental health and well-being (Gove et al., 1983). Yet, at the same time, a re-analysis of earlier findings has revealed that some singles may actually have equal or better well-being than married people (DePaulo & Morris, 2005). Moreover, many singles actually have more diverse and well-connected social networks and possibly deeper, interpersonal connections with their friends and family compared to people in relationships (Sarkisian & Gerstel, 2016). Thus, it is not necessarily the case that singles are suffering, nor is it necessarily the case that they are suffering because they lack close, supportive bonds. So, then, what explains the well-being gap between singles and married people?

I argue that the previous explanation for singles’ relatively poorer well-being is insufficient and incomplete, as it does not take into account the broader sociocultural context, in particular the negative cultural attitudes towards singles, that serve to maintain well-being

inequalities between single and married people, nor does it account for the fact that some singles may cultivate strong, interpersonal bonds that may support their well-being in the absence of a marriage or marriage-like bond (Brumbaugh, 2017; Musick & Bumpass, 2012). Thus, in the current research, I endeavor to reveal a more complete and accurate representation of singles experiences by examining (1) to what extent singles constitute a *stigmatized* group, as well as (2) to what extent singles have strong interpersonal relationships that maintain their well-being during singlehood.

In the first chapter, I detail the kinds of sociocultural attitudes that support the stigmatization of singles and how these attitudes may affect the group belonging and subsequent well-being of singles. In the second chapter, I briefly overview the existing evidence regarding the quality of singles' close relationships as well as the possible implications of these findings for singles' interpersonal belonging and well-being. I then present the first manuscript which will establish singles as a stigmatized group, followed by a second manuscript which will establish the association between the quality of singles' interpersonal relationships and their well-being. In doing so, this research will illustrate two potential pathways through which the experience of being single may disparately affect well-being. The conceptual model for these two pathways is presented in Figure 1. Although I will not test this model explicitly in the present research, I include it to help situate both manuscripts within a broader belongingness framework, as well as to facilitate relevant theoretical comparisons between the two manuscripts. The first pathway to well-being in my conceptual model is through group identity and belonging (e.g., group identification; pathway *a* in Figure 1) whereas the second pathway to well-being is through interpersonal belonging (e.g., quality of interpersonal bonds; pathway *b* in Figure 1). I propose that both of these pathways will be moderated by relationship status (i.e., whether someone is

single or in a relationship; i.e., paths *c* and *d* in Figure 1), such that single people will tend to experience lower group identity and belonging yet, at the same time, not all singles will necessarily exhibit lower interpersonal well-being than people in relationships (i.e., *partnered people*). For the purpose of my dissertation, I define a single person as anyone who self-selects into the “single” label and is seen and treated accordingly by others. Although singles are typically defined by their complete *lack* of a committed romantic partner or spouse (Gordon, 2003), by my definition, a single person may have casual romantic or sexual relationships so long as they still consider themselves to be and are perceived by others as being “single.”



*Figure 1.* Two proposed pathways that may affect singles' well-being.

## Chapter 2: Single Stigma and its Consequences for Group Belonging and Well-Being

In Western culture, positive notions of romantic love, marriage, and family are instilled from an early age. Take, for example, the lyric, “First comes love. Then comes marriage. Then comes baby in the baby carriage,” from *the K-I-S-S-I-N-G song*, a popular children’s song that can be heard on any North American playground. Encapsulated in this short lyric is the societal notion of what constitutes a typical life: love, marriage, and children. North American children grow up with this implicit guideline for how they ought to structure their lives and what kinds of behaviours they ought to engage in. But the messaging does not end there. These days, one is hard-pressed to find a television show or movie that does not feature a romantic plot or a hit song that does not allude to love. Popular television shows such as the “The Bachelor” revolve around the quest to find true love, often ending in a marriage proposal. Talk shows and magazines thrive on gossip about which celebrities are dating, getting married, or having a baby. Even in today’s changing world, heteronormative notions of love, marriage, and family are inescapable.

Marriage remains a culturally revered and supported institution. One that offers a number of additional benefits and privileges above and beyond the benefits of a high-quality bond. For instance, marriage grants a wide array of additional social, material, legal benefits that help to promote and maintain the health and well-being of those who marry (Bellas, 1992; DePaulo & Morris, 2005; Gove & Shin, 1989; Wise & Stanley, 2004). Getting married can also promote well-being by increasing the number of ties in their immediate social network that can be relied upon for various types of support (Wellman, Frank, Espinoza, Lundquist, & Wilson, 1991). Likewise, the sharing of resources and pooling of incomes improves married people’s financial stability (Antonovics & Town, 2004; Bellas, 1992), allowing for a better quality of life. Finally, marriage is also a symbol of status and a marker of success in its own right (Armstrong &

Hamilton, 2013; Eck, 2013; Edin & Kefalas, 2011; Silva, 2012). Getting married can offer a self-esteem boost as a result of both a subjective and objective gain in status and social approval that follows from conforming to societal norms and expectations (Bruckmuller, 2013; Diener et al., 2000). Each of these factors likely contributes to the existing well-being gap between singles and married people.

### **The Stigmatization of Singles**

In a society where marriage is a marker of success, singles are perceived as having a spoiled identity (Byrne, 2003; Davis & Strong, 1977; Sharp & Ganong, 2011)—one that is seen as lesser, deviant, flawed, or lacking (Budgeon, 2008; DePaulo & Morris, 2005; Gordon, 2003; Lewis, 1994; Reynolds & Taylor, 2005). Singles are negatively stereotyped as being lonely, cold, unsociable, selfish, immature, insecure, low in self-esteem, and generally less satisfied with their lives compared to married people (Etaugh & Malstrom, 1981; Greitemeyer, 2009; Hertel, Schutz, DePaulo, Morris, & Stucke, 2007). Qualitative accounts further suggest that singles experience pervasive disrespect, devaluation, and exclusion in their daily lives and social interactions (Byrne & Carr, 2005; DePaulo, 2006; Byrne, 2000). Singles also earn less money (Antonovics & Town, 2004) and end up paying disproportionately more for healthcare, social benefits, and income taxes compared to married people (DePaulo, 2006). Singles also do not have access to the legal rights, protections, and benefits such as social security, tax deductions, and health insurance that marriage affords (DePaulo & Morris, 2005; Wise & Stanley, 2004). The privileged status of marriage is so culturally entrenched that the stigmatization and discrimination of single adults often goes unnoticed and unchecked, as some openly admit that they would rather rent an apartment to a couple over a single person and see nothing inherently biased about this reasoning (Morris et al., 2007). Together, these findings suggest that singles are stigmatized.

To make matters worse, singles themselves also tend to endorse negative stereotypes toward their group (Greitemeyer, 2009), indicating that singles themselves may have internalized negative cultural attitudes (i.e., stigma) towards single people. Internalized stigma is a process whereby individuals endorse negative stereotypes, expect social rejection, and feel as though they are societally devalued for their membership in a stigmatized group (Corrigan, Kerr, & Knudson, 2005). In addition to engaging in negative self-stereotyping of other singles (Greitemeyer, 2009), there is some evidence to suggest that singles expect social rejection and devaluation. For instance, singles report opting-out of social events such as weddings or dinner parties in order to avoid social devaluation and rejection from others (Byrne, 2000). Many also report that they have been made to feel 'different' or excluded because they are single (Byrne, 2000; Byrne & Carr, 2005). Importantly, internalized stigma implies that negative group attitudes have also been attributed to the self (Herek, Gillis, & Cogan, 2009), which may manifest in blaming oneself for one's own stigmatization. Indeed, some singles view being single as a personal failure to live up to cultural norms and expectations (Band-Winterstein, & Manchik-Rimon, 2014; Sandfield & Percy, 2003), and may even attribute their singlehood to their own personal insecurities or difficulties with relationships (Apostolou, 2017).

In turn, internalized stigma, such as in the context of weight stigma, has been linked an increased risk of depression, low self-esteem, negative affect, generally poorer perceived health and well-being (Mensinger, Calogero, & Tylka, 2016; Pearl & Puhl, 2016; Pearl, Puhl, & Dovidio, 2015). The same is likely true for other internalized stigmas, such as single stigma. Not surprisingly, qualitative accounts show that singles commonly experience depression, and other negative emotions (i.e., disappointment and sadness) related to being single (Lewis & Moon, 1997; Schachner, Shaver & Gillath, 2008; Sharp & Ganong, 2011). Singles also report a great

deal of fear, anxiety, and worry about being single (Cole, 1999; Schachner, Shaver & Gillath, 2008; Spielman et al., 2013). In turn, this fear and paranoia around being single may lead to greater physiological stress reactivity and subsequently poorer health and well-being (Mendoza-Denton et al., 2003). Considering the pervasiveness of single stigma, even those who have come to embrace their single identity likely had to reckon with internalized single stigma at some point in their lives (Meyer, 2003; Szymanski, Chung, & Baslam, 2001), and may be at risk of poorer well-being as a result.

### **Group Belonging and Well-Being**

According to Social Identity Theory (e.g., Tajfel & Turner, 1971), people want to belong to groups that are culturally-valued and/or high-status, as membership in these groups can boost self-esteem (Bruckmuller, 2013). This desire for a positive self-concept can motivate strategies aimed at increasing the status and value of one's stigmatized group memberships. However, the exact strategies people can use to achieve a positive self-concept depends upon the nature and status of their existing group memberships. For example, when group boundaries are fixed such as when a group membership is based on a relatively enduring characteristic (e.g., race, gender, nationality), the desire for a positive self-concept can motivate people to promote the positive attributes of their stigmatized in-group (DiDonato, Ullrich, & Krueger, 2011), or engage in collective action to increase the actual status of their group (Reimer et al., 2017). Yet, when group boundaries are permeable such as when a stigmatized group membership is based on a relatively transient characteristic (e.g., relationship status), the desire for a positive self-concept might motivate members of stigmatized groups to abandon their stigmatized group membership in favor of a higher-status, more culturally-valued group membership.

And so, rather than identify with the stigmatized single group, singles may pursue opportunities for individual mobility to higher-status groups (e.g., by finding a romantic partner or getting married; Tajfel & Turner, 1986). With relative ease singles can increase their personal status and well-being by getting married and gaining access to marriage-specific rights, protections, and benefits such as social security, tax deductions, and health insurance (Armstrong & Hamilton, 2013; DePaulo & Morris, 2005; Silva, 2012; Wise & Stanley, 2004). For singles, pursuing individual mobility to a higher status-group is not only *possible* but socially *encouraged*. Singles often report feeling pressured by friends and family members to find a partner and settle down (Gordon, 2003). Unfortunately, the expectation that singles will eventually partner up and marry may also cause those who wish to remain single to appear even more absurd, and to be stigmatized more harshly. Indeed, singles who choose to remain single are not only perceived as less warm and sociable but also lonelier and more miserable than those who are not single by choice (Slonim et al., 2015). This stigmatization might explain why singles are often hesitant to define themselves as ‘single’ (Sharp & Ganong, 2007); preferring, instead, to think of themselves as ‘soon to be’ in a relationship or as ‘just waiting for the right one’ (Budgeon, 2008). Sadly, this lack of belonging or identification with other singles may further compromise singles’ well-being.

Group identification and well-being. Identifying with a group that shares one’s stigmatized social identity has been postulated to be beneficial for well-being in that it promotes a sense of connectedness and solidarity with other stigmatized individuals (Brondolo et al., 2009). Stigmatized individuals who identify as a part of a group may feel as though they have a broader support network to help them cope effectively with discrimination experiences (Bourguignon, Seron, Yzerbyt, & Herman, 2006; Outten, Schmitt, Garcia, & Branscombe,

2009). The social support benefits of group identification can also foster a sense of control and self-esteem, which can help to preserve and protect the well-being of stigmatized individuals (Armenta, & Hunt, 2009, Bourguignon, Seron, Yzerbyt, & Herman, 2006; Greenaway et al., 2015; Haslam & Reicher, 2006; Outten, Schmitt, Garcia, & Branscombe, 2009; Redersdorff, Martinot, & Branscombe, 2004; Schmitt, Branscombe, Kobrynowicz, & Owen, 2002). Thus, similar to the sense of belonging one gains from having high-quality, supportive interpersonal relationships (Easterbrook & Vignoles, 2013; Walton, Cohen, Cwir, & Spencer, 2012), group identification can provide a sense of belonging above and beyond one's close, interpersonal relationships (Crabtree et al., 2010). Ironically, then, if singles were to identify more strongly with other singles, the well-being gap between singles and married people may begin to narrow.

### **Conclusion**

In conclusion, by focusing solely on the marriage bond as the fundamental source of well-being, past research often neglects to consider how the broader sociocultural context and stigmatization of singles might negatively impact their well-being. Consequently, it is possible that a lack of group identification and belonging, and not necessarily a lack of interpersonal belonging, may explain the well-being gap between single and married people. To further support this account, in the next chapter, I briefly review past research which suggests that not all singles are necessarily suffering at the interpersonal level. Indeed, some singles may have strong, supportive friendships that help to close the well-being gap between them and their married counterparts.

### **Chapter 3: Singlehood, Interpersonal Belonging, and Well-Being**

Just because singles lack a romantic bond, does not necessarily mean they are suffering interpersonally compared to married people. There are many other types of interpersonal relationships through which singles may achieve a sense of interpersonal belonging and well-being. Specifically, I propose that some singles may maintain their well-being by cultivating stronger, more supportive interpersonal relationships with their communities, their family members, and, in particular, with their friends.

In support of this hypothesis, singles tend to have larger and more diverse social networks than married people (Antonucci, Akiyama, Landsford, 1998; Antonucci & Akiyama, 1978; Sarkisian & Gerstel, 2016). Singles are also especially likely to talk to their neighbours and volunteer within their communities (Sarkisian & Gerstel, 2016). Considering the importance of “weaker” community ties for belonging and happiness (Sandstrom & Dunn, 2014), singles’ may have better well-being to the extent that they maintain these community relationships.

Moreover, when it comes to family relationships, singles are more likely to spend time and exchange support with their parents compared to married people (Laditka & Laditka, 2001; Sarkisian & Gerstel, 2004; 2016). They also tend to have stronger attachments to their siblings than married people (Brumbaugh, 2017). Thus, it is possible that the relationships between singles and their families are actually stronger and more supportive than married people’s relationships with their families. However, these strong family bonds may not be enough to close the well-being gap between singles and married people (Stokes & Moorman, 2018), perhaps because these relationships do not require the same kind of investment and support as a marriage bond. Friendships, however, may be another story.

Friendships, especially to the extent that they are intimate, trusting, affectionate, and mutually supportive, are perhaps the next closest thing to a marriage or marriage-like bond (Fehr, 1996). And may offer similar well-being benefits for singles. Indeed, high-quality friendships have been linked to better physical health, longevity, mental well-being, and life satisfaction (Cable, Bartley, Chandola, & Sacker, 2013; Cohen, 2004; Demir, Orthel, & Andelin, 2013; Fiori, Antonucci, & Cortina, 2006; House, Landis, & Umberson, 1988; Gillespie et al., 2015; Perissinotto, Cenzer, & Covinsky, 2012). Singles may naturally intuit these benefits and invest more time and energy into their friendships.

Accordingly, there is some evidence to suggest that some singles may compensate for their lack of romantic bond by investing more heavily in their friendships. For one, singles tend to have more friends than partnered people (Gillespie et al., 2015; Wellman et al., 1991). Singles are also more likely to consider a friendship to be their “closest, deepest, most involved, and most intimate” relationship (Berscheid et al., 1989), suggesting a cognitive prioritization of the friendship bond over other relationships. For these singles, their friendships may offer opportunities for the exchange of emotional, social, material, and economic support similar to that of a marriage bond (Bellotti, 2008). This exchange of support may be particularly beneficial for singles, as frequent in-person contact with friends can decrease stress and improve well-being (Fuller-Iglesias, Webster, & Antonucci, 2013; van der horst & Coffe, 2012). Consequently, singles may be happier and healthier to the extent that they invest more time and effort into their friendships (Brumbaugh, 2017; Musick & Bumpass, 2012; Sarkisian & Gerstel, 2016). Such high-quality friendships may even be enough to bridge the well-being gap between singles and married people. For example, never-married singles tend to have equal (and sometimes better) well-being than married people (DePaulo, 2006; DePaulo & Morris, 2005). One hypothesized,

yet untested, explanation for this finding is the fact that never-married singles may have built a strong network of stable and supportive friendships that help to support their well-being (DePaulo & Morris, 2005).

Despite the potential for singles' friendships to bridge this well-being gap, the quality of singles' friendships may also be undermined by the cultural devaluation of singles and their friendships. From her interviews with men and women about their friendships and romantic relationships, Cronin (2015) found that friendships were often described in a way that made them appear inferior to the couple relationship. For example, one male participant remarked, "I suppose [friendships are] less important when you're in a relationship, really, because... you know, they're there, but you're concentrating on something else, aren't you?" (Cronin, 2015, p. 1173). Another common theme was the tendency for partnered people to view their social time with friends and partners as a "zero-sum game." In other words, they perceived time spent with their friends as quality time taken away from their romantic partner. Consequently, singles may spend less time with their partnered friends (Cronin, 2015; Milardo, Johnson, & Huston, 1983). Singles may also feel left out or excluded as their partnered friends begin to socialize primarily with other couples (e.g., Byrne, 2000). And when singles do spend time with their partnered friends, they may be subjected to prying questions about their relationship status (e.g., "Why aren't you dating anyone? Hang in there, you'll find someone"; Byrne, 2000; Cronin, 2015). Consequently, singles may feel deprioritized and devalued within their friendships to the extent that the majority of their close friends are partnered. This kind of interpersonal deprioritization and devaluation may explain why some singles still report feeling lonely or a lack of available social support (Greitemeyer, 2009) despite having ostensibly more diverse and well-connected social networks.

However, it is important to note that the prioritization of romantic relationships over friendships can also lead to lower quality friendships for partnered people. Gillespie and colleagues (2015) found that people who were more committed to their romantic relationships had fewer friends and were less satisfied with their friends than those who were less committed to their relationships. Considering the importance of high-quality friendships for emotional well-being and life satisfaction (Demir, Orthel & Andelin, 2013; Gillespie et al., 2015), both singles and partnered people may be at risk to the extent they devalue friendship and being single. In general, however, although the cultural stigma around being single may penetrate and undermine the quality of singles' interpersonal relationships, singles should still be able to maintain their well-being to the extent that they pursue and build close friendships with other single and partnered people who value and prioritize them.

### **Conclusion**

Given the cultural preoccupation with marriage and marriage-like relationships, there has been relatively little empirical examination of singles interpersonal relationships, as well as how these relationships might sustain (or thwart) their well-being. Nonetheless, the reviewed evidence suggests that some singles may actually have strong, well-connected social networks which support their well-being.

### The Present Research

The reviewed evidence suggests two potential, opposing pathways through which the experience of being single might affect singles' well-being. The first pathway (a x c) to singles' well-being is through a sense of group belonging with other singles whereas the second pathway (b x d) is through a sense of interpersonal belonging with their friends. I hypothesize that the stigmatization of singles may lead to a relatively low degree of group belonging among singles, which, in turn, could explain the well-being gap between singles and married people. Yet, I also hypothesize that some singles will have strong, supportive friendships that provide them a sense of interpersonal belonging and subsequent well-being benefits, bringing them closer in well-being to their married counterparts. To support this account, in the first manuscript, I establish singles as a stigmatized group, and demonstrate that they have a relatively low level of group identification relative to other groups. In the second manuscript, I examine the quality of singles' friendships, as well as how the quality of singles' friendships may relate to their well-being relative to people in romantic relationships. In doing so, the proposed research will demonstrate that the stigma around being single—and not necessarily the absence of a marriage bond per se—may explain the well-being gap between single and married people.

#### **Chapter 4: Manuscript #1 — Are Single People a Stigmatized ‘Group’?**

Evidence from Examinations of Social Identity, Entitativity, and Perceived Responsibility

In this first manuscript, I investigate the extent to which singles feel as though they belong to a stigmatized group. In doing so, this research will set the stage for the first part (path a) of the proposed pathway (a x b) through which being single may affect well-being. Due to the stigmatized nature of being single, I expect that singles will have a generally low sense of group belonging (i.e., group identification). Accordingly, because group identification is closely linked to the well-being of stigmatized individuals (e.g., Greenaway et al., 2015), low group identification may be a risk factor singles’ well-being. The following manuscript is the accepted version of the following article (citation below) which has been published its final form at the *Journal of Experimental Social Psychology*

(<https://www.sciencedirect.com/science/article/pii/S0022103119303737?via%3Dihub>):<sup>1</sup>

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## Abstract

Past research consistently suggests that singles are stigmatized, but do they constitute a stigmatized group? The current research provides deeper insight into the stigmatization of single people by understanding their ‘group-y’ nature, and how group identification and perception map onto discrimination and prejudice. Study 1 examined the extent to which singles identify as part of a group. Participants were assigned a novel minimal group identity and then completed measures of group identification for four group memberships (e.g., minimal group, relationship status, sexual orientation, nationality). As hypothesized, singles’ identification with other singles was lower compared to their identification with other identities—as well as compared to partnered people’s group identification. Contrary to our hypothesis, singles did not perceive less discrimination towards singles relative to other aspects of their identity. Study 2 examined the extent to which singles are perceived as a group and the extent to which their group-y-ness vs. perceived responsibility for their group membership explains the acceptability of prejudice towards them. Participants completed measures of entitativity and perceived responsibility for similar out-group identities as in Study 1 (e.g., single people vs. people in romantic relationships). As hypothesized, singles were rated lower in entitativity than people in romantic relationships and other groups. Prejudice towards singles was also more acceptable than prejudice towards national and sexual orientation groups. Accordingly, perceived responsibility was a stronger predictor of the acceptability of prejudice towards singles than their entitativity. We discuss the importance of group-based theoretical perspectives for understanding the current and future stigmatization and well-being of singles.

*Keywords:* Entitativity, Group identification, Prejudice, Single people, Social identity, Stigmatization,

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## **Are Single People a Stigmatized ‘Group’?**

### **Evidence from Examinations of Social Identity, Entitativity, and Perceived Responsibility**

In the U.S., U.K., Canada, and many Scandinavian countries, singles now outnumber partnered people (e.g., those who are married or in common-law relationships; British Office for National Statistics, 2014; Pew Research Center, 2014; Statistics Canada, 2017; Statistics Netherlands, 2018; Statistics Norway, 2018). This trend will likely continue, as people increasingly date longer, marry later, divorce more, and prioritize their careers over their relationships (Copen, Daniels, Vespa, & Mosher, 2012; Gunter, 2013). Despite the cultural shift towards increasing singlehood, marriage remains a symbol of status and a marker of success (Silva, 2012). Most people want to get married and believe that doing so will provide them with happiness and personal fulfillment (Coontz, 2005; Fowers, Lyons, Montel, & Shaked, 2001). This belief is often borne out of the lived experiences of married people; past research consistently demonstrates a link between marriage and greater well-being (e.g., Diener, Gohm, Suh, & Oishi, 2000). Unfortunately, however, this cultural exaltation of marriage goes hand-in-hand with the simultaneous devaluation of singlehood.

Like members of a stigmatized group, singles are the targets of prejudice and discrimination. People hold negative attitudes, stereotypes, and beliefs about singles (DePaulo & Morris, 2005; Greitemeyer, 2009). Singles are also economically disadvantaged; they earn less money (Antonovics & Town, 2004) and end up paying disproportionately more for healthcare, social benefits, and income taxes compared to married people (DePaulo & Morris, 2005). And singles may even experience overt discrimination because of their single status, as some openly admit that they would rather choose to rent an apartment to a married couple over a single person, and see nothing inherently biased about this choice (Morris, Sinclair, & DePaulo, 2007).

Yet unlike members of other marginalized groups who are stigmatized *because of* their group membership, singles appear to be stigmatized precisely because they *lack* a group membership (e.g., because they are not married or in a romantic relationship). And so whereas the reviewed evidence strongly corroborates the claim that singles are stigmatized, it remains unclear why singles are stigmatized, and to what extent the perception of singles as a group—or not a group—facilitates this stigmatization. In the present set of studies, we therefore examine both group self-identification and others' group-perception as they relate to singlehood and the experience of prejudice.

### **What Makes a Group?**

Group-based perspectives on the experience of prejudice (e.g., Allport, 1954; Crandall et al., 2001; Tajfel & Turner, 1986) suggest that understanding individual *self-identification* with a group, others' *perception* of an individual's group membership, as well as others' perceptions of an individual's *responsibility* for their group membership are crucial factors in the manifestation and experience of prejudice. From these perspectives, singles provide an interesting context for studying group dynamics because the stigmatized nature of singlehood may simultaneously discourage a strong sense of group identification among singles yet facilitate others' perception that singles are indeed a group.

The criteria for what constitutes a 'group' varies widely within the literature, ranging from simple ("two or more people", Williams, 2010, p. 269) to complex (e.g., requiring social recognition, valuing membership, common goals, interaction, shared norms, etc., Brown, 2003; Cartwright & Zander, 1953; Lickel et al., 2000; McGrath, 1984; Moreland, 2010). Nonetheless, two recurring qualities that seem to reliably 'make' a group across definitions are (a) individual self-identification with a group and (b) others' perception of an individual's group membership

(Brown, 2003; Cartwright & Zander, 1953). Yet, also critical for the expression of prejudice towards a group (Crandall et al., 2001) and towards singles in particular (e.g., Slonim, Gur-Yaish, & Katz, 2015) is the extent to which an individual or group is seen as being personally responsible for their stigmatized group membership. It is therefore upon these factors—self-identification and others' perception—that we focus in terms of their implications for the experience and expression of prejudice towards singles

### **Group Identification**

The first reliable quality of group-y-ness—group identification—involves defining oneself as a member of a group (e.g., self-definition) as well as feeling emotionally tied to or invested in a group (e.g., self-investment; Leach et al., 2008). Individuals who define themselves as members of a group tend to see themselves as being similar or as having things in common with the average group member (e.g., self-stereotyping), and perceive the entire group as being relatively similar to one another (e.g., in-group homogeneity). Importantly, the findings of Leach and colleagues (2008) suggest that an identity can be central to the self regardless of whether an individual feels satisfied or bonded with a group and its members. Generally, though, the more an individual values, enjoys, feels a bond with, and feels similar to a group, the stronger their group identification.

**Group Identification and Perceived Discrimination.** According to Social Identity Theory (Tajfel & Turner, 1986) and the Rejection Identification Model (Branscombe, Schmitt, & Harvey, 1999), perceiving prejudice and discrimination towards a culturally devalued group membership can lead to stronger self-definition and investment in that identity (Seaton, Yip, Morgan-Lopez, & Sellers, 2012; Schmitt, Spears, & Branscombe, 2003), and a stronger connection and sense of solidarity with group members sharing the identity (Giamo, Schmitt, &

Outten, 2012). Alternatively, perceiving devaluation and discrimination towards an identity might instead lead to stronger feelings of self-consciousness about that identity (Pinel, 1999). Individuals who are self-conscious about their stigmatized identity may also perceive devaluation and discrimination towards that identity (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002; Pinel, 1999), and may cope by disengaging from situations in which they face stigmatization.

In either case, the identity may still be central to the self (Leach et al., 2008). Considering the strong link between the centrality of an identity and perceived discrimination (Seaton et al., 2012), centrality may be a better indicator of perceived discrimination than overall group identification. In other words, an individual can be aware of, and affected by, discrimination, whether or not they appreciate, feel similar to, or bonded with other individuals who share that group membership. Importantly, however, those who do have strong overall group identification are likely to fare better in the face of stigmatization than those who do not (Greenaway et al., 2015). Thus, examining overall group identification, as well as the centrality of an identity in particular, is essential for understanding singles' experiences of discrimination and for identifying potential risk factors for single's well-being.

**Do Singles Identify as a Group?** There is mixed evidence to suggest that singles identify as part of a group. Singles admit to feeling lonely, suggesting that they see themselves as being similar, at least in some respect, to the stereotypical single person. Singles also tend to stereotype other singles (Greitemeyer, 2009), indicating that they perceive their in-group as fairly homogenous. And although some singles may feel a strong sense of connection with other singles (Budgeon, 2008), they are often not very satisfied with their relationship status—at least not compared to partnered people (Greitemeyer, 2009). Moreover, the fact that singles often

report feeling lonely suggests that they may lack a strong sense of community or bond with other singles. And though some singles may feel no less lonely than their married counterparts (Essex & Nam, 1987), these experiences may be restricted to singles who have large and more diverse social networks (Sarkisian & Gerstel, 2016), and so the absence of loneliness may not be on account of feeling a bond with other singles, *per se*.

Finally, unlike other groups for which membership is more permanent (e.g., ethnicity/race, gender, sexual orientation), membership in the singles group is highly permeable. Most can join or leave the group with relative ease. Critically, then, the negative stereotyping of singles by singles suggests that they too endorse cultural attitudes regarding the superiority of married and partnered people. Thus, given the right set of circumstances, singles might prefer to be in a relationship. Indeed, most people (80%) marry at some point in their lives (Wang & Parker, 2014), whereas relatively few remain single indefinitely. This desire to eventually be part of a couple may keep singles in a state of arrested development—waiting for the day when they will finally find a partner and begin the coupled phase of life (Lahad, 2012). It may also encourage singles to frame being single as a temporary state (Hostetler, 2009; Lahad, 2012), which may reduce singles' overall investment in their single identity. Subsequently, for many singles, their single identity may not be very central to their sense of self, and as a result, they may be unlikely to notice—and may even be active participants in—discrimination towards singles.

Although group identification among singles may generally be low, there is some evidence to suggest that specific subgroups of singles with distinct constellations of group identification may exist. For example, some dissatisfied and perhaps disconnected singles may avoid situations where their singlehood would be salient or obvious to themselves and others

(Byrne, 2000), or pursue and settle for lower quality romantic partners to avoid remaining single (Spielmann et al., 2013). These behaviors are characteristic of individuals who are hyper-aware of their membership in a stigmatized group (Pinel, 1999), and suggest that although these singles' overall sense of group identification may be low, it may still be central to the self. Singles with this particular constellation of high centrality yet low overall group identification may be at greatest risk of poor well-being as they may tend to notice discrimination towards singles yet may not feel as though they have a group to rely on for support in the face of discrimination (e.g., Greenaway et al., 2015).

There is also some evidence to suggest that some singles may have a particularly strong overall group identification with other singles. For example, Budgeon (2008) found that people who have been single between two and thirteen years are more satisfied with being single and feel that being single is even more satisfying than being part of a couple. These longer-term singles have likely had more time to come to terms with and integrate their single identity into their self-concept and/or form close bonds with other singles in their social networks (Baumbusch, 2004; Eck, 2013; Sarkisian & Gerstel, 2016). Because these singles may have high overall group identification with other singles, perceiving discrimination may therefore serve to bolster their group identification.

### **Group Perception and Prejudice**

The second reliable quality of group-y-ness—others' perception of an individual's group membership—requires that a group is perceived as existing in the first place. A collection of individuals is more likely to be perceived as a group to the extent that members are perceived as being similar to one another, sharing common goals and outcomes, interacting with one another, and as ascribing value to their group membership (Lickel et al., 2000). Each of these factors

contribute to a group's *entitativity* (Campbell, 1958)—that is, the extent to which a group is perceived as cohesive or 'group-y.'

Entitativity has important implications for prejudice towards a group. Members of groups high in entitativity are perceived as sharing the same underlying essence or goals (Spencer-Rodgers, Hamilton, & Sherman, 2007; Yzerbyt, Schadron, Leyens, & Rocher, 1994). Accordingly, perceptions of commonality can spur negative group stereotypes (Abelson, Dasgupta, Park, & Banaji, 1998; Spencer-Rodgers et al., 2007) and allow group stereotypes to be more readily applied to individual group members. Moreover, because prejudiced attitudes toward a group are often based upon and reinforced by negative beliefs and stereotypes about a group (Allport, 1954), groups higher in entitativity tend to be seen as more threatening (Abelson et al., 1998) and thus tend to evoke stronger prejudice from outgroups (Agadullina & Lovakov, 2018). In turn, stronger prejudice toward an outgroup can heighten perceptions of that outgroups' entitativity (Newheiser, Tausch, Dovidio, & Hewstone, 2009). Therefore, the more singles are perceived as high in entitativity and the stronger the negative stereotypes towards them, the more likely they are to face prejudice in their daily life.

**Entitativity and Acceptability of Prejudice.** Entitativity may also affect the extent to which it is considered socially acceptable to express prejudice towards a group. Groups high in entitativity are seen as more powerful and vested in their group's outcomes (Abelson et al., 1998). Consequently, expressing prejudice towards a highly entitative group may be more socially risky, as it may be correctly recognized by others as prejudice and socially condemned. Alternatively, groups that are higher in entitativity may attract more prejudice precisely because they are seen as powerful and threatening (Cotrell & Neuberg, 2005). Comparing the overlapping groups in Lickel et al.'s (2000) study of entitativity to similar groups in Crandall,

Eshleman, and O'Brien's (2002) study regarding the acceptability of prejudice towards groups suggests the latter may be true. Highly entitative groups such as street gangs (e.g., entitativity rating of 7.64 [out of 9]), for example, also tend to receive relatively high acceptability of prejudice ratings (1.51 [out of 3]) whereas groups lower in entitativity such as Jewish people (entitativity rating of 5.39) tend to receive much lower acceptability of prejudice ratings (0.12). Thus, expressing prejudice towards groups higher in entitativity may be more acceptable than expressing prejudice towards groups lower in entitativity.

**Perceived Responsibility and the Acceptability of Prejudice.** According to Crandall et al.'s (2001) Attribution-Value Model, prejudice against certain groups—at least in individualistic cultures—can also stem from the extent to which a group membership or group-defining characteristic is culturally devalued and the extent to which group members are seen as having personal control over their group membership or group-defining characteristic. For instance, in Crandall and colleagues (2002) study of the acceptability of prejudice towards one hundred and five different groups, the groups towards which people perceived prejudice as most acceptable were those that could be construed as having control over the culturally devalued characteristic or behavior that granted them their stigmatized group membership (e.g., rapists, child abusers). In contrast, it was least acceptable to express prejudice towards members of groups who had no control over the characteristic that defined their group membership (e.g., Black Americans, blind people). In turn, perceptions of controllability over a stigmatized group membership can have implications for prejudice. People tend to react with greater hostility and less willingness to help the victims of prejudice when their stigmatized identity is described as being due to controllable causes (Menec & Perry, 1995; Murray, Aberson, Blankenship, & Barry Highfield, 2013). They also place less blame on the perpetrators of prejudice when the victim is perceived as being

personally responsible for their stigmatized group membership (Rodin, Price, Sanchez, & McElligot, 1989).

Importantly, for groups with more permeable boundaries, the cultural value of a group may be reflected in people's general beliefs or ideologies surrounding group members' desire or motivation to belong (or not to belong) to a particular group. For instance, the negative cultural value of being poor is reflected in the fact that most people would surely agree that poor people, if given the choice or opportunity, would much rather be rich (Kasser & Ryan, 1993). In fact, it might seem downright bizarre for an individual of little financial means to desire to remain that way. Nonetheless, it is possible. These seemingly bizarre individuals are likely to evoke greater prejudice from others, as people tend to penalize those who appear to actively defy social norms (Phelan & Rudman, 2010; Rudman & Fairchild, 2004). Ultimately, then, the more group members are perceived as being personally responsible for and actively desiring to be part of a stigmatized group, the stronger prejudice towards them may be.

**Are Singles Perceived as a Group?** It is possible that singles may be perceived as a group. For instance, the term 'single' is used to characterize a broad class of individuals who are similar in that they are not in a committed romantic relationship. Moreover, singles are perceived as sharing a common identity — albeit one that is considered 'flawed' or 'incomplete' by cultural standards (DePaulo & Morris, 2005). And as with other group-based stereotypes, stereotypes of singles tend to be well-developed and readily available (Spencer-Rodgers et al., 2007), with highly detailed cultural tropes of the sad, lonely, insecure single person easily conjured (e.g., Bridget Jones wrapped in a blanket crying into a pint of ice-cream). Singles may also be perceived as sharing common goals such as to find a partner, to remain single, or to get ahead in their careers (Etaugh & Malstrom, 1981). Also like a group, singles certainly interact

with one another—whether it be through friendships, dating, or singles-only events—and may even band together to establish a ‘family’ of friends (Watters, 2003), a pattern that lends to singles serving as the focus of popular television sitcoms (e.g., *Seinfeld*, *Broad City*). And as singlehood becomes more common and normative, it is possible that singles may begin to more strongly value this group membership (Bruckmüller, 2013), becoming increasingly ‘group-y.’

**Are Singles Perceived as Responsible for Being Single?** The devaluation of being single is a likely byproduct of the broader ideology of committed relationships (e.g., Day, Kay, Holmes, & Napier, 2011; see also DePaulo & Morris, 2005), which include beliefs that everyone wants to be in a relationship, and that people who are in a relationship are generally better off than those who are not. Given the pervasiveness of this ideology in Western culture (Budgeon, 2008; Coontz, 2005; Day et al., 2011; DePaulo & Morris, 2005), being single may be seen as either an unwanted circumstance or an act of intentional defiance (e.g., Shostak, 1987). These assumptions reflect general beliefs about singles motivation to be (or not to be) single as well as their control (or lack thereof) over their single status, both of which can affect prejudice towards singles. For instance, singles who desire to be single are stereotyped as being less warm and sociable and more lonely and miserable than those who do not desire to be single (Slonim et al., 2015). People also respond with more anger and less pity towards singles by desire than those who are not single by desire, as the former may elicit greater threat by appearing to willingly defying traditional marriage expectations and ideologies (e.g., Day et al., 2011). Thus, the more people are inclined to perceive singles as motivated to be single, the more permitting of single-specific prejudice they may be.

Perceptions of controllability may similarly affect prejudice towards singles. For instance, Etaugh and Malstrom (1981) found that single widows are evaluated more favourably

than singles who had never been married or those who had been divorced, suggesting that those whose relationships ended for reasons beyond their control (e.g., widows)—and are therefore not personally responsible for being single—are stigmatized less harshly. In contrast, those who might appear to have more control over their single status, whether they tried to leave the group and “failed” (e.g., divorced) or never tried to leave the group (e.g., never married), are perceived more negatively. These perceptions of motivation and control may, in turn, interact to predict the acceptability of prejudice. For instance, never married singles may evoke more anger and face more stigmatization because they are perceived as desiring and actively choosing to remain single, whereas widowed singles might evoke more pity and less stigmatization because they appear to have less desire to be and less control over being single (Slonim et al., 2015). Generally, then, the more someone is inclined to believe that being single is generally controllable and that singles are generally motivated to be single, the more accepting they may be of prejudice towards singles as a whole.

### **The Present Research**

Considering the growing population of singles (British Office for National Statistics, 2014; Pew Research Center, 2014; Statistics Canada, 2017; Statistics Netherlands, 2018; Statistics Norway, 2018), understanding their group nature (or lack thereof) and experience of prejudice, discrimination, and stigma, has never been more pertinent. Therefore, the purpose of the proposed research is to examine both the extent to which singles *identify* with (Study 1: Social Identity) and are *perceived* as a group (Study 2: Entitativity). We provide a detailed description of our hypotheses and their corresponding analytic approaches, effects of interest, and thresholds for evidential value for both Study 1 and Study 2 in Table 1.

Because being part of a romantic relationship tends to be culturally valued, whereas being single tends to be devalued (Greitemeyer, 2009), there is relatively little incentive for singles to invest in the ‘single’ identity (Reimer et al., 2017). Thus, for Study 1, we expect that singles group identification with other singles will generally be lower than partnered people’s group identification with other partnered people, as well as compared to other established groups (e.g., nationality-based groups, sexual orientation-based groups). Still, we expect singles to self-identify with their group beyond a minimal threshold of self-identification (i.e., compared to an entirely arbitrary group). However, we further suspect that a subset of especially high-identifying singles may exist, as some past research suggests that certain singles are perfectly content, and even prefer being single (e.g., Budgeon, 2008). We also anticipate that there may be a subgroup of singles for whom being single is central, yet their group identification with other singles may otherwise be low.

Moreover, though past research certainly suggests that singles are stigmatized, it is unclear the extent to which singles are generally aware of this stigmatization. If the stigmatization of being single is a byproduct of ideological beliefs regarding the value and importance of marriage (e.g., Day et al., 2011; DePaulo & Morris, 2005), then most singles may not accurately recognize and label bias against singles as discrimination. Instead, singles may be just as likely as people in relationships to endorse relationship-valuing ideologies and engage in negative stereotyping of singles (Greitemeyer, 2009). Thus, we suspect that singles, on the whole, will perceive less discrimination towards singles relative to other aspects of their identity, primarily because negative attitudes towards singles are still normalized. However, consistent with past literature, we suspect that the centrality of an identity and perceived discrimination will be positively related for most identities (Mendoza-Denton et al., 2002; Seaton et al., 2012), and

that both the especially high-identifying singles and the central-but-otherwise-low identifying singles will perceive greater discrimination than other singles—a possibility we will test in the event we can reliably detect these particular subgroups of singles.

Similarly, the negative stereotyping and stigmatization of singles suggests that singles may, to some extent, be perceived as a group (Newheiser et al., 2009). Crucially, however, singles may still be perceived as lacking some of the key characteristics of a highly entitative group (i.e., interaction, valuing their group membership; Lickel et al., 2000). Therefore, in Study 2, we expect that singles' entitativity will be lower than that of romantic partners (Lickel et al., 2000), and other established groups (e.g., Canadians, heterosexual people). Yet, singles' entitativity will still surpass the minimal threshold of entitativity (i.e., compared to people arbitrarily assigned to groups).

According to group-based perspectives of prejudice (e.g., Allport, 1954), perceptions of singles' entitativity should be positively associated with the acceptability of prejudice towards them (e.g., Agadullina & Lovakov, 2018). However, considering singles' anticipated low level of entitativity relative to other groups, we suspect that prejudice towards singles may be more likely to stem from an ideological basis (e.g., Crandall et al., 2001; Crandall & Martinez, 1996). If this is so, then perceptions of singles' responsibility for being single should predict the acceptability of prejudice towards singles above and beyond perceptions of their entitativity.

Similarly, although romantic partners may be higher in entitativity than single people, these two groups exist within a cultural context where being in a relationship is highly coveted and valued whereas being single is highly discouraged and devalued (e.g., DePaulo & Morris, 2005). That singles are often blamed for their devalued status (e.g., Byrne & Carr, 2005) may render singles an especially normalized target of prejudice (e.g., Crandall et al., 2002; Morris et

al., 2007). If this is indeed the case, then prejudice towards singles should be considered more acceptable than prejudice towards people in romantic relationships and other more culturally valued groups (DePaulo & Morris, 2005; Morris et al., 2007).

By adopting a group-based perspective to the study of singlehood, this research will not only offer insight into the current and future stigmatization and well-being of singles but also offer new conceptual considerations for the social psychological study of close relationships as groups. Specifically, this research will illustrate how group-based processes such as group identification, entitativity, and perceptions of responsibility may influence close relationships at the individual level. The group-y nature of singles also presents an interesting case study for group dynamics due to the nature of the intergroup context between singles and people in romantic relationships. For instance, the boundary between 'single' and 'in a relationship' is highly permeable and most people have (or are perceived as having) at least some degree of choice regarding to which group they belong. Consequently, this research can offer insight into how the relative status, value, and entitativity of a group may influence group identification and perception, as well as how these processes may correspond with the experience and expression of prejudice.

Table 1

*Hypotheses, Analytic Approaches, Effects of Interest, Sampling Plan, and Thresholds of Evidential Value Studies 1-2*

Hypothesis		Prediction	Analysis	Effect(s) of Interest	Sampling Plan and Thresholds for Evidence
<i>Study 1</i>	<i>H1</i>	Singles' group self-identification with singles will be lower than partnered people's group self-identification with people in romantic relationships.	Bayesian Mixed Analysis of Variance (ANOVA)	Interaction between Group and Relationship Status AND Simple Main Effects <ul style="list-style-type: none"> <li>• Within relationship status: Single ID vs. Partnered ID</li> </ul>	We will collect a minimum of 200 singles and 100 people in relationships and then sample in increments of 50 until interaction:  1/6 > BF <sub>10</sub> > 6
<i>Study 1</i>	<i>H2</i>	Singles will have especially low self-identification compared to sexual orientation-and nationality-based groups.	Bayesian Mixed ANOVA	Interaction between Group and Relationship Status AND Simple Main Effects <ul style="list-style-type: none"> <li>• Within singles: Relationship ID vs. Orientation ID Relationship ID vs. Nationality ID</li> </ul>	
<i>Study 1</i>	<i>H3</i>	Singles will self-identify more than "overestimators."	Bayesian Mixed ANOVA	Interaction between Group and Relationship Status AND Simple Main Effects <ul style="list-style-type: none"> <li>• Within Singles: Relationship ID vs. Overestimator ID</li> </ul>	
<i>Study 1</i>	<i>H4a</i>	There will exist a subgroup of singles who demonstrate especially high overall group identification.	Latent Profile Analysis (LPA)	Profile of singles whom score highly on most/all indicators of group identification.	We will recruit at least 200 participants who are single and 100 participants
<i>Study 1</i>	<i>H4b</i>	There will exist of subgroup of singles to whom the single identity is central	LPA	Profile of singles whom score low on all indicators of group identification except centrality.	

		yet have otherwise low group identification.			who are in relationships.  Best fitting model as indicated by low BIC and LogLik and high Entropy statistics.
<i>Study 1</i>	<i>H5a</i>	Singles will generally have lower perceived discrimination vs. other groups (except for people arbitrarily assigned to groups towards which we remain agnostic).	Bayesian Mixed ANOVA	Interaction between Group and Relationship Status AND Simple Main Effects <ul style="list-style-type: none"> <li>• Within relationship status: Single ID vs. Partnered ID</li> <li>• Within singles: Relationship ID vs. Orientation ID Relationship ID vs. Nationality ID</li> </ul>	Sampling of H1/H2/H3/H4 prioritized  1/6 > BF <sub>10</sub> > 6
<i>Study 1</i>	<i>H5b</i>	Depending on results of LPA: Especially high-identifying singles and central-yet-otherwise-low identifying singles will perceive greater discrimination relative to singles for whom being single is a less central identity.	Bayesian One-way ANOVA	Main effect of Single subgroup: <ul style="list-style-type: none"> <li>• High-identifying singles &gt; other less-central identifying single subgroups</li> <li>• Central-but-otherwise-low identifying singles &gt; less-central identifying single subgroups</li> </ul>	Sampling of H1/H2/H3/H4 prioritized  1/6 > BF <sub>10</sub> > 6
<i>Study 1</i>	<i>H5c</i>	The centrality of an identity and perceived discrimination will be positively related for most identities.	Multilevel Modeling (MLM)	Slope between centrality and perceived discrimination (one-tailed test; positive direction).	Sampling of H1/H2/H3/H4 prioritized

					$1/6 > BF_{10} > 6$ $\alpha = .05$
<i>Study 2</i>	<i>H6</i>	Singles will be perceived as lower in entitativity compared to romantic partners.	Bayesian Repeated Measures ANOVA	Main Effect of Group AND pair-wise comparison: <ul style="list-style-type: none"> <li>• Singles vs. Romantic partners</li> </ul>	Sampling Until Main Effect:  $1/6 > BF_{10} > 6$
<i>Study 2</i>	<i>H7</i>	Singles will have lower entitativity compared to Canadians and Gay, Lesbian and Bisexual (GLB) people.	Bayesian Repeated Measures ANOVA	Main Effect of Group AND pair-wise comparisons: <ul style="list-style-type: none"> <li>• Singles vs. Canadians</li> <li>• Singles vs. GLB people</li> </ul>	
<i>Study 2</i>	<i>H8</i>	Singles will be perceived as higher in entitativity compared to people arbitrarily assigned to groups.	Bayesian Repeated Measures ANOVA	Main Effect of Group AND pair-wise comparison: <ul style="list-style-type: none"> <li>• Singles vs. people arbitrarily assigned to groups</li> </ul>	
<i>Study 2</i>	<i>H9</i>	Prejudice towards singles will be perceived as more acceptable vs. other groups.	Bayesian Repeated Measures ANOVA	Main Effect of Group AND pair-wise comparisons: <ul style="list-style-type: none"> <li>• Singles vs. Romantic partners</li> <li>• Singles vs. Canadians</li> <li>• Singles vs. GLB people</li> <li>• Singles vs. Asexual people</li> <li>• Singles vs. Heterosexual people</li> <li>• Singles vs. People arbitrarily assigned to groups</li> </ul>	Sampling of H6/H7/H8 prioritized  $1/6 > BF_{10} > 6$

<i>Study 2</i>	<i>H10</i>	Entitativity will be positively associated with acceptability of prejudice	MLM	Slope between entitativity and acceptability of prejudice (one-tailed test; positive direction).	Sampling of H6/H7/H8 prioritized  $\alpha = .05$
<i>Study 2</i>	<i>H11</i>	Perceived motivation and control (i.e., responsibility) will uniquely and interactively predict the acceptability of prejudice	MLM	Slope between perceived control and acceptability of prejudice (one-tailed test; positive direction). Slope between perceived motivation and acceptability of prejudice (one-tailed test; positive direction). Slope of the interaction between perceived control and motivation and acceptability of prejudice (one-tailed test; positive direction).	
<i>Study 2</i>	<i>H12</i>	Perceptions of responsibility for being single should predict the acceptability of prejudice towards singles above and beyond perceptions of their entitativity	MLM	Slope of entitativity on acceptability of prejudice becomes non-significant after including interaction between perceived motivation and control in the model (one-tailed test; positive direction).	

### **Study 1: Do Singles Identify as a Group?**

The purpose of Study 1 was to examine the extent to which singles identify as part of a group. We adapted one of Tajfel and colleagues (1971) original minimal group paradigms, the “Dot Estimation Task (DET),” to assign a temporary novel group membership to participants on the basis of minimal, arbitrary criteria. The true purpose of the DET was to establish a reasonable baseline level of arbitrary group identification from which to compare participants’ identification with other groups, and their identification with singles in particular. After completing the DET, participants completed measures of group identification (Leach et al., 2008) for four group memberships related to their nationality, sexual orientation, relationship status, as well as for the minimal group membership to which they were previously assigned. Finally, participants indicated their perceptions of personal and group discrimination for each group membership (Taylor, Wright, Moghaddam, & Lalonde, 1990).

#### **Methods**

In accordance with Simmons, Nelson, and Simonsohn (2012), we describe how we determined our sample size, all data exclusions, all manipulations, and all measures. Our preregistered proposal, materials, and data can be accessed on our Open Science Framework (OSF) page for this project (doi: 10.17605/OSF.IO/TMCNQ)

**Sampling procedure and data collection stopping rule.** We recruited American adults over the age of 19 from Amazon’s Mechanical Turk website. To determine our desired sample size, we employed a combination of latent profile analysis sample size requirements (see Nylund, Asparouhov, & Muthén, 2007) along with sequential analyses with Bayes Factors (see Schönbrodt, Wagenmakers, Zehetleitner, & Perugini, 2017) to inform our sampling plan.

Simulations by Nylund and colleagues (2007) suggest that  $n = 200$  would be a reasonable target number of singles to recruit for the purpose of identifying plausible subgroups based on singlehood identity with continuous indicators. We therefore aimed to recruit at least 200 participants who were single and 100 participants who were in relationships. We continued collecting data (in increments of 50 participants, irrespective of relationship status) until we reached our specified threshold for evidence for our main hypotheses, as described in Table 1. We anticipated having to recruit no more than 1000 participants total. Based on recommendations by Hauser, Paolacci, and Chandler (2018), participants were excluded if they indicated that they failed to answer questions honestly, which was defined as a score of three or lower to the question “I tried to answer the questions honestly” answered on a scale from 1 (not at all) to 5 (all of the time), if they failed a comprehension check at the end of the survey (e.g., chose a response other than ‘overestimator’ for the question, “At the beginning of the study you completed a task designed to assess your ‘cognitive style.’ What was the name of your ‘cognitive style?’”), if they completed the survey in less than two minutes (the minimal amount of time it should take to complete the survey), and if their IP address was the same as a previously submitted response, as the duplicate IP address indicates that someone used the same computer to complete the survey on multiple occasions. Participants with missing data were also excluded through list-wise deletion (JASP’s default) during analyses.

**Preregistered exclusions and sample characteristics.** As proposed, we collected a sample of 300 (200 singles, 100 people in romantic relationships) American adults (age 19+) from Amazon’s Mechanical Turk website. Based on our preregistered exclusion criteria, one participant was excluded because they indicated that they had failed to answer questions honestly. Three participants were excluded because they failed the comprehension check at the

end of the survey. No participants completed the survey in less than two minutes and there were no exclusions based on duplicate IP addresses. The final sample consisted of 297 participants (see the Online Supplemental Materials (OSM) for sample demographics).

**Procedure.** The following procedure was approved by our research ethics review board (REB). Participants first completed a “Dot Estimation Task (DET)” (see Tajfel et al., 1971, for details). After completing this task, participants were directed to a new webpage and informed that their score for the DET was ostensibly being calculated. All participants were informed that their cognitive style was that of an “overestimator.” Therefore, all participants were assigned the same novel minimal group membership.

Next, participants completed repeated measures of group identification (Leach et al., 2008) for four social identities: sexual orientation (e.g., asexual, bisexual, gay/lesbian, straight), nationality (e.g., American), relationship status (e.g., in a relationship, single), and the novel assigned minimal group membership (i.e., overestimator). The order by which participants complete these four measures of group identification was random. We used participants’ responses from the earlier demographic survey to personalize each identity measure to each participant’s unique social identities (e.g., participants who indicate they are asexual will complete an asexuality identification measure). After each measure of group identification, participants were also asked two questions regarding their perceptions of personal and group discrimination related to each identity.

### **Measures.**

*Group Identification.* Leach *et al.*’s (2008) multi-component measure of group identification consists of 14 items rated on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*), designed to assess two subscales: Self-Investment and Self-Definition. The Self-

Investment subscale has three components: solidarity (e.g., “I feel a bond with people who are [in-group]”), satisfaction (e.g., “I am glad to be [in-group]”), and centrality (e.g., “I often think about the fact that I am [in-group]”). Likewise, the Self-Definition subscale has two components: individual self-stereotyping (e.g., “I have a lot in common with the average [in-group] person”), and in-group homogeneity (e.g., “[In-group] people have a lot in common with each other”). All items were personalized to each participant’s own group memberships (e.g., “I am glad to be *single*”). Responses were averaged to create a reliable score for each subscale of group identification (all average subscale  $\alpha$ s across identities  $> .91$ ), as well as an average overall group identification score (average  $\alpha$  across identities =  $.95$ ).

***Perceived Discrimination.*** Based on previous measures used by Taylor et al. (1990), participants were asked two items regarding their perceptions of discrimination towards each of their social identities. The first assessed their perceptions of the extent to which people who share their social identity experience discrimination (e.g., “To what extent do you think people who are [in-group] experience discrimination?”). The second assessed the extent to which they personally experience discrimination related to that social identity (e.g., “To what extent have you personally experienced discrimination for being [in-group]?”). Responses were given on a 7-point scale, which ranged from 1 (*not at all*) to 7 (*a great deal*). We examined these items separately.

**Data analysis strategy.** We use Bayesian Mixed Analysis of Variance (ANOVA) using JASP (JASP Team, 2018; Wagenmakers et al., 2018) to calculate Bayes Factors (BF) in order to test our hypotheses regarding differences in group self-identification as well as differences in perceived discrimination (see again Table 1).  $BF_{10}$  cutoffs of  $\frac{1}{6}$  or less (support for  $H_0$ ) and  $BF_{10}$  of 6 or more should lead to an acceptably low rate of misleading evidence (see Schönbrodt &

Wagenmakers, 2018). As Bayesian repeated-measures ANOVA models are an approach with evolving capacities and standards (see Wagenmakers et al., 2018), we fit our models using medium ( $r = 1/2$ ), wide ( $r = \sqrt{2}/2$ ), and ultrawide ( $r = 1$ ) priors, in order to appraise the sensitivity of our results on prior specification. Our results were similar across our range of preregistered priors. Thus, for simplicity, we report our results based on JASP's default priors for Bayesian ANOVA ( $r = 1/2$ ) and Bayesian t-tests ( $r = \sqrt{2}/2$ ).<sup>1</sup>

We also used multilevel modeling to examine the association between group centrality and perceived discrimination (see again Table 1). For our multilevel modeling analyses, we used `lmerTest` from the `lme4` package (Bates, Maechler, Bolker, & Walker, 2015) in R (R Core Team, 2018). For these analyses, we fit both a random intercept model, which allowed the intercept to vary between groups, and then we fit a random intercept and random slope model, which allowed both the intercept and slope to vary between groups. We compared both models and interpreted the model with the better fit for the data.

Finally, to determine whether distinct subgroups of singles existed, we conducted a latent profile analysis (LPA; Lanza, Flaherty, & Collins, 2003) using the `tidyLPA` package (Rosenberg, Beymer, Anderson, & Schmidt, 2018) in R (R Core Team, 2018). Because this type of analysis assumes that the data has been sampled from multiple populations as opposed to one, it is possible to estimate a unique set of parameters ( $\mu$  and  $\sigma^2$ ) for each profile's distribution. We compared the fit indices of more complex models (e.g., a model with two extracted latent profiles) to simpler models (e.g., a model with only one extracted latent profile). We evaluated and compared the fit of each model using the Bayesian information criteria (BIC; Schwartz, 1978), log-likelihoods, and Entropy values as provided by `tidyLPA`. The BIC and log-likelihoods

are descriptive fit indices for which smaller values indicate better model fit, whereas higher Entropy values indicate better model fit.

## Results

Group identification (Hypotheses 1-3). We applied our proposed analysis in the form of a 4 (Identity Type: Minimal Group, Relational, Sexual Orientation, National) x 2 (Relationship Status: Single vs. In a Relationship) mixed Bayesian ANOVA for group identification. The results of this analysis showed that the data are  $2.250e+108$  times more likely under our proposed interaction model than the null model and 81.033 ( $2.250e+108/1.516e+104$ ) times more likely under the interaction model than the model with the next highest  $BF_{10}$ , the main effect of identity type and relationship status model, suggesting that there were appreciable differences in group identification by identity type and relationship status. We therefore proceeded to test our specific hypotheses of group- (e.g., single vs. partnered people) and identity-target-comparisons (e.g., relationship status vs. sexual orientation) using Bayesian independent and paired sample t-tests.

Supporting our predictions for *H1-H3* (see Figure 1), singles' group identification was appreciably lower than partnered people's group identification,  $BF_{10}$  of  $4.97e+8$ , *median posterior effect size* ( $\delta$ ) = -0.84, 95%  $CR_{\delta}$  [-1.10, -0.59]. Single's group identification was also appreciably lower than their group identification with their sexual orientation,  $BF_{10} = 1.17e+10$ ;  $\delta = -0.54$ , 95%  $CR_{\delta}$  [-0.69, -0.38], and their national identity,  $BF_{10} = 1.53e+6$ ;  $\delta = -0.42$ , 95%  $CR_{\delta}$  [-0.56, -0.27]. Finally, singles also had appreciably higher group identification relative to their minimal group identity,  $BF_{10} = 1.01e+29$ ,  $\delta = 1.01$ , 95%  $CR_{\delta}$  [0.83, 1.17].

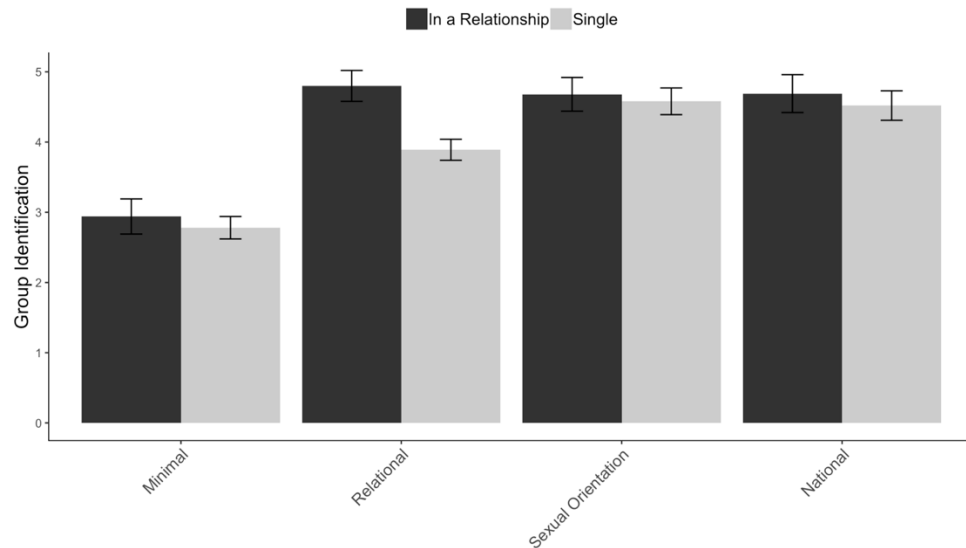


Figure 2. Group identification as a function of group type and relationship status. Error bars reflect 95% Credibility Intervals.

***Latent profile analysis of single’s group identification (Hypotheses 4a and 4b).*** Next, we examined whether there was support for our hypothesized latent profiles of singles with the predicted patterns of group identification (*H4a*, *H4b*). Although the results of our exploratory taxometric analyses suggested that the underlying structure of singles’ group identification may be better characterized as dimensional rather than categorical (see OSM for details), we proceeded to perform our preregistered latent profile analysis for singles’ group identification. Our final, most well supported and parsimonious model had six profiles (See OSM for details). Consistent with *H4a*, 21% of singles ( $n = 40$ ) were characterized by above average centrality and below-average scores on the other four subscales of group identification (i.e., “Central-But-Otherwise-Low-Identifiers”). Moreover, consistent with *H4b*, 6% of singles ( $n = 12$ ) were characterized by very high scores on all the subscales of group identification (i.e., “High Overall Identifiers”). More information about these analyses and profiles can be found in the OSM.

**Perceived discrimination (Hypotheses 5a and 5b).** Additional Bayesian Mixed ANOVAs supported our predicted interactions regarding perceptions of personal,  $BF_{10} = 1.45e+22$ , and group discrimination,  $BF_{10} = 3.91e+23$ , suggesting there were appreciable differences in perceived personal and group discrimination as a function of identity type and relationship status (*H5a*; see Figure 2.). Thus, once again, we proceeded to use Bayesian independent and paired sample t-tests for our specific group comparisons for both personal and group discrimination.

First, we compared singles' perceived personal discrimination to partnered peoples' perceived personal discrimination; the results did not support our hypothesis,  $BF_{10} = 0.03$ , instead, favoring the null model,  $BF_{01} = 35.20$ . The results were similar for perceived group discrimination,  $BF_{10} = 0.03$  ( $BF_{01} = 38.49$ ). It is therefore not the case that singles perceive *less* personal or group discrimination relative to partnered people.

Also contrary to our predictions, single's perceived personal discrimination on the basis of their relationship identity was not appreciably lower than their sexual orientation,  $BF_{10} = 0.01$ ;  $\delta = -0.01$ , 95%  $CR_{\delta} [-0.05, -0.000]$ , or national identity,  $BF_{10} = 0.01$ ;  $\delta = -0.01$ , 95%  $CR_{\delta} [-0.05, -0.000]$ . Similarly, the data did not support our hypothesis that single's perceived group discrimination toward their single identity was appreciably lower than toward their sexual orientation (*H5b*),  $BF_{10} = 0.016$ ;  $\delta = -0.008$ , 95%  $CR_{\delta} [-0.041, -0.01]$ , or national identity,  $BF_{10} = 0.07$ ;  $\delta = -0.05$ , 95%  $CI_{\delta} [-0.15, -0.002]$ .

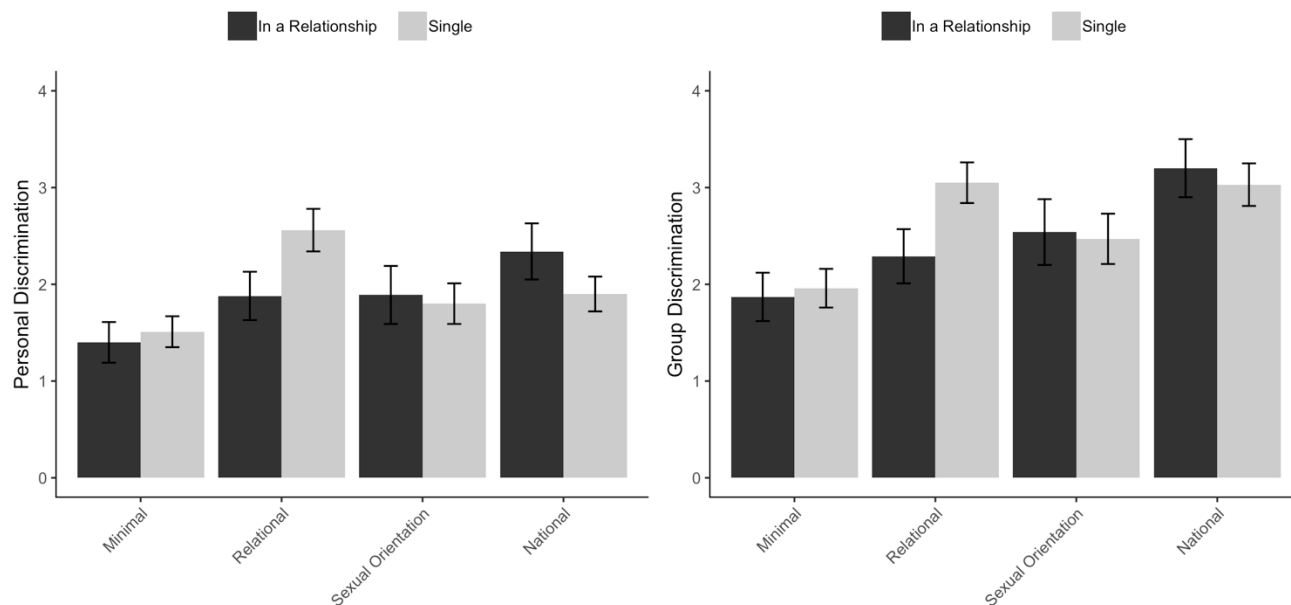


Figure 3. Perceived personal and group discrimination by identity type and relationship status. Error bars reflect 95% Credibility Intervals.

***Perceived discrimination among profiles of singles (H5b).*** We conducted a Bayesian one-way ANOVA to test if there were appreciable differences in perceived personal and group discrimination between the profiles of singles (*H5b*). The results of the analysis for personal discrimination analysis were inconclusive,  $BF_{10} = 0.48$  ( $BF_{01} = 2.19$ ). Nonetheless, our pairwise comparisons revealed moderate support that perceived personal discrimination for the hypothesized profile of Central-but-Otherwise-Low identifiers was appreciably greater than that of a profile characterized by low overall group identification,  $BF_{10} = 5.44$  (all other  $BF_{S10} < 2.21$ ), partially supporting our hypothesis that Central-but-Otherwise-Low identifying singles perceive greater personal discrimination compared to other groups. The results of the analysis for group discrimination, meanwhile favored the null hypothesis that there were no appreciable differences in perceived group discrimination among the profiles of singles,  $BF_{10} = 0.17$  ( $BF_{01} = 5.74$ ).

**Centrality and perceived discrimination (Hypothesis 5c).** Finally, we examined the relationship between identity centrality and perceived personal and group discrimination. For personal discrimination, the random intercept and random slope model fit better than the random intercept model,  $\chi^2(2) = 13.74, p = .001$ . There was no consistent association between centrality and perceived personal discrimination across identity types,  $b = 0.19, t(2.77) = 2.82, p = .07$ . For group discrimination, the random intercept and random slope model also provided a better fit for the data,  $\chi^2(2) = 12.24, p = .002$ . Once again, centrality did not emerge as a consistent predictor of perceived group discrimination across identity types,  $b = 0.18, SE = 0.07, t(2.79) = 2.49, p = .10$ .

#### **Exploratory analyses.**

**Perceived personal and group discrimination.** Because our preregistered analyses did not support our hypotheses that singles' perceived personal and group discrimination was appreciably lower than that of partnered people as well as toward their other identities, we explored whether singles' perceived discrimination was appreciably *higher* than towards these other identities. Indeed, singles' perceived personal and group discrimination was appreciably higher than partnered people's perceived personal discrimination,  $BF_{10} = 176.60, \delta = 0.44, 95\% CR_{\delta} [0.20, 0.68]$ , and perceived group discrimination,  $BF_{10} = 771.10, \delta = 0.49, 95\% CR_{\delta} [0.25, 0.74]$ .

Likewise, singles' perceived personal discrimination toward their single identity was appreciably greater than toward their sexual orientation,  $BF_{10} = 779500, \delta = 0.41, 95\% CI_{\delta} [0.26, 0.56]$ , and national identity,  $BF_{10} = 1.53e+6, \delta = 0.42, 95\% CI_{\delta} [0.27, 0.56]$ . Moreover, singles perceived greater group discrimination toward their single identity than towards their sexual orientation identity,  $BF_{10} = 177.05, \delta = 0.27, 95\% CR_{\delta} [0.13, 0.41]$ , but not their national

identity,  $BF_{10} = 0.09$ ,  $\delta = 0.05$ , 95%  $CR_{\delta}$  [0.002, 0.17]. Interestingly, however, singles with minority sexual orientation identities perceived greater personal,  $BF_{10} = 18.68$ ,  $\delta = 0.57$ , 95%  $CR_{\delta}$  [0.20, 0.97], and group discrimination,  $BF_{10} = 147528.72$ ,  $\delta = 1.22$ , 95%  $CR_{\delta}$  [0.72, 1.71], toward their sexual orientation identity than toward their single identity.

### **Brief Discussion**

The results of Study 1 are among the first to demonstrate that singles do, to some extent, self-identify as a ‘group.’ Consistent with our hypotheses, single’s group identification with other singles surpassed the proverbial lowest reasonable bar of group identification (i.e., with their experimentally-assigned minimal group) yet, as expected, fell short of other more well-established identities.

Contrary to our predictions, however, singles appear to be well aware of their membership in a *stigmatized* group. Singles did not perceive less personal or group discrimination relative to people in relationships, and did not perceive less personal and group discrimination toward their single identity relative to their sexual orientation and national identity. Ultimately, then, it does not appear to be the case that singles under-detect or misperceive singlism, as has sometimes been suggested in past theorizing (e.g., DePaulo & Morris, 2005). Our finding diverges from past research linking perceived discrimination to group identification (Branscombe et al., 1999; Jetten, Branscombe, Schmitt, & Spears, 2001; Simon et al., 1998), instead suggesting that singles’ experiences of discrimination and stigmatization may feel more personal, and less group-based, than their experiences of discrimination toward other group identities.

Finally, as predicted, a small proportion of singles (6%) demonstrated high overall identification with other singles and a larger proportion of singles (21%) demonstrated central-but-otherwise-low identification with other singles. Yet, contrary to our hypothesis that profiles with higher centrality scores would perceive greater personal and group discrimination than profiles with lower centrality scores (e.g., Seaton et al., 2012), there were no detectable differences in perceived personal and group discrimination across the profiles of singles. Nonetheless, differences in group identification among singles may still have meaningful consequences for other aspects of singles' lives and well-being (e.g., Branscombe et al., 1999). Future research should seek to understand whether these profiles of singles differ in regard to other well-being outcomes as well as to what extent improving single group identification may buffer single's well-being.

### **Study 2: Are Singles Perceived as a Group?**

In Study 2, we examined the degree to which singles are perceived as a group. Participants completed measures of entitativity for five identities similar to those in Study 1 that they do not share (i.e., for which they are out-group members): (1) single people or people in romantic relationships, (2) sexual or asexual people, (3) heterosexual or gay, lesbian, and bisexual (GLB) people, (4) Canadians, and (5) people arbitrarily assigned to groups). Our focus in Study 2 on out-group members is important, as we had already assessed in-group perceptions of identity in Study 1. Participants also indicate their perceptions of group members' responsibility for their group memberships as well as their perceptions of the acceptability of prejudice towards each group.

### **Methods**

Again, following Simmons and colleagues' (2012) recommendations, we describe how we determined our sample size, all data exclusions, all manipulations, and all measures. Our preregistered proposal, materials, and data can be accessed on our OSF project page (doi: 10.17605/OSF.IO/TMCNQ).

**Proposed sample and data collection stopping rule.** We used the same Bayesian sequential analysis sampling strategy and MTurk data collection strategy as in Study 1. We also employed the same exclusion criteria (except for exclusions based on a comprehension check for which there was no analogous check in Study 2). Our effects of interest and cutoffs for evidential value for Study 2 are also in Table 1.

**Preregistered exclusions and sample characteristics.** We collected data for 161 American adults (age 19+) from Amazon's Mechanical Turk website. Based on our preregistered exclusion criteria, one participant was excluded because they indicated that they had failed to answer questions honestly.<sup>2</sup> Seven participants were excluded because they took less than two minutes to complete the survey. No participants were excluded based on duplicate IP addresses. Thus, the final sample consisted of 153 participants (see Table S1 in the OSM for sample demographics).

**Procedure and measures.** The following procedure was approved by our REB. After consenting to participate, participants had the opportunity to provide the same demographic information as Study 1. We then used participants' demographic selections to inform which repeated measures of entitativity (Spencer-Rodgers et al., 2007) they completed, for similar kinds of identities as in Study 1: (1) single people or people in romantic relationships, (2) heterosexual people or gay, lesbian, and bisexual (GLB) people, (3) sexual people or asexual people, (4) Canadians, and (5) people arbitrarily assigned to groups. Because we were primarily

interested in others' (i.e., out-group members') perceptions of a group, participants only completed evaluations of groups for which they were *not* a member. For example, people who identified as single, heterosexual, sexual, and American provided their perceptions of people in relationships, GLB people, asexual people, Canadians, and people arbitrarily assigned to groups. As we sampled only American participants, all participants rated the entitativity of Canadians. The order by which participants completed these measures was random. In addition to the entitativity ratings for each group, participants rated their perceptions of group members' general responsibility (motivation and control over) for their group membership, as well as their perceptions of the acceptability of expressing prejudice towards each group.

Perceptions of group entitativity were assessed using 8 items from Spencer-Rodgers et al. (2007). This measure captured both general perceptions of entitativity (e.g., "Some groups have the characteristics of a 'group' more than others do. To what extent does this group qualify as a 'group'?") as well as more specific aspects of group entitativity (e.g., "How important is the group to its members?", "How much do the group members interact with one another?"). All ratings were made on a 9-point scale, ranging from 1 (*not at all*) to 9 (*extremely*). All items were averaged to create a total entitativity score (average  $\alpha$  across groups = .94).

Next, perceptions of motivation for belonging to each group was assessed with the item, "To what extent do you believe group members' desire to be part of this group?" Scores for motivation were provided on a scale from 1 (*not at all*) to 7 (*extremely*). Attributions of control over group membership were assessed by asking, "To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?" Scores were provided on a scale from 1 (*outside of individual control*) to 7 (*within individual control*; based on Crandall & Martinez, 1996).

Finally, acceptability of prejudice was assessed by asking how *not ok* (0) or *perfectly ok* (100) it is to “express negative feelings toward the group” (Crandall, Miller, & White, 2018). Higher scores indicated greater perceived acceptability of prejudice.

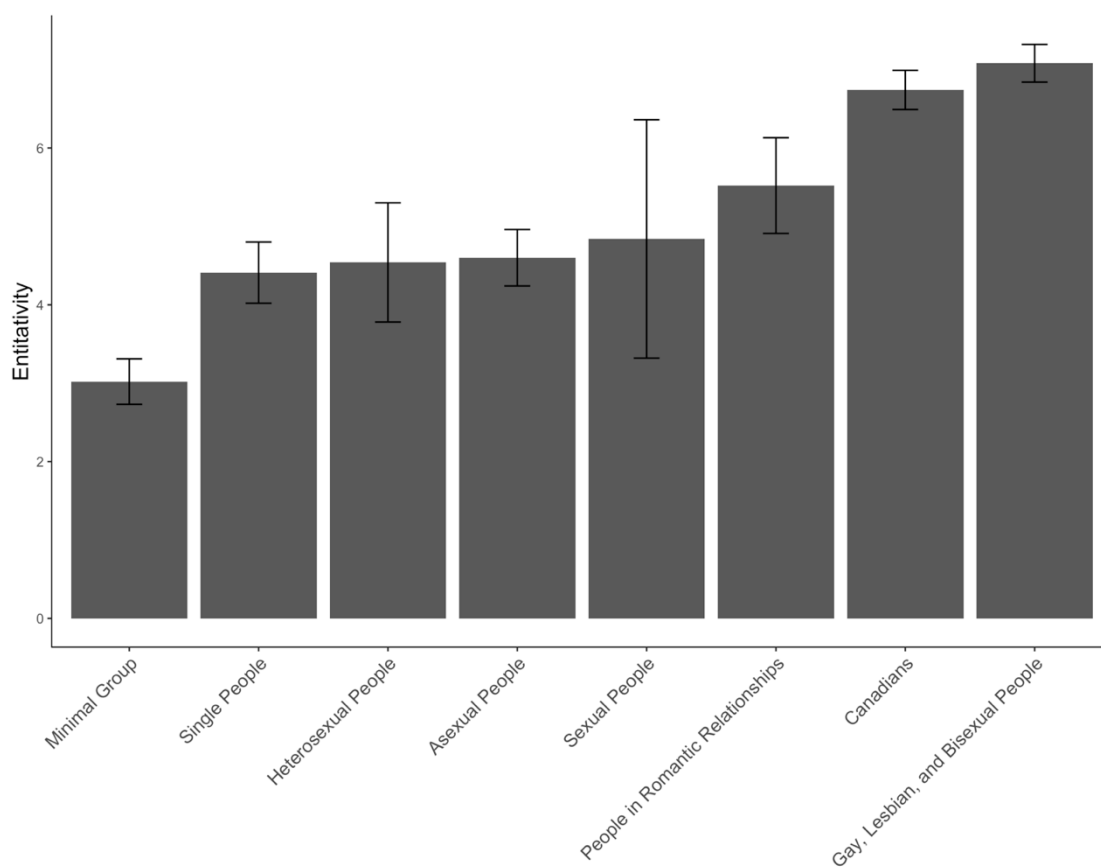
**Data analysis strategy.** We again used a Bayesian Repeated Measures ANOVA to test our hypotheses about group entitativity, responsibility (e.g., motivation and control), and acceptability of prejudice. We also examined the association between entitativity, responsibility, and the acceptability of prejudice across group types (i.e., Minimal [People arbitrarily assigned to groups], Relational [Singles and People in Relationships], Sexual [Sexual and Asexual people], Sexual Orientation [Heterosexual and GLB people], and National [Canadians]) using the same multilevel modeling strategy as in Study 1.

## Results

**Entitativity (Hypotheses 6-8).** We applied our proposed analysis in the form of a one-way Bayesian ANOVA for entitativity across group types (Minimal Group, Relationship Status, Sexual, Sexual Orientation, and National). The results of this analysis revealed that the data are  $2.33e+80$  times more likely under our proposed model than the null model. We therefore proceeded to test our specific hypotheses of group comparisons using Bayesian independent (e.g., single people vs. people in romantic relationships) and paired sample t-tests (e.g., single people vs. Canadians).

Supporting our predictions for *H6-H8* (see Figure 3), singles entitativity was appreciably lower than that of people in romantic relationships ( $BF_{10} = 32.86$ ,  $\delta = -0.52$ , 95%  $CR_{\delta} [-0.86, -0.17]$ ). Single’s entitativity was also appreciably lower than that of Canadians ( $BF_{10} = 6.36e+18$ ;  $\delta = -1.23$ , 95%  $CI_{\delta} [-1.49, -0.96]$ ), and that of GLB people ( $BF_{10} = 1.53e+6$ ;  $\delta = -1.37$ , 95%  $CI_{\delta}$

[-1.71, -1.08]). Finally, singles' entitativity was also appreciably higher than the entitativity of people arbitrarily assigned to groups ( $BF_{10} = 9.22e+8$ ;  $\delta = -0.75$ , 95%  $CI_{\delta}$  [-0.98, -0.52]).



*Figure 4.* Entitativity scores across group type in order of increasing entitativity. Error bars reflect 95% Credible Intervals (CRs). Note that CRs vary based on within-condition sample size.

**Acceptability of prejudice (H9).** Additional Bayesian one-way ANOVAs supported our prediction that there are appreciable differences in the acceptability of prejudice towards different groups ( $BF_{10} = 4.04e+9$ ; see Figure 4.). Thus, once again, we proceeded to use Bayesian independent and paired sample t-tests for our specific group comparisons of acceptability of prejudice. The results of these comparisons are presented in Table 2. Supporting our prediction for *H9*, prejudice towards singles was more acceptable than prejudice towards Canadians or GLB

people. Similarly, our results evidenced moderate and anecdotal support for the greater acceptability of prejudice towards singles than towards asexual and heterosexual people, respectively. Contrary to our prediction for *H9*, however, the acceptability of prejudice towards singles was not appreciably greater than towards people in romantic relationships or people arbitrarily assigned to groups.

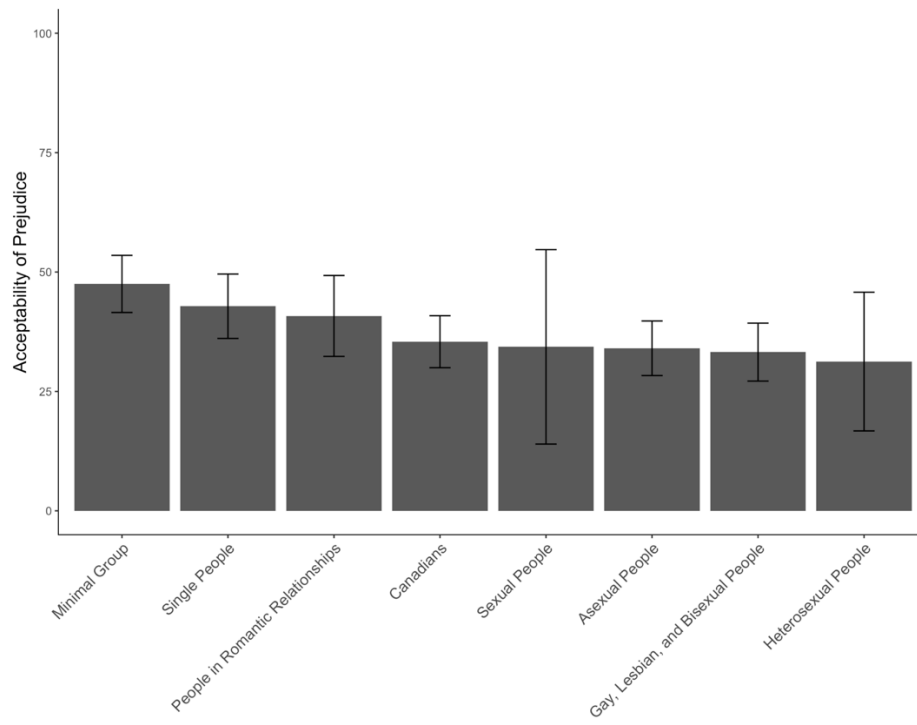


Figure 5. Acceptability of prejudice by group type in order of decreasing acceptability. Error bars reflect 95% Credible Intervals.

Table 2

*Bayes factors for the alternative hypothesis ( $BF_{10}$ ) and null hypothesis ( $BF_{01}$ ), median posterior effect sizes  $\delta$ , and 95% credible intervals ( $CR_\delta$ ) for posterior effect size for acceptability of prejudice.*

Acceptability of Prejudice						
Hypothesis 9			Median Posterior			
			$BF_{10}$	$BF_{01}$	Effect Size ( $\delta$ )	95% $CR_\delta$
Singles	>	People in romantic relationships	0.25	4.00 (Moderate)	0.14	[0.01, 0.41]
Singles	>	Canadians	22.21 (Strong)	0.05	0.31	[0.11, 0.50]
Singles	>	Gay, Lesbian, and Bisexual people	13.11 (Strong)	0.08	0.31	[0.10, 0.53]
Singles	>	Asexual people	3.81 (Moderate)	0.26	0.25	[0.06, 0.45]
Singles	>	Heterosexual people	2.12 (Anecdotal)	0.47	0.44	[0.05, 0.96]
Singles	>	People arbitrarily assigned to groups	0.05	21.42 (Strong)	0.03	[0.002, 0.15]

**Entitativity, perceived responsibility, and acceptability of prejudice (Hypotheses 10-12).** Next we examined the associations between entitativity, perceived responsibility and acceptability of prejudice across groups. The results of these analyses are presented in Table 3. Consistent with *H10*, greater entitativity was uniquely and positively associated with acceptability of prejudice across group types. Moreover, consistent with *H11*, greater perceived control was associated with increases in acceptability of prejudice across group types. Yet, inconsistent with *H11*, perceived motivation did not uniquely predict acceptability of prejudice across group types. However, consistent with *H11*, we found support for our hypothesized interaction between perceived responsibility (i.e., motivation X control) predicting acceptability of prejudice. When group membership was perceived as being within individual control, prejudice was deemed more acceptable to the extent that group members were perceived as desiring to be part of the group,  $b = 1.66$ ,  $SE = 1.09$ ,  $t = 85.18$ . However, when group membership was perceived as being outside of individual control, prejudice was deemed more acceptable to the extent that group members were perceived as not desiring to be part of the group,  $b = -4.03$ ,  $SE = 1.01$ ,  $t = 85.18$ . This interaction is depicted in the top panel of Figure 5.

Table 3

*Multilevel modeling results for the effects of entitativity, perceived control, perceived motivation, and perceived responsibility (motivation X control) on the acceptability of prejudice across group types.*

Acceptability of Prejudice Across Groups				
<i>Entitativity</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	29.72***	5.13	5.80	10.63
Slope	1.65*	0.66	2.51	469.99
Random Effects				
	Variance	<i>SD</i>		
	Component			
<i>u<sub>0i</sub></i>	65.49	8.09		
$\epsilon_{ij}$	1164.99	34.13		
<i>Perceived Control</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	23.27**	4.51	5.17	7.11
Slope	4.27***	0.66	6.50	686.84
Random Effects				
	Variance	<i>SD</i>		
	Component			
<i>u<sub>0i</sub></i>	67.03	8.19		
$\epsilon_{ij}$	1110.35	33.32		
<i>Perceived Motivation</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	35.24***	4.80	7.34	13.73
Slope	0.73	0.82	0.89	256.55
Random Effects				
	Variance	<i>SD</i>		
	Component			
<i>u<sub>0i</sub></i>	43.32	6.58		
$\epsilon_{ij}$	1171.52	34.23		
<i>Perceived Responsibility (Motivation x Control)</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	49.50***	6.31	7.85	38.04
Motivation Slope	-6.05***	1.34	-4.51	120.10
Control Slope	-2.26	1.71	-1.32	301.21
Motivation x Control Slope	1.38***	0.32	4.27	459.54
Random Effects				
	Variance	<i>SD</i>		
	Component			
<i>u<sub>0i</sub></i>	17.16	4.14		
$\epsilon_{ij}$	1093.14	33.06		

Note. \*\*\*p < 0.001, \*\*p < .01, \*p < .05

Finally, we examined whether perceptions of responsibility (motivation X control) predicted the acceptability of prejudice towards singles above and beyond their entitativity (*H12*). The results of this analysis are presented in Table 4. First, we fit a random intercept model with entitativity as the sole predictor of acceptability of prejudice towards singles. Singles' entitativity was negatively associated with acceptability of prejudice. As predicted, however, once the interaction between motivation and control was entered into the model, the slope between entitativity and acceptability of prejudice was no longer significant, indicating that perceived responsibility was a stronger predictor of acceptability of prejudice towards singles than their entitativity. The interaction between control and motivation for singles is depicted in the bottom panel of Figure 5.

Table 4

*Multilevel modeling results for the effects of entitativity and perceived responsibility (motivation X control) on the acceptability of prejudice towards singles.*

Acceptability of Prejudice Towards Singles				
<i>Entitativity</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	50.14***	3.90	12.87	10.63
Slope	-1.97*	0.42	-4.66	469.99
	Variance	<i>SD</i>		
Random Effects				
	Component			
<i>u<sub>0i</sub></i>	994.30	31.53		
<i>ε<sub>ij</sub></i>	336.90	18.36		
<i>Entitativity vs. Perceived Responsibility (Motivation X Control)</i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>
Fixed Effects				
Intercept	54.64 ***	4.99	10.96	394.36
Entitativity Slope	-0.92	0.68	-1.36	418.13
Motivation Slope	-4.01***	1.13	-3.54	405.84
Control Slope	-0.63	1.13	-0.56	398.24
Motivation x Control Slope	0.55*	0.24	2.37	403.10
	Variance	<i>SD</i>		
Random Effects				
	Component			
<i>u<sub>0i</sub></i>	930.80	30.51		
<i>ε<sub>ij</sub></i>	328.40	18.12		

Note. \*\*\*p < 0.001, \*\*p < .01, \*p < .05

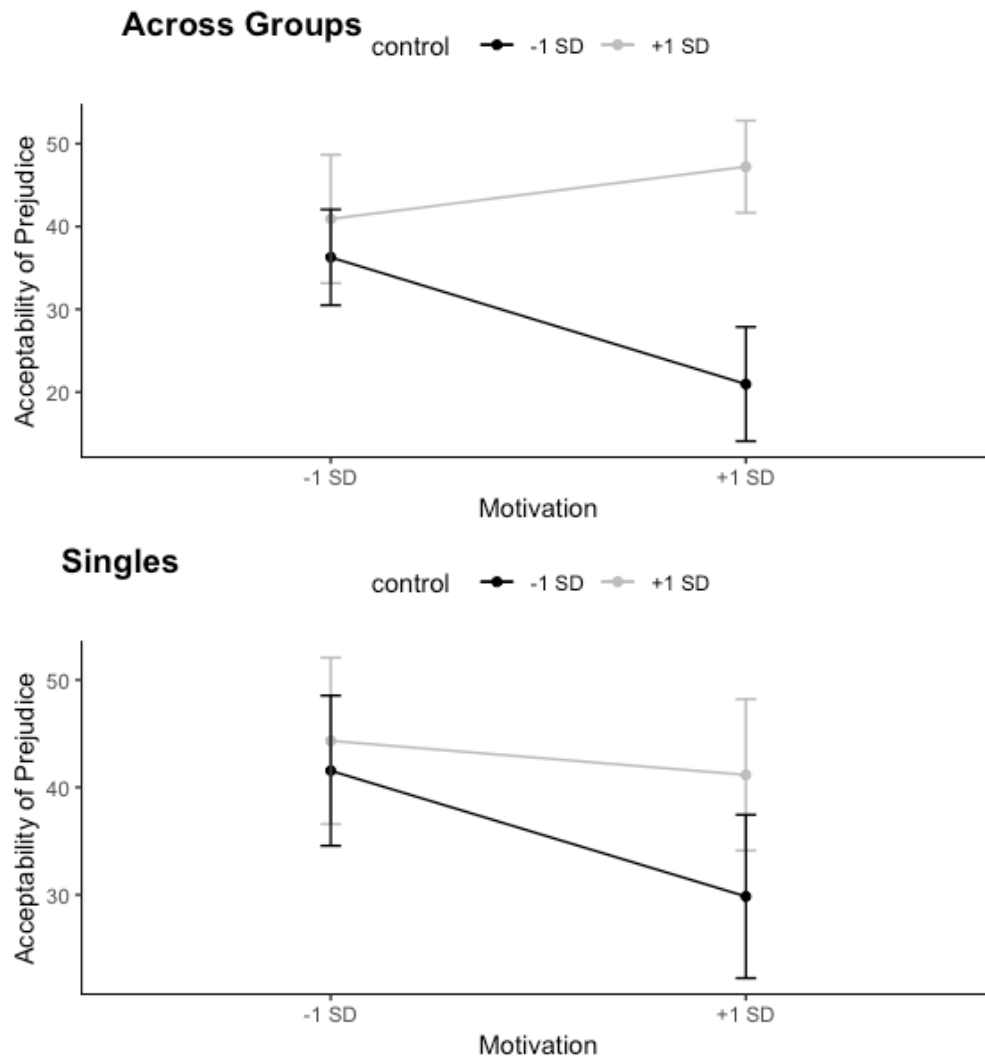


Figure 6. The interaction between control and motivation on acceptability of prejudice across groups (top panel) and towards singles (bottom panel).

## Brief Discussion

The results of Study 2 provide initial evidence that singles are *perceived* as a ‘group.’ As predicted, singles were perceived as more ‘group-y’ than people arbitrarily assigned to groups yet not nearly as ‘group-y’ as other more well-defined and established groups. Despite their relatively low entitativity, expressing prejudice towards singles was considered more acceptable than expressing prejudice towards other, more entitative groups. This finding appears to contradict past research, in which entitativity and prejudice have been positively associated for most groups (Agadullina & Lovakov, 2018), instead suggesting that the acceptability of expressing prejudice towards singles may stem from the cultural value placed on being single rather than their ‘group’ nature. Indeed, greater entitativity was associated with less acceptability of prejudice toward singles, suggesting that increasing perceptions of singles’ ‘group-y-ness’ may help to legitimize their status as a stigmatized group and their related experiences of prejudice.

Moreover, consistent with the attribution-value model of prejudice (Crandall et al., 2001), perceived responsibility was a stronger predictor of prejudice towards singles than their entitativity: When being single was perceived as being within individual control, perceived motivation to be single did not influence acceptability of prejudice towards singles. However, when being single was perceived as being outside of individual control, prejudice was deemed more acceptable to the extent that singles were perceived as not desiring to be part of the group. Together, these findings suggest that negative attitudes toward singles may be justified in part by their lack of entitativity as well as the belief that singles generally do not desire to be single.

## General Discussion

In light of the growing global population of singles (British Office for National Statistics, 2014; Pew Research Center, 2014; Statistics Canada, 2017; Statistics Netherlands, 2018; Statistics Norway, 2018), understanding their group nature and their experiences of prejudice and discrimination has never been more pertinent. Across two studies, we found evidence that singles both self-*identify* as a group (Study 1) and are *perceived* as a group by others (Study 2). In Study 1, singles' group identification was higher than their identification with an experimentally-assigned minimal group identity—the minimal threshold of group identification—but lower than their group identification with other, more established social identities such as those based on sexuality and nationality. The results of Study 2 mirrored these findings. Singles were perceived as higher in entitativity than people arbitrarily assigned to groups yet lower in entitativity than GLB people or Canadians. Together, these findings suggest that singles are indeed a 'group.'

Our findings further suggest that singles are a *stigmatized* group. Although we anticipated that the normalization of negative attitudes towards singles might lead singles to mis-label or under-detect discrimination towards their own single identity (Day et al., 2011; DePaulo & Morris, 2005), in actuality, singles are well aware of the discrimination they face. Indeed, singles were no less likely to perceive personal or group discrimination toward their single identity than toward their sexual orientation or national identity. Moreover, consistent with the attribution-value model of prejudice (Crandall et al., 2001; Crandall & Martinez, 1996), prejudice towards singles had more to do with people's beliefs about individual singles' ability and desire to un-single themselves rather than their perceived group-y-ness per se.

## Implications

By adopting a group-based perspective, this research offers insight into the current and future stigmatization and well-being of singles. Even though prejudice towards singles may be more ideologically-rooted, singles' group-y-ness may offer a potential clue for reducing prejudice towards singles. Because singles' entitativity was inversely associated with the acceptability of expressing prejudice toward them, increasing singles' entitativity may serve to legitimize singles' status as a group, perhaps allowing prejudice towards singles to appear less warranted. The steadily declining prevalence of negative attitudes towards GLB people and other sexual minority identities (Fetner, 2016) offers one example of how increasing group-y-ness (e.g., through group-affirming movements like Pride or through campaigning and protesting for legal rights and protections) may help to combat prejudiced attitudes over time. Similar kinds of movements among singles may also improve the status of single people.

Our findings also provide insight into the unique intergroup context between singles and people in romantic relationships. For instance, the relatively 'group-y-er' nature of people in relationships may reinforce the existing status hierarchy that simultaneously favors partnered people and permits the stigmatization of singles (e.g., DePaulo & Morris, 2005; Greitemeyer, 2009). Accordingly, romantic relationships may be more appealing to individuals, in part, because they offer a greater sense of identity and belonging to a group that is also culturally valued. Perhaps if singles were perceived as equally or more 'group-y' than people in romantic relationships, then singles might be more inclined to identify with other singles (Reimer et al., 2017) and being single may not be as lonely of an experience (Bruckmüller, 2013).

## Limitations and Future Directions

Although our sequential sampling strategy with Bayes Factors allowed us to efficiently acquire evidence for (or against) our hypotheses, it resulted in relatively small sample sizes for both Study 1 and Study 2, which may have influenced the representativeness of our samples. The small sample of singles ( $n = 197$ ) in Study 1, in particular, may explain why our exploratory taxometric analyses revealed the structure of group identification among singles to be dimensional rather than categorical. Despite this limitation, the results of our latent profile analysis offer some tentative insight into the potential diversity of singles' experiences. For instance, despite being equally likely to perceive (and ostensibly experience) discrimination, the high-identifying singles in our study reported being quite satisfied with being single whereas the central-but-otherwise-low identifying singles were much less happy about being single. Thus, group identification may be another social-psychological factor, along with avoidance goals (Girme, Overall, Faingataa, & Sibley, 2016) and attachment style (Pepping & MacDonald, 2019) influencing singles' well-being. Future research should investigate this possibility using a broader and more diverse sample of singles.

Moreover, we did not explore potential moderators of singles' experiences of discrimination and prejudice. Past research hints that other aspects of singles' identities (e.g., gender, age/life stage, ethnicity, sexual orientation, and length of time being single) may also affect their group identification with other singles, as well as their day-to-day well-being and experiences of discrimination. For instance, being single tends to be more normative among African American and GLB people (Engram & Lockery, 1993; Herek, 2006), which may encourage stronger group identification, and perhaps lessen or change the nature of single-specific discrimination and strain (Pudrovska, Schieman, & Carr, 2006). Likewise, other

qualitative research suggests that young, affluent women are more content with their single identity and more likely to frame being single as a positive, self-enhancing state compared to women of lower socio-economic status (Bay-Cheng & Goodkind, 2016). Future research should continue to consider the various intersections of identity that might affect singles' group identification, well-being, and experiences of discrimination.

Finally, by demonstrating that both singles and people in relationships self-identify and are perceived as 'groups' by others, our findings offer a more definitive response to the long-standing debate regarding whether close relationships, particularly those composed of two people, can be considered a group (e.g., Moreland, 2010; Williams, 2010) and, in doing so, opens the door for exciting new directions for future research. For instance, do group norms form and influence singles or partners in a romantic relationship? Could positive illusions about one's romantic partner(s) be explained by in-group favoritism? Our findings also demonstrate that despite the arguably more ephemeral nature of relationship status (Moreland, 2010), singles still identify with and are perceived as having the properties of a group. As such, various group processes may help make sense of singles' experiences. For example, group-based processes such as assimilation to group norms, depersonalization and self-stereotyping, and/or conformity to negative cultural stereotypes may help to explain the oft-observed poor well-being of singles. Our research sets the stage for these and other conceptual considerations related to the study of close relationships as groups.

## **Conclusion**

Ultimately, our research is among the first to provide evidence that singles both identify and are perceived as a group while also demonstrating some of the ways in which singles differ from other more traditionally recognized social identities and groups—a necessary first step

towards addressing singlism and developing targeted interventions to improve singles' well-being. In this way, we hope our findings will set the stage for future theoretical considerations of relationship statuses as groups and that future research will continue to shed light on singles' experiences of stigmatization and well-being.

### Footnotes

<sup>1</sup> JASP uses numerical approximations for estimating Bayes Factors, which, without substantively altering our conclusions, will affect the exact reproducibility of our reported results (<https://github.com/jasp-stats/jasp-desktop/issues/1347>).

<sup>2</sup> The honesty check question was left out of the first wave of data collection ( $n = 50$ ) but, with the approval of the Action Editor, was added to subsequent waves.

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## Chapter 5: Manuscript #2 — Singlehood and Psychological Attunement to Friendships

The previous manuscript established that singles have a relatively low level of group belonging compared to other groups (path  $a \times c$ ), which I propose could explain the poorer well-being of singles compared to married people. Fortunately for singles, there may be another potential pathway to well-being: the pathway through interpersonal belonging (path  $b \times d$ ). In this next manuscript, I examine the evidence for this pathway by investigating the extent to which singles psychologically attune to their friendships to maintain their well-being.

Friendships are one of the earliest and most important developmental relationships (Harris & Vazire, 2016). They are also essential for well-being. For example, spending time with friends is linked to greater feelings of happiness; even greater happiness than spending time with family or colleagues (Mueller et al., 2019). Close, supportive friendships are also linked to better health and longevity (Cohen, 2004; de Leon, 2005). For example, frequent in-person contact with friends decreases stress (Fuller-Iglesias, Webster & Antonucci, 2013; van der horst & Coffe, 2012). Finally, friendships are also intrinsically rewarding, offering a vital source of trust, support, belonging, and life meaning (de Leon, 2005). Given these potential benefits, friendships are likely to be an important source of well-being for singles.

Moreover, the absence of a long-term romantic bond may necessitate the need for singles to rely more heavily on friends to support their well-being compared to partnered people. Thus, it follows that unsupportive or poor-quality friendships may be especially detrimental to singles' well-being. Nonetheless, past research suggests that singles are generally very well-connected to their friends and families (Sariskian & Gerstel, 2016). Furthermore, the singles who are especially likely to thrive are those who build 'families' of close friends to support their emotional, social, and sometimes even financial needs (Bellotti, 2008). Based on these findings, I

expect that singles will psychologically depend upon and invest in their friendships to meet their belongingness needs, and that they will do so to a greater extent than do people in romantic relationships. If proven, this tendency for singles to draw closer to their friendships will highlight a point of resiliency among singles and help to demonstrate that it is not necessarily a lack of interpersonal belonging from close relationships that explains their poorer well-being. The following manuscript has been submitted for publication (citation below).

Fisher, A.N., Stinson, D.A., Wood, J.V., Holmes, J.G. & Cameron, J.J. (under review).

Singlehood and psychological attunement to friendships. Submitted for review on May 27<sup>th</sup>, 2020.

### Abstract

Romantic relationships involve a process of psychological attunement whereby the self shifts to prioritize and incorporate the romantic partner, which benefits relationship quality and bolsters belonging. Yet some people are romantically single, raising the question: Do single people also exhibit psychological attunement? In a two-year longitudinal study of young adults ( $N = 279$ ), we test the hypothesis that singles psychologically attune to their friendships. Multilevel modeling revealed that within-person fluctuations in friendship quality predicted within-person fluctuations in self-esteem, and this association was stronger for singles than for partnered people. A cross-sectional mediation analysis also revealed that singles invested more in their friendships than partnered people, which in turn predicted greater friendship quality and self-esteem over time. Finally, singles maintain their friendship quality over time while partnered people experience declines. Taken together, these results suggest that singles' psychological attunement to their friendships may benefit their well-being and bolster their belongingness over time.

WORD COUNT: 150

### **Singlehood and Psychological Attunement to Friendships**

“I am someone who is looking for love. Real love. Ridiculous, inconvenient, consuming, can’t-live-without-each-other love.”

“Friendships don’t magically last forty years... you have to invest in them”

– Carrie Bradshaw, *Sex and the City*

Idealized notions of romantic love and coupledness are ubiquitous. As reflected in the first quote, above, popular songs, poems, TV shows, and movie scripts emphasize the all-consuming nature of romantic love. Indeed, the romantic bond is revered by the general public and experts alike (Fingerman & Hayes, 2002). This reverence is not unearned. High-quality romantic relationships provide a wealth of benefits including a steady source of entertainment and joy, a secure base from which to explore, and a confidant in times of trouble (see Finkel, Simpson & Eastwick, 2017 for a review).

Yet, not everyone has a romantic partner, either by choice or by circumstance, and many people spend the majority of their lives without one (i.e., single; DePaulo, 2006). About half of the population in Canada, the US, and the UK is currently single (i.e., unmarried; British Office for National Statistics, 2014; Pew Research Center, 2014; Statistics Canada, 2018). Despite this reality, psychological scientists have largely ignored the single experience (e.g., DePaulo & Morris, 2005). In the current research, we take steps towards addressing this critical oversight by investigating how singles meet their belongingness needs in a world that prioritizes romantic relationships.

### **Belongingness and Psychological Attunement in Romantic Relationships**

Humans possess a deep-rooted need to belong that drives them to pursue and invest in high-quality, long-term, mutually caring relationships (Baumeister & Leary, 1995). Within a

culture that prioritizes the romantic bond, it is unsurprising that many people meet their need to belong, in part, by seeking and working to maintain high quality romantic relationships (Gere et al., 2013). In such a culture, it is also unsurprising that psychologists have devoted considerable time and energy to understanding the psychological adaptations that people possess to facilitate their romantic belongingness goals (Finkel et al., 2017).

Many of these psychological adaptations amount to a fundamental shifting of the self to incorporate the romantic partner and prioritize the romantic bond, a process that we call *psychological attunement*. For example, when people fall in love, the attachment system shifts to focus on the beloved, who often becomes the primary attachment figure (Hazan & Shaver, 1987). As intimacy grows, romantic partners may come to include the other in the self by incorporating the traits and experiences of their ‘other half’ into their own self-concept (Aron et al., 2013). Lovers may also psychologically invest in their relationship by envisioning all of the ways in which their life and their outcomes depend on their romantic relationship (Rusbult, Martz, & Agnew, 1998).

Psychological attunement to important relationships, including romantic bonds, is particularly evident in the functioning of the self-esteem system, which is the primary focus of our research. The self-esteem system is thought to have evolved to serve the need to belong (Leary & Baumeister, 2000; Stinson et al., 2010). It accomplishes this goal by closely monitoring the social world for cues of acceptance and rejection and using this information to form an internal appraisal of one’s relational value (i.e., global self-esteem). Then, using this internal appraisal as a guide, the self-esteem system motivates behaviors to regulate belonging. The self-esteem system is thought to accomplish these functions, in part, by *attuning* to important relationships, including the romantic bond (Anthony, Holmes, & Wood, 2007; Hoplock, Stinson,

Marigold, & Fisher, 2019). For example, high quality romantic relationships enhance self-esteem over time whereas poor quality romantic relationships undermine self-esteem (Harris & Orth, 2019). Those who derive self-esteem benefits from their romantic relationships also exhibit relationship-enhancing processes like positive illusions and psychological attachment, which help to maintain this rewarding relationship (Murray, Holmes, & Griffin, 2000; Murray, Rose, Bellavia, Holmes, & Kusche, 2002). Accordingly, for those who have them, romantic bonds offer a reliable source of self-esteem and belonging.

Psychological attunement and the resulting boost to belonging that it brings may be beneficial to people in relationships (i.e., *partnered people*). A large body of research demonstrates that partnered people who exhibit the characteristics of psychological attunement feel more satisfied and connected to their romantic partner, and enjoy additional benefits such as self-growth (Dys-Steenbergen, Wright, & Aron, 2016), life meaning (Murray, Lamarche, & Seery, 2018), and better health (Frost & Forrester, 2013; Lawrence et al., 2019). So partnered people's psychological attunement to their romantic bonds is seemingly adaptive, directly benefiting their belongingness and indirectly benefitting their health and well-being. Yet these benefits of psychological attunement raise the question: Do single people also exhibit psychological attunement to the important relationships in their lives?

### **Singlehood and Psychological Attunement to the Friendship Bond**

As illustrated by the second quote that opened this manuscript, singles are renowned for their friendships, and so we propose that singles psychologically attune to the friendship bond.

Although the friendship bond has been vastly understudied relative to the romantic bond (Harris & Vazire, 2016), there is some evidence that singles rely on their friendships to meet their need to belong. Singles have more friends than partnered people (Gillespie, Lever,

Frederick, & Royce, 2015), and they are more likely to keep in touch with and exchange support with their friends compared to their coupled counterparts (Sarkisian & Gerstel, 2016).

Furthermore, people generally incorporate their dearest friends into their own self-concept (Thai & Lockwood, 2015) and hold positive illusions about their friends' traits (Boucher, 2014). Some may even develop an attachment bond with their friends, a tendency that is especially apparent among singles (Brumbaugh, 2017). Positive friendships can also benefit psychological health and well-being (Deci et al., 2006; Sun, Harris, & Vazire, 2019). Together, this body of research leads us to propose and test two key hypotheses:

*Hypothesis 1: Singles are psychologically attuned to their friendships.*

*Hypothesis 2: Singles' psychological attunement to their friendships positively predicts well-being.*

## **Research Overview**

We test our hypotheses using seven waves of data collected from emerging adults during the first two years of their university experience. University is a time when young adults are striking out on their own and forming new friendships and relationships (Rawlins, 1992). Thus, emerging adulthood may be a time when psychological attunement to friendships is particularly important for singles.

We test our hypotheses concerning singles' psychological attunement to friendship in a few different ways. First, we examine how closely self-esteem tracks within-person fluctuations in friendship quality over time, and we examine how the strength of this measure of attunement varies as a function of participants' relationship status – either single or partnered. We expect that within-person fluctuations in friendship quality will be positively associated with within-person fluctuations in self-esteem for everyone, but consistent with Hypothesis 1 (H1), we

expect that this association will be stronger for singles than for partnered people. For comparison purposes, we will also examine whether relationship status moderates the attunement of self-esteem to fluctuations in family quality over time.

We also examine whether singles' psychological attunement to their friendships predicts benefits to their psychological and relational well-being over time. Consistent with Hypothesis 2 (H2), we expect that singles' attunement to their friendships will predict greater investment in their friendships, relative to partnered people, which in turn will predict improvements in friendship quality and self-esteem over time. Moreover, given the psychological and behavioral adaptations that are thought to follow from singles' greater psychological attunement to friendship, we expect that singles' friendship quality will maintain or increase over time whereas partnered people's friendship quality will decrease over time.

Taken together, our research will not only reveal the process of psychological attunement to friendships, but also demonstrate how this attunement may change depending on one's relationship status. Our research therefore stands to illuminate yet another way in which the self and the self-esteem system function to optimize individual belonging (e.g., Anthony et al., 2007). Ultimately, then, our research will advance scientific understanding of singlehood, friendship, and belonging by providing necessary and nuanced insight into how belongingness needs are met outside of a romantic relationship.

## **Methods**

All measures and some additional analyses are reported in the online supplemental materials (OSM), which are available on the Open Science Framework: [blinded URL for review [https://osf.io/seuxd/?view\\_only=237a3144e2a54d5784a6c793cbfa4b59](https://osf.io/seuxd/?view_only=237a3144e2a54d5784a6c793cbfa4b59)]

## Participants and Procedure

Participants were first-year university students taking part in a two-year longitudinal study of early adult life.<sup>1</sup> We analyze data from seven of 10 waves of internet-based data collection because each of these waves included measures that were relevant to our hypotheses. In total, 279 participants completed Wave 1 (80.29% women, 19.71% men; 44% partnered, 56% single,  $M_{age} = 18.79$  years,  $SD_{age} = .71$ ). Approximately two years later, 98 of these participants completed Wave 7 (80.61% women, 19.39% men, 59.18% partnered, 40.82% single,  $M_{age} = 21.04$ ,  $SD_{age} = .69$ ). Participants received partial course credit for participating in the initial recruitment phase of the study and had their names entered in a draw for prizes each time they completed a wave of data collection.

These data were collected before current norms for sample sizes and power were adopted, but the researchers recruited as many participants as possible during a two-year period.

## Measures

**Relationship status.** At each Wave, participants reported whether they were in a romantic relationship (1 = *yes*, 0 = *no*).

**Friendship quality.** At each Wave, participants used a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) to indicate their comfort being close to their friends, their relational doubts about their friendships (reverse-coded), and general friendship satisfaction. These items were averaged to form a composite measure of *friendship quality* (average  $\alpha$  across waves = .71).

**Family relationship quality.** At each Wave, participants used the same scale to indicate their comfort depending on their family, their relational doubts about their family relationships

(reverse-coded), and satisfaction with their relationship with their parents. These items were averaged to form a composite measure of *family relationship quality* (average  $\alpha = .74$ ).

**Self-esteem.** At each Wave, participants used the same 7-point scale to indicate their agreement with a four-item version of Rosenberg's Self-Esteem Scale (1965; average  $\alpha = .73$ ).

**Friendship investment.** During Wave 5 only, participants used the same 7-point scale to indicate their agreement with four items tapping investment in their friendships, adapted from Rusbult and colleagues' (1998) Investment Model of Commitment (e.g., "I have put a great deal into my friendship that I would lose if my friendship were to end."). These items were averaged to form a composite measure of *friendship investment* ( $\alpha = .84$ ).

## Results

### Preliminary Analyses

Participants who completed all seven waves did not differ from those who completed only Wave 1 in terms of self-esteem, friendship quality, or family relationship quality. Because it predicted many of the variables in our models, we controlled for gender (0 = woman, 1 = men) in the analyses that follow (however, gender did not moderate any of the results we report). See the OSM for descriptive statistics and additional analyses.

### H1: Singles Are Psychologically Attuned to Their Friendships

We tested H1 using multi-level modeling. Using this approach, a stronger association over time between within-person fluctuations in self-esteem and within-person fluctuations in friendship quality reflects a higher degree of attunement between self-esteem and friendship quality. This approach allows us to evaluate three pieces of evidence concerning singles' psychological attunement to their friendships. First, we can determine whether people's self-esteem is attuned to friendship quality, and we can characterize the magnitude of the attunement

effect. Second, we can compare people's psychological attunement to their friendships when they are single vs. when they are in a romantic relationship, which will reveal whether the self-esteem system dynamically shifts focus as opportunities for belongingness change. We predict that people's self-esteem will be more strongly attuned to friendship quality when they are single compared to when they are in a romantic relationship. Third, we can compare and contrast the attunement of self-esteem to friendships and family relationships as a function of relationship status, to explore whether single people are more attuned to multiple non-romantic relationships, or just friendships.

To test these hypotheses, first we used the nlme multilevel modeling package (Pineiro et al., 2020) in R to examine the within- and between-person associations between friendship quality and self-esteem at any given time-point (i.e., collapsing across waves). We restructured the data such that each participant had up to seven rows in the dataset (one for each possible Wave of data collection). We used Full Maximum Likelihood estimation for this and all subsequent similar analyses. This method minimizes bias by using all of the available information to estimate the model parameters (Raudenbush & Bryk, 2002), and allows for missing data at the within-person level (Level 1) but not the between-person level (Level 2). Cases with completely missing data at Level 1 are dropped during analysis using list-wise deletion. Because waves were nested within participants, we included participant ID as a random effect in all models. Partial effect sizes were obtained by calculating the  $R^2$  for individual predictors (Edwards et al., 2008).

We entered time in study (measured in years), relationship status, two indices of friendship quality, and the interaction between relationship status and each friendship quality index into a model predicting self-esteem. We included both the average friendship quality for

participants over the course of the study (i.e., person mean [PM] friendship quality) as well as each participant's deviation around their own mean level of friendship quality (i.e., person-mean centered [PMC] friendship quality) as predictors. By including both indices of friendship quality in our model, we can assess between- and within-person associations between self-esteem and friendship quality as a function of relationship status, independent of time in study. This approach will allow us to observe the attunement of self-esteem to friendship quality (i.e., within-person associations) independent of any general, between-person association between self-esteem and friendship quality that may exist.

The results are presented in Table 5. Between-person friendship quality (i.e., PM friendship quality) was positively associated with self-esteem, such that participants with friendship quality that was above the sample average also had self-esteem that was above the sample average ( $R^2 = 0.17$ ; 17% of variance explained). However, as predicted, within-person increases in friendship quality (i.e., PMC friendship quality) also predicted within-person increases in self-esteem ( $R^2 = 0.05$ ; 5% variance explained), and relationship status moderated this attunement effect ( $R^2 = 0.005$ ; 0.5% variance explained). As detailed in the bottom two panels of Table 5, people's self-esteem was more strongly attuned to their friendships when they were single ( $b = .29$ ) than when they were partnered ( $b = .17$ ). This means that compared to partnered people, single people's self-esteem was more responsive to fluctuations in their friendship quality over time. Additional analyses revealed that our measures of friendship quality and self-esteem did not differ in terms of their reliabilities or their range for singles versus partnered people. We can therefore be reasonably sure that this observed difference in attunement is not a methodological artifact.

Table 5. Self-esteem as a function of between- and within-person friendship quality and relationship status

Fixed Effects	Dependent variable: Self-Esteem (All Participants)				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	95% <i>CI</i>
Intercept	1.81***	0.35	5.14	857	1.12, 2.50
Time in Study	0.09**	0.04	2.60	857	0.02, 0.16
Gender	0.36**	0.14	2.67	273	0.10, 0.63
Relationship Status	0.40	0.36	2.66	273	-0.31, 1.10
PM Friendship Quality	0.58***	0.06	9.28	273	0.45, 0.70
PMC Friendship Quality	0.30***	0.04	7.04	857	0.22, 0.39
Relationship Status * PM Friendship Quality	-0.02	0.06	-0.49	857	-0.15, 0.10
Relationship Status * PMC Friendship Quality	-0.13*	0.06	-2.06	857	-0.25, -0.01
Fixed Effects	Dependent variable: Self-Esteem (Single Participants)				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	95% <i>CI</i>
Intercept	1.66***	0.40	4.10	373	0.87, 2.45
Time in Study	0.02	0.05	0.39	373	-0.09, 0.13
Gender	0.46**	0.17	2.72	190	0.13, 0.78
PM Friendship Quality	0.60***	0.07	8.47	190	0.46, 0.74
PMC Friendship Quality	0.29***	0.04	6.58	373	0.21, 0.38
Fixed Effects	Dependent variable: Self-Esteem (Partnered Participants)				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	95% <i>CI</i>
Intercept	2.28***	0.39	5.87	392	1.52, 3.05
Time in Study	0.14**	0.5	2.66	392	0.04, 0.24
Gender	0.32	0.19	1.73	173	-0.04, 0.69
PM Friendship Quality	0.53***	0.07	7.80	173	0.40, 0.67
PMC Friendship Quality	0.17***	0.04	3.78	392	0.08, 0.25

Note. PM = Person Mean, PMC = Person-Mean Centered, \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

Next, we substituted between and within-person family relationship quality for friendship quality in the original model. Results are presented in Table 6. A main effect of relationship status revealed that partnered people had higher self-esteem than single people ( $R^2 = 0.005$ ; 0.5% variance explained). A main effect of between-person family relationship quality (i.e., PM family quality) revealed that people with family quality that was above the sample average also had self-esteem that was above the sample average ( $R^2 = 0.12$ ; 12% variance explained). However, in contrast to the results for friendship quality, within-person changes in family quality (i.e., PMC family quality) did not predict within-person changes in self-esteem, nor did relationship status interact with either indicator of family quality. These results suggest that among this sample of emerging adults, self-esteem was not attuned to family relationship quality.<sup>2</sup>

Table 6. Self-esteem as a function of between- and within-person family relationship quality and relationship status

Fixed Effects	Dependent variable: Self-esteem				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	95% <i>CI</i>
Intercept	2.09***	0.41	5.12	859	1.29, 2.89
Time in Study	0.09*	0.04	2.30	859	0.01, 0.16
Gender	0.23	0.14	1.57	274	-0.05, 0.51
PM Family Relationship Quality	0.49***	0.07	7.23	274	0.36, 0.62
PMC Family Relationship Quality	0.06	0.06	1.12	859	-0.17, 0.15

Note. PM = Person Mean, PMC = Person-Mean Centered, \*\*\* $p < .001$ . \* $p < .05$ .

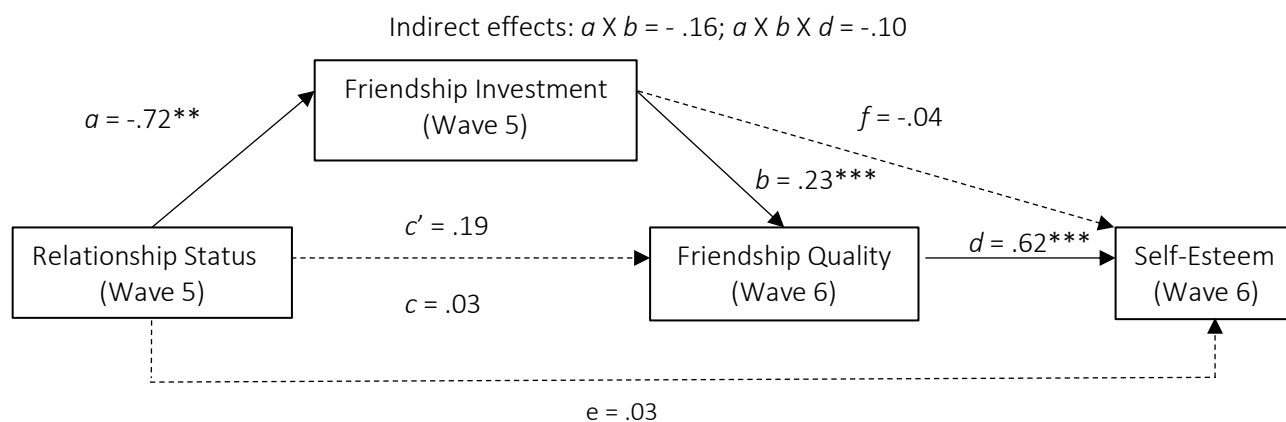
## H2: Singles' Psychological Attunement to Their Friendships Positively Predicts Well-Being

**Friendship investment and well-being.** Because they are more attuned to their relationships, we propose that singles will be more invested in their friendships than partnered people. *Investment* is the degree to which two people's lives become psychologically bound to one another, and it is an important determinant of relationship commitment (Rusbult & Buunk, 1993). Greater friendship investment, in turn, should positively predict friendship quality and self-esteem over time. The results of our analyses testing this model are presented in Figure 7. Because our data set included measures of friendship investment only at Wave 5, we tested this mediation model using a measure of relationship status at the same timepoint (Wave 5), and measures of friendship quality and self-esteem at the subsequent timepoint (Wave 6). We used hierarchical linear regression to derive the path co-efficients in Figure 1, and we used Hayes' (2013) PROCESS Macro in SPSS to estimate the indirect effects in our model (Model 6 with 5000 bootstrap estimates).<sup>3</sup>

As expected, single participants were more invested in their friendships than partnered participants at Wave 5,  $b = -.72$ ,  $B = -.23$ ,  $SE = .27$ ,  $t(126) = -2.66$ ,  $p = .009$  (i.e., path *a* in Figure 7). Furthermore, people who were more invested in their friendships at Wave 5 reported better friendship quality at Wave 6, nearly two months later,  $b = .23$ ,  $B = .30$ ,  $SE = .07$ ,  $t(125) = 3.42$ ,  $p < .001$  (i.e., path *b* in Figure 1). The indirect path from relationship status to friendship quality via friendship investment was also present,  $b = -.16$ ,  $SE = .08$ ,  $95\% CI [-.33, -.03]$ , (i.e., path *a X b* in Figure 7). Thus, singles' greater investment in their friendships predicted better friendship quality than their partnered peers. In turn, and consistent with the results of the multi-level modeling we reported previously, greater friendship quality at Wave 6 predicted higher self-esteem at the same timepoint,  $b = .62$ ,  $B = .59$ ,  $SE = .08$ ,  $t(123) = 7.67$ ,  $p < .001$  (i.e., path *d* in

Figure 7). The indirect path from relationship status to self-esteem via friendship investment and friendship quality was also present,  $b = -.10$ ,  $SE = .05$ ,  $95\% CI [-.21, -.02]$ , (i.e., path  $a \times b \times d$  in Figure 7), indicating that singles' investment in their friendships was associated with benefits for their friendship quality and self-esteem over time.<sup>4</sup>

Additional analyses testing alternative versions of this model are reported in the OSM.



*Note.* The model also included gender as a control variable. Dotted lines are not statistically significant.

Figure 7. Mediation model describing the associations among relationship status, friendship investment, friendship quality, and self-esteem.

**Friendship quality over time.** The results that we have reported so far indicate that, relative to partnered people, singles' self-esteem is more dependent on their friendship quality and singles invest more in their friendships. If psychological attunement functions, in part, to help motivate people to work at maintaining important relationships that can meet their belongingness needs, then differences in attunement to friendships should predict differences in the trajectory of single and partnered people's friendship quality over time. Specifically, singles' greater psychological attunement to their friendships should predict maintenance or improvement of their already high-quality friendships over time, whereas partnered people's weaker

psychological attunement to their friendships should predict decreases in friendship quality over time. In contrast, because relationship status does not predict attunement to family relationship quality, we should not observe group differences in the trajectory of family quality over time.

To test these hypotheses, we used the same multilevel modeling package in R that we described previously. We tested two models in which friendship quality and family quality were regressed onto gender, relationship status, time in study, and the interaction between time and relationships status; we also included participant ID as a random effect. This model allows us to examine whether the slopes of change in friendship quality and family quality over time are different from zero (i.e., does relationship quality change over time?) and whether the slopes are different for single and partnered people. We also tested a model for partnered people in which romantic relationship quality was regressed onto gender and time in the study, which will allow us to compare any observed changes in partnered people's friendship quality over time to potential changes in romantic relationship quality over time.

Results for these three models are presented in Table 7. As indicated by the relationship status effect for friendship quality, partnered people had higher friendship quality than single people at the beginning of the study period. However, there was also an interaction between relationship status and time in study ( $R^2 = 0.008$ ; 0.8% variance explained). Among single participants, friendship quality remained stable or even tended to increase over time,  $b = .09$ ,  $SE = .06$ ,  $t(871) = 1.45$ ,  $p = .15$ . In contrast, and as expected, friendship quality decreased over time among partnered participants,  $b = -.16$ ,  $SE = .06$ ,  $t(871) = -2.50$ ,  $p = .01$ .

Family quality increased over time for everyone ( $R^2 = 0.01$ ; 1% variance explained), regardless of their relationship status and, for people in relationships, romantic quality did not

change over time. Together, these findings suggest that relationship status uniquely predicts the trajectory of young adults' friendship bonds.

Table 7. Friendship quality (top), family relationship quality (middle), and romantic relationship quality (bottom) over time as a function of relationship status

Dependent variable: Friendship Quality					
Fixed Effects	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	<i>95% CI</i>
Intercept	5.45***	0.08	68.18	871	5.29, 5.60
Gender	-0.28	0.15	-1.91	274	-0.57, 0.01
Time in Study	0.09	0.06	1.46	871	-0.03, 0.22
Relationship Status	0.31***	0.09	3.58	871	0.14, 0.49
Time in Study *Relationship Status	-0.25**	0.09	-2.82	871	-0.42, -0.08
Dependent variable: Family Relationship Quality					
Fixed Effects	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	<i>95% CI</i>
Intercept	5.87***	0.07	85.15	875	5.72, 6.02
Gender	-0.12	0.14	-0.86	275	-0.41, 0.16
Time in Study	0.11*	0.06	1.98	875	0.001, 0.23
Relationship Status	0.05	0.07	0.70	875	-0.09, 0.19
Time in Study *Relationship Status	0.03	0.07	0.40	875	-0.12, 0.18
Dependent variable: Romantic Relationship Quality					
Fixed Effects	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	<i>95% CI</i>
Intercept	6.04***	0.06	96.99	398	5.24, 5.53
Gender	-0.24	0.14	-1.69	398	-0.52, 0.04
Time in Study	-0.03	0.05	-0.79	398	-0.57, 0.57

Note. \*\*\* $p < .001$ . \*\* $p < .01$ . \* $p < .05$ .

## Discussion

We expected that singles would exhibit psychological attunement to their friendships. Consistent with this proposal, our longitudinal multilevel modeling analyses revealed that within-person fluctuations in friendship quality were positively associated with within-person fluctuations in self-esteem, and this association was stronger when people were single than when they were in a relationship. In keeping with past research concerning singlehood and attachment (Umemura et al., 2017), this effect of relationship status was present for friendships but not for family relationships. These results support and extend past research demonstrating the contextual sensitivity of self-esteem and belonging (Adamczyk, 2018; Anthony et al., 2007) and provide novel evidence that the self-esteem system attunes to the specific relationships that are most likely to offer a sense of belonging given an individual's particular relational context. Our cross-sectional mediation analysis also demonstrated that singles were more invested in their friendships than partnered people, and greater investment predicted greater friendship quality and self-esteem over time. Furthermore, whereas partnered people's friendship quality decreased over a two-year period, singles' friendship quality remained stable over the course of the study. Thus, our results suggest that singles' psychological attunement to their friendships may have downstream benefits for their psychological and relational well-being.

Our findings also have implications for partnered people's psychological and relational well-being. Despite beginning the study with higher quality friendships than singles, partnered people's friendship quality declined over the course of the study, possibly because they were less invested in their friendships. The all-consuming nature of romantic love (Finkel, 2017; Coontz, 2005) may draw partnered people's attention away from their friendship bonds, resulting in the decline of these important bonds over time. This possibility is worrisome given that most young

adults' romantic relationships will end sooner than later (Macskassy, 2013). Thus, young adults who experience a romantic break up may suffer double blows to their well-being as they contend with the pain of a breakup and the realization that their friendships lack the closeness they once had. Unfortunately (or fortunately!), breakups were not frequent enough in our study to test this possibility. Still, our research not only provides a more holistic and nuanced understanding of the oft-overlooked experiences of singles, but also highlights a potential pitfall of prioritizing romantic love over friendships during emerging adulthood.

### **Questions That Remain**

**What is the direction of causation among self-esteem, investment, and friendship quality?** Because our data was correlational, we cannot make causal claims about the association between psychological attunement and friendship quality. The results of our mediation analyses are consistent with the sociometer model of self-esteem (Leary & Baumeister, 2000), which proposes that self-esteem is an internal reflection of the quality of one's social bonds. By this account, investing in one's friendships not only improves the quality of those friendships but also benefits the self. However, the reverse pathway is also possible. Risk regulation theory (e.g., Murray et al., 2006) suggests that people with higher self-esteem prioritize connection goals and engage in relationship-enhancing behaviors that deepen their investment and strengthen their relationships. In either case, self-theorists acknowledge that self-esteem is both a reflection of the quality of one's relationships and a motivational and behavioral guide. Thus, it is probable that psychological attunement is a self-reinforcing and recursive process. Singles' attunement to their friendships may lead them to invest more in those relationships, which may yield interpersonal rewards like increasing friendship quality and personal rewards like increasing self-esteem, which in turn may strengthen psychological attunement, leading to greater investment, and so on.

Thus, psychological attunement and feelings of belongingness may form a feedback loop that ultimately supports well-being. Future research should explore these possibilities.

**Are these results specific to university students?** Participants in the current research were recruited during their first six months at university, which is a time of great social and personal upheaval (Adamczyk, 2016). Moving to a new school or city and leaving old friends and relationships behind may heighten the salience and importance of both friendships and romantic relationships for belonging. So our results may not generalize to other life stages, especially ones that offer more stability. However, we suspect that psychological attunement to friendships is important for belonging at any age, especially for singles. Past research highlights the wellbeing benefits of friendships across the lifespan, and especially in late life (Chopik, 2017; Deci et al., 2006). Nonetheless, future research should examine the process and patterns of psychological attunement to friendships as they unfold across the life course.

**What about investment behaviors?** Typically, psychological investment is accompanied by relationship-enhancing behaviors like accommodation, responsiveness, and willingness to sacrifice (Rusbult et al., 1994; Wieselquist et al., 1999). Unfortunately, the current research did not include behavioral measures of investment, nor do we have partner or friend reports of participants' behavior. So we cannot determine whether the processes we observed are "in the head" phenomena, primarily involving participants' feelings and perceptions, or whether singles' psychological attunement to their friendships translates into observable behavior. We suspect that it is the latter. Although it is possible that people possess adaptive psychological mechanisms that are specific to their romantic relationships, we suspect that psychological attunement is a more general adaptation aimed at helping people to meet their need to belong no matter their romantic relationship status. Thus, we suspect that singles' investment in their

friendships is qualitatively similar to partnered people's investment in their romantic relationship. Future research should test whether this is true.

## **Conclusions**

Our research is the first to examine people's psychological attunement to friendships and among the first to examine whether psychological processes that were identified within the context of romantic bonds can generalize to the friendship bond. Specifically, our research suggests that the self may dynamically shift to prioritize and incorporate relationships that offer the best chance to optimize opportunities for belonging. For singles, this means that the self attunes to friendships. By studying these processes, our research not only sheds light on an important yet understudied relationship – that is, friendship -- but also highlights the critical role that friendships play in maintaining singles' well-being. Our research also points toward a potential pitfall of 'couple culture' and the all-consuming nature of romantic love: Namely, that it may contribute to the decline of important friendship bonds. We hope our findings will set the stage for continued investigation of singles' well-being and the friendships that nourish them.

### Footnotes

<sup>1</sup> Anthony et al. (2007) reported additional results collected from a sub-set of this sample during the recruitment phase of the study. Stinson et al. (2008) reported additional results from a sub-set of this sample at Waves 1 and 2 only. Logel et al. (2014) reported additional longitudinal results from this sample.

<sup>2</sup> We also explored whether partnered people's self-esteem is more attuned to their romantic relationship or their friendships, and results revealed no significant difference ( $b = .23$  and  $.14$ , respectively). We describe these analyses in the OSM.

<sup>3</sup> Although there was no direct effect of relationship status on later friendship quality,  $b = -.03$ ,  $B = .01$ ,  $SE = .21$ ,  $t(126) = 0.15$ ,  $p = .88$  (i.e., path  $c$  in Figure 1), the absence of a direct effect does not preclude the possibility of indirect effects (Hayes, 2013).

<sup>4</sup> Ideally, we would expect to observe that investment at Wave 5 predicted changes in friendship quality from Wave 5 to Wave 6. Unfortunately, we do not have a measure of friendship quality at Wave 5 to use as a control variable in such a model, and when we used Wave 4 friendship quality for this purpose, the sample size was reduced to just 78 participants. Thus, we cannot reliably test this hypothesis with our data (see the OSM for more details)

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## Chapter 6: General Discussion

Past research has consistently documented a well-being gap between singles and married people (Diener, Gohm, Suh, & Oishi, 2000; Gove & Shin, 1989; Gove et al., 1983; Luciano & Orth, 2017). While some have attributed this well-being gap to singles' lack of a long-term, committed romantic bond (e.g., Gove & Shin, 1989), few have actually begun to unpack the mechanisms that maintain this inequality. The goal of my dissertation research was therefore to unpack this well-being gap and provide a more comprehensive understanding of its origins. Employing a belongingness perspective, I proposed two possible pathways through which singlehood might affect well-being. The first pathway was through singles' sense of group identity and belonging whereas the second pathway was through singles' sense of interpersonal belonging. I further proposed that singles would exhibit worse well-being compared to married people not because they lack a sense of interpersonal belonging, but because they lack a sense of group belonging. In other words, I expected that the stigma associated with being single may lead many singles to devalue or dissociate from their single group identity, thus compromising their sense of group belonging (Reimer et al., 2017). At the same time, I expected that some singles would still be able to meet their belongingness needs through their close interpersonal relationships, specifically, their friendships. I therefore conducted two independent lines of research which, when taken together, offer novel insight into the purported well-being gap between singles and married people and helps to identify possible avenues for improving the future well-being of single people. In the following section, I detail my main findings as they relate to both group-based (pathway a x b in Figure 1) and interpersonal belonging (pathway c x d in Figure 1) among singles.

## **A Belongingness Perspective on the Well-Being Gap Between Singles and Married People**

Belongingness is a fundamental human need that, when met, confers numerous health and well-being benefits (Begen & Turner-Cobb, 2015; Cohen, 2004). While some theorists have conceptualized the need to belong as one that is met through lasting, high-quality interpersonal relationships (Baumeister & Leary, 1995), others have proposed additional group-based routes through which the need to belong can be met (i.e., group identity, intragroup status; Haslam, Jetten, Postmes, & Haslam, 2009). Consistent with both perspectives, my findings illuminate two clear pathways through which singles' belongingness needs can be simultaneously met and thwarted: 1) group-based belonging, and 2) interpersonal belonging.

### **The First Pathway: Group-Based Belonging and Well-being**

The results of my first paper (Fisher & Sakaluk, 2019) lend support to my hypothesis that singles' lack of group belonging may put them at increased risk of poor well-being compared to married people or people in marriage-like relationships. I found that singles had a relatively low degree of group-based belonging as evidenced by their low levels of group identification with other singles. This low-level of group-based belonging has direct implications for singles' well-being, as group identification has been linked to various health and well-being benefits including better recovery from illness and addiction (Best et al., 2003; Haslam et al., 2009), less work-related stress (Haslam et al., 2005), greater life satisfaction (Haslam et al., 2008), and importantly, a sense of social support and protection against stigma (Bourguignon, Seron, Yzerbyt, & Herman, 2006; Branscombe et al., 1999; Outten, Schmitt, Garcia, & Branscombe, 2009). However, according to self-categorization theory (Turner et al., 1987), the benefits of belonging to a group can only be realized if individual members themselves actually identify

with that group (Jetten, Haslam, Haslam, Dingle, & Jones, 2014). Put another way, singles must value their single identity and feel a sense of solidarity with other singles in order to reap the belongingness benefits of being a group member. Both of these elements (i.e., identity centrality and solidarity) are components of group identification (Leach et al., 2008), and reflected in singles' generally low levels of group identification. These results suggest that singles' low level of group identification is a critical risk factor for the well-being of this population.

In addition to having low group belonging, my findings show that singles are well aware of discrimination toward their single identity and group: Exploratory analyses revealed that singles perceived more discrimination toward their single identity than toward their other personal identities. To make matters worse, being a target of discrimination has been linked to poor well-being outcomes in its own right (Schmitt, Branscombe, Postmes, & Garcia, 2014). Typically, however, the negative effects of discrimination on well-being can be buffered to some extent by the sense of belonging derived from being a member of a group, even if that group suffers social stigma. Moreover, discrimination can be attributed to one's stigmatized group identity rather than a personal characteristic, thus preserving self-esteem (Crocker & Major, 1989). Sadly, my results suggest that singles may find themselves in a precarious predicament whereby they notice discrimination targeting their group membership yet lack a sense of group belonging to that same group that might otherwise buffer them against the ill effects of such discrimination. Essentially, then, singles experiences of discrimination appear to be qualitatively different from many other previously studied groups. Ultimately, the results of my first manuscript expose singles' low level of group-based belonging as a point of potential vulnerability for this population and suggest that closing the well-being gap between singles and married people will require further examination of this critical avenue to well-being.

## **The Second Pathway: Interpersonal Belonging and Well-Being**

The results of my second manuscript (Fisher, Stinson, Wood, Holmes & Cameron, under review) further support my hypothesis that it is a lack of group belonging—and not necessarily a lack of close interpersonal belonging—that explains singles' relatively poorer well-being compared to partnered people. My research demonstrated that people rely upon their friendships to meet their interpersonal belongingness needs to a greater extent when they are single compared to when they are in a romantic relationship. Singles also displayed greater psychological investment in their friendships, which in turn, led to greater friendship quality and well-being benefits in the form of increased self-esteem. Given that self-esteem has been proposed to reflect one's sense of interpersonal belonging (Anthony et al., 2007), these findings lend support to my hypothesis that singles are not necessarily suffering when it comes to their sense of interpersonal belonging. Singles' greater investments in their friendships had lasting benefits for the quality of their friendships: Whereas the quality of partnered people's friendships declined over time, the quality of singles' friendships remained stable. This finding is crucial considering that people who have many, high-quality friendships tend to have better physical and mental health (Cable, Bartley, Chandola, & Sacker, 2013; Fiori, Antonucci, & Cortina, 2006), emotional well-being (Demir, Orthel, & Andelin, 2013), life satisfaction (Diener & Seligman, 2002), and even live longer (Perissinotto, Cenzler, & Covinsky, 2012) than people with fewer or lower quality friendships. Given the importance of high-quality friendships for well-being, singles may be in a relatively good position to weather life's ups and downs compared to married people who may have fewer friendships and generally more insular social networks (Musick & Bumpass, 2012). Not only do these findings support the previously untested hypothesis by singlehood experts Bella DePaulo and Wendy Morris (2005) that singles build a network of

stable and supportive friendships to support their well-being, they also highlight a point of resilience among singles, which may have previously been overlooked due to the cultural fixation on romantic relationships.

### **Closing the Well-Being Gap: A Three-Pronged Approach**

The results of these independent manuscripts reveal two very different sides of the single experience, and further attest that belongingness needs can be both met and thwarted through multiple avenues and relationships. Moreover, in line with my hypothesis, the results of my first manuscript highlight singles' lack of group belonging as a potential risk factor for their well-being whilst the results of my second manuscript highlight a point of resiliency in singles' ability to cultivate interpersonal belonging by building lasting, high-quality friendships. Together, these findings suggest that closing the well-being gap between singles and partnered people will require, at the very least, a three-pronged approach.

Based on the results of my research, the first prong of this approach should involve efforts to support singles' ability to create and cultivate strong and lasting friendship bonds. Although there is a relative dearth of literature examining how people make and maintain their friendships during adulthood (Harris & Vazire, 2016), many of the principles of interpersonal attraction that apply to romantic bonds are likely to also apply to friendships (i.e., proximity, familiarity, and similarity; Fehr, 2008; Festinger, Schachter, & Back, 1950; Zajonc, 2001). We tend to become friends with people who live nearby, frequent the same places (i.e., work, clubs, parks, etc.), or share common interests. With these principles in mind, local communities can help to improve singles' sense of belonging by creating opportunities for them to interact with nearby neighbors and acquaintances on a regular basis. Singles are already inclined to engage in many new and different forms of socialization, as evidenced by their varied and diverse social

networks (Sarkisian & Gerstel, 2016). However, because it becomes increasingly difficult to make and maintain friendships in late life (Wrzus et al., 2013), communities and local governments can encourage deeper connections for singles of all ages by doing their part to facilitate regular community events, programs, volunteer opportunities, clubs, and groups. In support of this, public spaces that provide an attractive, inviting atmosphere and opportunities to interact with other people have been found to be associated with an increased sense of community among residents (Francis et al., 2012). These findings suggest that planning cities and community spaces with the intention of fostering a sense of interpersonal belonging may be especially beneficial for the well-being of singles. Cities could create more infrastructure such as interactive art exhibits, chess boards, musical instruments, etc. that would spark conversation and connection among residents. Creating programs and environments that allow singles to connect for platonic interactions could have the added bonus of facilitating a sense of solidarity among singles, thereby increasing singles' sense of group identification and belonging.

The second prong to close the well-being gap involves bolstering singles' sense of group identity and belonging. Although singles' group identity may be strengthened by forming friendships with other singles, a strong sense of group identification also requires individuals to *value* their group identity. Unfortunately, singlehood stigma may cause singles to distance themselves from the single group identity rather than take pride in it. After all, people typically want to be part of groups that are perceived as valuable or high-status (Tajfel & Turner, 1986), and singles as a group do not fit that bill. If being single were more culturally valued or, at the very least, not culturally *devalued*, singles might express a stronger sense of group identification (Crandall et al., 2001). Therefore, efforts need to be made to increase the perceived value of

being single. Yet, for singles to really begin to embrace and value their single identity, a major cultural shift is necessary.

Across cultures, marriage has been, and continues to be, a prominent and respected institution (Coontz, 2005; Karandashev, 2017). Indeed, the *Ideology of Marriage and Family* (DePaulo & Morris, 2005) also known as the *Committed Relationship Ideology* (Day et al., 2011) is deep-woven into the cultural fabric of the West and many other cultures. This ideology proclaims that marriage is the ultimate form of human connection. Accordingly, there are numerous culturally-recognized and conferred benefits to being married (e.g., social, financial, legal, well-being, and status benefits) whereas there are relatively few, if any, culturally-recognized and conferred benefits to being single (Antonovics & Town, 2004; Bellas, 1992; Wellman et al., 1991; Wise & Stanley, 2004; Silva, 2012). Moreover, my research revealed yet another previously unknown benefit of being partnered: The possession of a valued group identity. Given these benefits and the cultural value associated with being married, the most obvious, and perhaps most popular, solution for singles to improve their well-being is to find a romantic partner and swap their single identity for a partnered identity. The problem with this “solution”, however, is that this swap is not always permanent (Rosenfeld et al., 2018). Nor does it help the existing and growing number of singles who enjoy being single and wish to remain that way (e.g., DePaulo, 2006). A far better solution is one that both increases the perceived value of being single as well as increases the group-y-ness of singles.

This leads to the third prong of the belongingness approach to improving singles’ well-being: Decrease singlehood stigma. My research suggests one potential avenue for combatting the stigma towards singles. Specifically, I found that perceptions of singles’ group-y-ness were inversely related to the acceptability of expressing prejudice towards them. In other words, the

more ‘group-y’ singles appeared, the less permitting people were of negative attitudes towards them. Increased group-y-ness, whether perceived or actual, may increase the perceived status and legitimacy of singles’ as an organized group with the ability to seek retributive justice against those who express prejudice towards them. Consequently, people may be less inclined to express hostility towards singles out of fear of retaliation (Newheiser & Dovidio, 2015). In addition, increased group-y-ness may also increase the perceived value of belonging to the singles’ group, as group-y-er groups are assumed to consist of members who value their group membership (e.g., Lickel et al., 2000). These efforts to increase the group-y-ness and value of singles may have the added benefit of reducing the permissive devaluation of single identities that can occur within singles’ interpersonal relationships and damage the quality of such relationships (Byrne, 2000). Therefore, the aforementioned strategies to increase the group-y-ness of singles may have the added benefits of ameliorating negative cultural attitudes towards them as well as improving singles’ interpersonal relationships.

Another way to increase the perceived value of being single is to combat the stigma with more accurate, and more positive, cultural portrayals of single people. Stereotypes follow from observations of groups in their social roles (Eagly & Steffen, 1984). Unfortunately, positive portrayals of singles in both society and science are few and far between. Happy, healthy singles are virtually non-existent in sitcoms and other television programs. But their pathetic (e.g., Winston in the television show ‘New Girl’) and pathologized (e.g., Barney Stinson in the television show ‘How I Met Your Mother’) counterparts are pervasive. Moreover, in romantic movies, singlehood is portrayed as a problem to be solved, typically by a proposal or a wedding, rather than as a respectable end in and of itself. These same old tropes are trodden out again and again. And though they may be crowd-pleasing, they do little to help the plight of singles.

The lack of representation of singles in science has a similar effect. In relationship research, singles are often treated as a comparison group, not a population of substantive interest in their own right. This subtle othering of singles has been shown to have negative implications for their well-being (Bruckmüller, 2013), and is therefore perhaps no better than the negative portrayals of singles in the media. Without more positive single role models and more complete and well-rounded representations of singles in science (Cheryan, Master, & Meltzoff, 2015), there is simply no basis upon which singles can start to build a positive sense of identity (Cheryan, Plaut, Handron, & Hudson, 2013). And if people cannot build a positive sense of single identity, there will be no tangible group for singles to belong. Consequently, bolstering group identification among singles will require dedicated efforts to represent the broader diversity of singles' experiences, especially those of the positive variety, in both society and science.

Despite this dreary outlook, there is reason to believe that a positive sense of group identity is within reach for singles. Already, there are certain social contexts that value singlehood. Individuals in recovery from substance use concerns or other addictions are often encouraged to remain romantically single (Twelve Steps and Twelve Traditions, 1981). Nuns and priests of certain denominations are not permitted to marry, and their singlehood is well regarded. These groups of singles may enjoy a positive single identity because their singlehood is perceived to be a 'legitimate' and culturally-valued, and thus the stigma is reduced (Jost, 2006; Kaiser & Wilkins, 2010). Indeed, past research suggests that people view singles less harshly when they perceive them to be single due to their circumstances rather than due to personal choice (Slonim et al., 2015). Those singles in the aforementioned examples might also benefit from the existence of other valued identities (e.g., nun, person in recovery; Iyer et al., 2009), as

well as the sense of solidarity with other singles in a similar circumstance. In my own research, I also found a small subset of singles who had a very strong single group identity. These singles were also most satisfied with their single identity, suggesting that strong group identification comes with additional well-being benefits. These findings suggest that listening to and studying the experiences of people at the margins of society could offer critical insight into how to improve well-being for broader population of singles. Together, these examples demonstrate that a positive sense of single identity *is* possible, though presently it is a relatively uncommon outcome.

Ultimately, then, closing the well-being gap between singles and partnered people requires targeted efforts to 1) support the already strong interpersonal belonging of singles, 2) increase singles' sense of group belonging, and 3) decrease prejudice towards singles. It is also likely that these three prongs reinforce one another: Increased community among singles should increase the group-y-ness of singles and simultaneously make the single group more desirable, and thus more culturally valuable (Bruckmüller, 2013; Crandall et al., 2001). Likewise, the greater the cultural value placed on being single, the more people will embrace being single, and the more likely they will be to find community among others who similarly embrace being single. In turn, efforts to increase both singles' interpersonal and group belonging should bolster single's status as a legitimate group and reduce the expression of prejudice towards them.

### **Limitations and Future Directions**

Although singles are generally stigmatized and marginalized, the experience of being single is still culturally and contextually dependent. Being single at age 20 is not only more normative but perhaps more joyful than being single later in life (Bay-Cheng & Goodkind, 2016; Poortman & Liefbroer, 2010). Some singles also have temperaments or tendencies (e.g., social

avoidance goals) that are well-suited to being single, while others have temperaments or tendencies (e.g., social approach goals) that cause them additional suffering during periods of singlehood (Girme et al., 2016; Spielmann et al., 2013). Thus, any one study or set of studies of singlehood cannot possibly reflect the full diversity of singles' experiences. My studies are no exception to this rule. My first manuscript sampled a small population of American singles during early adulthood whereas my second manuscript sampled a relatively small population of university-age Canadian singles. Despite this limitation, the purpose of both manuscripts was to document novel phenomena (i.e., group identification and psychological attunement to friendships) in an often-overlooked population (i.e., singles). Thus, my research serves as a springboard for future research wishing to both replicate and extend my findings by examining how different intersections of identity and context might alter the single experience. For example, because both friendships and group memberships are so critical for well-being yet so difficult to cultivate in later life (Chopik, 2017; Diener & Seligman, 2002), future researchers should investigate how both group identification and attunement to friendships function and change across the life course.

Likewise, because my overarching belongingness framework was theoretical, and therefore not directly tested in this research, I cannot make causal claims about the pathways from singlehood to well-being nor can I provide statistical evidence for adequacy of my conceptual model of singles' belongingness. It is not only possible, but probable, that there are additional belongingness-related pathways that influence singles' well-being. For example, singles' own level of intragroup status and belonging amongst other singles might affect the extent to which they both notice discrimination as well as the extent to which their well-being is affected by such discrimination (Begeny & Huo, 2018). Likewise, although not discussed in this

dissertation, individual differences in personality, social goals, attachment styles, and other characteristics might buffer or thwart some singles' well-being (Girme et al., 2016; Pepping & MacDonald, 2019). Similarly, I did not directly test the link between the stigmatization of singles and their sense of group identity and belonging or the link between group identification and well-being. Future research could directly test these links. Because my research revealed that singlehood stigma has ideological roots, future research could experimentally manipulate people's ideological beliefs about marriage and singlehood and then examine their subsequent group identification with their relationship status identity. Ideological frameworks that either prime idealized beliefs about marriage or stigmatizing beliefs about singles should lower group identification among singles but increase group identification among partnered people. As for the link between group identification and well-being, my research suggests that singles with stronger all-around group identification are also more satisfied with this identity (a subcomponent of group identification), suggesting that stronger group belonging may lead to better well-being among singles. This pathway could also be tested experimentally by manipulating singles' group identity and measuring subsequent well-being.

Finally, along the same lines, alternative conceptualizations of my model are also plausible. For example, instead of comprising two parallel pathways to well-being, group and interpersonal belonging could be conceptualized as interchangeable serial links in a causal chain connecting singlehood and well-being. There is some evidence to support such a model. For instance, group identification leads to increased well-being through both the perception of a support network as well as the reality of actually having a supportive social network to rely on (Bourguignon, Seron, Yzerbyt, & Herman, 2006; Branscombe et al., 1999; Outten, Schmitt, Garcia, & Branscombe, 2009). Thus, interpersonal belonging explains why group identification

bolsters well-being. Conversely, developing close interpersonal bonds with others who share an identity is also certain to influence one's perceptions of their own belonging within a larger group context (Cameron, 2004; Leach et al., 2008). Thus, group identification also explains why interpersonal belongingness bolsters well-being. While there may be empirical support for such a model, my research suggests that there are also unique components of group belonging (e.g., cultural value and status of the group) that might uniquely predict well-being, which is why it may be important to treat these pathways as distinct. Nonetheless, future research may wish to empirically test and compare these various theoretical models and tease apart the various causal pathways linking singlehood and well-being.

### **Theoretical and Practical Implications**

My dissertation research has important theoretical and practical implications. First, my dissertation draws much needed attention to an understudied population (i.e., singles) and type of relationship (i.e., friendship). Both the experience of being single and friendships more generally have not received nearly the same amount of empirical attention as romantic relationships (Harris & Vazire, 2016), likely due to the pervasiveness of couple culture and the related, stubborn *Ideology of Marriage and Family* (DePaulo & Morris, 2005; Fingerman & Hayes, 2002). Studying ignored populations like singles can reveal important boundary conditions or exceptions to existing theory. For example, in my research, perceived 'group-y-ness' was positively related to the acceptability of expressing prejudice towards groups, except when it came to singles. For singles, perceived group-y-ness was negatively related to the acceptability of expressing prejudice. These findings suggest that understanding and combatting prejudice may require a more tailored approach that carefully considers the characteristics of the stigmatized group and the social context within which the group is embedded.

On a more practical level, the cultural context around singles is changing. There are now more singles than ever before, and amid rising concerns about social isolation and loneliness (Dykstra & Fokkema, 2007; Holt-Lunstad et al., 2015), the need to understand and maximize the well-being of this growing population is more pressing than ever. My findings suggest multiple avenues through which these goals could be achieved. In doing so, my research demonstrates that the need to belong can be fulfilled through multiple types of relationships, and broader, group-based sources of belonging may be essential for well-being.

My findings also extend beyond the single experience to demonstrate, for the first time, two basic psychological processes. Specifically, my research is the first to demonstrate that both single and married people exhibit group identification with their respective groups, and are perceived as groups by others. Thus, my research bridges the gap between group processes and close relationship literatures and demonstrates how these two perspectives can be brought together to better understand individual and collective experiences. My research is also the first to document the process of psychological attunement to friendships, which occurs for both single and partnered people. It is also the first to demonstrate the particular importance of singles' friendships for their well-being. In doing so, this research also demonstrates how well-known romantic relationship theories and models can be applied to the study of friendships and highlights the extent to which the well-being of both single and partnered people is affected by the quality of their friendships.

## **Conclusion**

Cultural stereotypes of singles make singlehood seem like a miserable and lonely experience. However, my research suggests that the truly miserable part about being single is not necessarily the experience of being single itself but rather the stigma that surrounds it. Despite

low group belonging stemming from negative cultural attitudes about singles, singles have a relatively robust sense of interpersonal belonging supported by their close friendships. Thus, there is good reason to believe that being single isn't as lonely as the stigma makes it out to be. Ultimately, my research demonstrates two theoretical pathways to well-being – one group-based and one interpersonal – both of which offer opportunities for psychological interventions aimed at closing the long-standing well-being gap between singles and partnered people.

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## Appendix A

### Materials for Manuscript #1

#### Single Identity Study 1

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##### Start of Block: Consent

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##### *Letter of Information for Implied Consent*

##### Cognitive Styles and Identity

You are invited to participate in a study entitled *Cognitive Styles and Identity* that is being conducted by Dr. John Sakaluk and his Methodology and Relationship/Sexual Science (MaRSS) Lab. Dr. Sakaluk is an Assistant Professor in the department of psychology at the University of Victoria and you may contact him if you have further questions by emailing sakaluk@uvic.ca.

##### Purpose, Objectives, and Importance of Research

The purpose of this research project is to investigate the relationship between cognitive style and identity. Research of this type is important because it will allow us to understand individual differences in cognition and how people think and perceive aspects of their own and other people's identities.

##### Participants Selection and Involvement

You are being asked to participate in this study because of your availability on Amazon's Mechanical Turk Service. If you consent to participate in this research, your participation will include: 1) answering a brief number of demographic items; 2) completing a short dot-estimation task (e.g., estimating the number of dots in a presented image); and (3) answering questions about your thoughts and feelings regarding different aspects of your identity. All participation will take place online through this survey, and will require 20 minutes or less of your time.

##### Risks

There are some potential risks to you by participating in this research and they include potentially feeling embarrassed answering some of the demographic questions. To prevent or to deal with these risks, you are free to skip any questions that might make you feel uncomfortable.

##### Benefits and Compensation.

The potential benefits of your participation in this research include learning about the process of research first hand and helping to advance the state of knowledge of identity and cognition. Better understanding of how people think and feel about different aspects of their identity will help illuminate the relationship between the self and social cognition.

As a way to compensate you for any inconvenience related to your participation, you will be

paid \$1.75 USD. If you consent to participate in this study, this form of compensation to you must not be coercive. It is unethical to provide undue compensation or inducements to research participants. If you would not participate if the compensation was not offered, then you should decline.

#### Voluntary Participation

Your participation in this research must be completely voluntary. If you withdraw during survey completion, your responses will be discarded and will not be used in this research. If you wish to withdraw from the study after your survey responses have already been submitted, your data can be deleted if you contact Dr. Sakaluk with your confirmation code that is presented at the end of the study. If you do not retain this code, we will be unable to identify and delete your responses.

#### Anonymity and Confidentiality

Your responses will be anonymous, as no one will be able to associate your individual answers with your identity. Your confidentiality and the confidentiality of the data will be via the security protocols in place for data collected through Qualtrics. All data collected through Qualtrics for this study will be stored on Qualtrics's protected Canadian servers which are located in Canada.

#### Dissemination of Results and Disposal of Data

It is anticipated that the results of this study will be shared with others in the following ways: 1) conference oral and poster presentations; 2) press-releases and social media; and 3) peer-reviewed journal articles. In the course of dissemination, it may be necessary to share anonymized aggregated data, in order for external reviewers and readers to verify the accuracy of our analyses and research reports. This will be facilitated via Dr. Sakaluk's Open Science Framework page—a service for sharing research materials. Data from this study will be stored indefinitely, in order to maintain the verifiability of the findings to interested researchers and readers.

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca)).

By completing and submitting the questionnaire, YOUR FREE AND INFORMED CONSENT IS IMPLIED and indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

*Please retain a copy of this letter for your reference.*

- I confirm that I am age 19 or older and consent to take part in this experiment. (1)
- I do not consent to take part in this experiment. (2)

*Skip To: End of Survey If  
consent to take part in this experiment.*

*Letter of Information for Implied Consent*

*... = I do not*

End of Block: Consent

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Start of Block: Demographics

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Background Information

Please tell us a bit about yourself. Results will only be reported in aggregate form. You may decline to answer these questions if you wish.



Age What is your current age, in years?

▼ 19 (19) ... 90 (90)

---

Assigned Sex What sex were you assigned at birth, meaning on your original birth certificate?

- Male (1)
- Female (2)
- 

Gender Identity Which best describes your current gender identity?

- Male (1)
- Female (2)
- Indigenous or other cultural gender minority identity (e.g., two-spirit) (3)
- Another term describes me better (e.g., gender fluid, non-binary; please specify) (4)
-

Ethnicity Which of the following best describes your ethnic background

- African (1)
  - Chinese (2)
  - European (3)
  - Filipino (4)
  - Indian (5)
  - Japanese (6)
  - Korean (7)
  - Southeast Asian (8)
  - Latino/Latina (9)
  - Indigenous (10)
  - Middle Eastern (11)
  - Multi-ethnic (12)
  - Something else (please specify) (13)
- 

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Nationality What is your nationality?

▼ Afghan (1) ... Something else (please specify) (81)

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Sexual Orientation Which best describes your sexual orientation?

- straight (e.g., heterosexual) (1)
  - lesbian/gay (2)
  - bisexual (3)
  - asexual (4)
  - Something else (please specify) (5)
- 

-----

Monogamy When it comes to relationships, I think of myself as:

- Monogamous (1)
  - Non-Monogamous (e.g., polyamorous, open relationships, swinging, etc.,) (2)
  - Questioning (3)
  - Something else (please specify) (4)
- 

-----

Relationship Status Are you...?

- single (1)
  - in a relationship (2)
- 

*Display This Question:*

*If Are you...? = in a relationship*

Rel type I am... (check all that apply)

- Casually dating (1)
  - Seriously dating (2)
  - Cohabiting (3)
  - Domestic Partnership/Common-law union (4)
  - Married (5)
  - Living with someone (10)
  - Divorced (6)
  - Widowed (7)
  - Separated (8)
  - Something else (please specify) (9)
- 

-----  
**Display This Question:**

*If Are you...? = single*

Single type I am... (check all that apply)

- Single, never married (1)
  - Never dated (2)
  - Casually dating (3)
  - Seriously dating (4)
  - Separated (5)
  - Divorced (6)
  - Widowed (7)
  - Not currently looking for a romantic partner (8)
  - Currently looking for a romantic partner (9)
  - Something else (please specify) (10)
- 

-----

*Display This Question:*

*If Are you...? = single*

Single Length For how many years have you been single? In other words, how long has it been since your last serious relationship? (e.g., 1.5, 1, 5, 10)

---

-----

*Display This Question:*

*If Are you...? = in a relationship*

Rel Length If you are currently in a relationship, for how many years have you been with your primary partner? (e.g., 1.5, 5, 10)

---

Single Friend Do you have close friend(s) who are single?

Yes (1)

No (2)

Friend R.Stat Most of my close friends are...

single (1)

in a relationship (2)

Sexual/ASexual I consider myself to be:

Sexual (i.e., someone who typically experiences sexual attraction and/or desire for partnered sexual activity) (1)

Asexual (i.e., someone who does not typically experience sexual attraction and/or desire for partnered sexual activity) (2)

Something else (please specify) (3)

---

Sexually active Have you been sexually active in the last year?

Yes (1)

No (2)

*Display This Question:*

*If Have you been sexually active in the last year? = No*

SexAct2 Have you been sexually active in the past?

- Yes (1)
  - No (2)
- 

Political Identity I consider myself to be a(n)..

- Democrat (1)
  - Republican (2)
  - Independent (3)
  - Something else (please specify) (4)
- 

Education Please indicate your highest attained level of formal education

- High school diploma (1)
  - College/Trade-School diploma (2)
  - Undergraduate Degree (3)
  - Master's Degree (4)
  - Doctoral Degree (5)
  - Professional Degree (6)
-

Attitudes I think of myself as...							
	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	
Liberal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Conservative
Atheist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Religious

HSE Using the scale below, please indicate your agreement with the following statement:

"I have high self-esteem"

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: Demographics

Start of Block: Minimal Group Assignment

Q41 Timing

First Click (1)

Last Click (2)

Page Submit (3)

Click Count (4)

## Task Instructions

### Dot Estimation Task (DET) Description

Past studies have shown that, given the task of estimating how many objects they have seen, different people tend to consistently overestimate or underestimate the correct number. The numbers of overestimators and underestimators in the population seem to be about even.

While psychologists do not place any value judgment on whether it is better to be an overestimator or an underestimator, past research has shown that whether one is an overestimator or an underestimator does tend to reveal something fundamental about the psychological characteristics and personality of the person. For example, performance on the following task has been found to be indicative of individual differences in cognitive style.

#### Instructions:

In a moment, you will be shown a series of images. Each image will contain a different number of dots and will be presented for two seconds. After viewing each image, you will be asked to estimate the number of dots displayed.

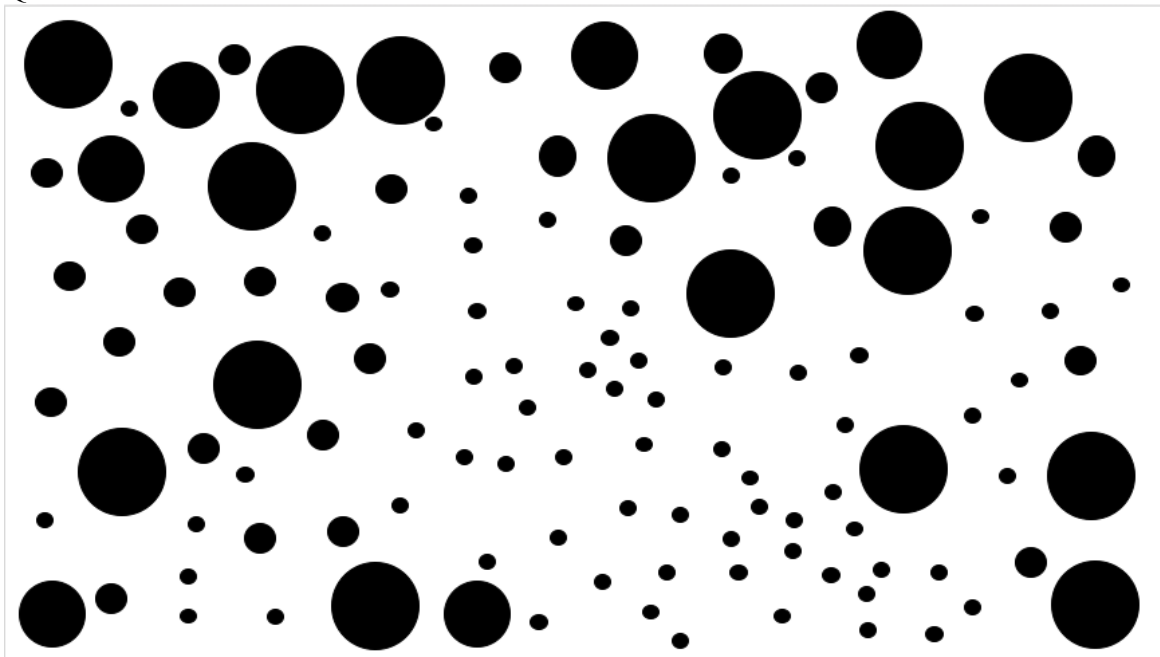
---

Page Break

Q32 Timing  
First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)

---

Q75



---

Page Break

Q76 Please estimate the number of dots shown in the previous image:

---

---

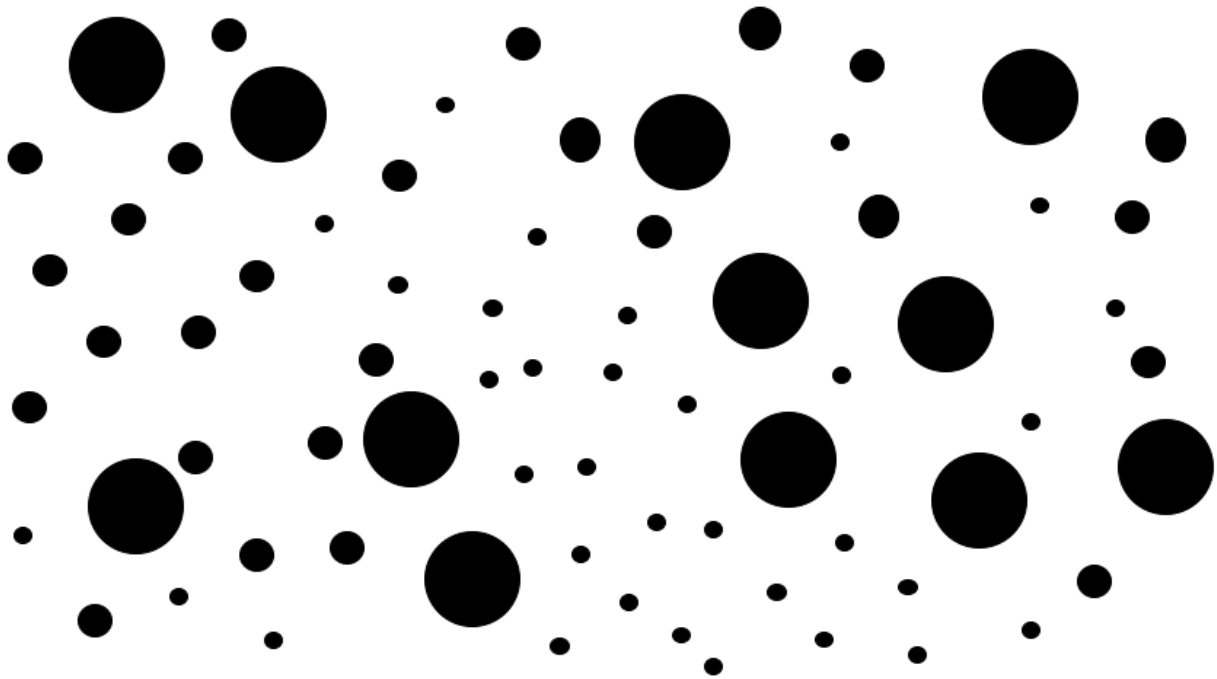
Page Break

---

Q33 Timing  
First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)

---

Q26



---

Page Break

Q28 Please estimate the number of dots shown in the previous image:

---

---

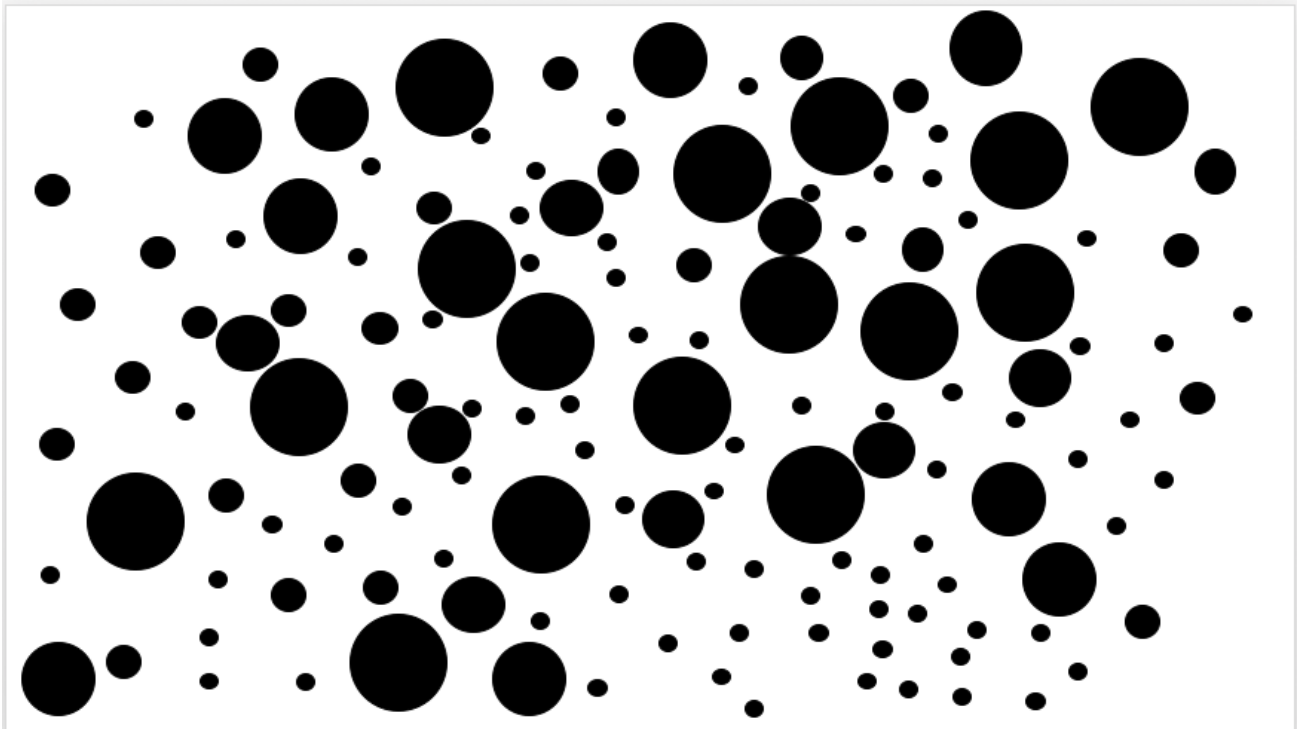
Page Break

---

Q35 Timing  
First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)

---

Q29



---

Page Break

Q30 Please estimate the number of dots shown in the previous image:

---

End of Block: Minimal Group Assignment

---

Start of Block: Estimation Task Results

Q39 Timing  
First Click (1)  
Last Click (2)  
Page Submit (3)  
Click Count (4)

---

Q37 Based on your responses, your cognitive style is:

---

Q40



**calculating..**

---

Page Break

---

Q38 Based on your responses, your cognitive style is: *overestimator*

End of Block: Estimation Task Results

---

Start of Block: Block 9

Q40

Thinking about Identity

For the remainder of the survey, you will be asked about your thoughts and feelings about different aspects of your identity.

End of Block: Block 9

---

Start of Block: Minimal Group Identity



MG Ident

Please rate the extent to which you agree with the following statements.



The fact that I  
am an  
overestimator  
is an  
important part  
of my identity  
(9)

Being an  
overestimator  
is an  
important part  
of how I see  
myself (10)

I have a lot in  
common with  
the average  
person who is  
an  
overestimator  
(11)

I am similar to  
the average  
person who is  
an  
overestimator  
(12)

People who  
are  
overestimators  
have a lot in  
common with  
each other  
(13)

People who  
are  
overestimators  
are very  
similar to each  
other (14)

MG Group Disc To what extent to you think that people who are overestimators experience discrimination?

- 1 Not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 A great deal (7)
- 

MG Per Disc To what extent have you personally experienced discrimination for being an overestimator?

- 1 Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 A great deal (7)

End of Block: Minimal Group Identity

---

Start of Block: Sexual Orientation Identity



SO Ident

Please rate the extent to which you agree with the following statements

	1	2	3	4	5	6	7
	<i>strongly disagree</i> (1)	(2)	(3)	(4)	(5)	(6)	<i>strongly agree</i> (7)
I feel a bond with people who are \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (1)	<input type="radio"/>						<input type="radio"/>
I feel solidarity with people who are \${Sexual Orientation/ChoiceGroup/SelectedChoices} (2)	<input type="radio"/>						<input type="radio"/>
I feel committed to being \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (3)	<input type="radio"/>						<input type="radio"/>
I am glad to be \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (4)	<input type="radio"/>						<input type="radio"/>
I think that people who are \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} have a lot to be proud of (5)	<input type="radio"/>						<input type="radio"/>
It is pleasant to be \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (6)	<input type="radio"/>						<input type="radio"/>
Being \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} gives me a good feeling (7)	<input type="radio"/>						<input type="radio"/>
I often think about the fact that I am \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (8)	<input type="radio"/>						<input type="radio"/>
The fact that I am \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} is an important part of my identity (9)	<input type="radio"/>						<input type="radio"/>
Being \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} is an important part of how I see myself (10)	<input type="radio"/>						<input type="radio"/>
I have a lot in common with the average person who is \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (11)	<input type="radio"/>						<input type="radio"/>
I am similar to the average person who is \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} (12)	<input type="radio"/>						<input type="radio"/>

People who are \${Sexual  
Orientation/ChoiceGroup/SelectedChoicesTextEntry  
} have a lot in common with each other (13)



People who are \${Sexual  
Orientation/ChoiceGroup/SelectedChoicesTextEntry  
} are very similar to each other (14)



---

Page Break

SO Group Disc To what extent to you think that people who are \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry} experience discrimination?

- 1 Not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 A great deal (7)
- 

SO Pers Disc To what extent have you personally experienced discrimination for being \${Sexual Orientation/ChoiceGroup/SelectedChoicesTextEntry}?

- 1 Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 A great deal (7)

End of Block: Sexual Orientation Identity

---

Start of Block: Relationship Status Identity



RS Ident Please rate the extent to which you agree with the following statements



I have a lot in common with the  
average person who is \${Relationship  
Status/ChoiceGroup/SelectedChoices}  
(11)

I am similar to the average person  
who is \${Relationship  
Status/ChoiceGroup/SelectedChoices}  
(12)

People who are \${Relationship  
Status/ChoiceGroup/SelectedChoices}  
have a lot in common with each other  
(13)

People who are \${Relationship  
Status/ChoiceGroup/SelectedChoices}  
are very similar to each other (14)

---

Page Break

RS Group Disc To what extent to you think that people who are \${Relationship Status/ChoiceGroup/SelectedChoices} experience discrimination?

- 1 Not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 A great deal (7)
- 

RS Per Disc To what extent have you personally experienced discrimination for being \${Relationship Status/ChoiceGroup/SelectedChoices}?

- 1 Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 A great deal (7)

End of Block: Relationship Status Identity

---

Start of Block: National Identity



Nat Ident Please rate the extent to which you agree with the following statements

	1	2	3	4	5	6	7
	<i>strongly disagree</i> (1)	(2)	(3)	(4)	(5)	(6)	<i>strongly agree</i> (7)
I feel a bond with people who are \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (1)	<input type="radio"/>						<input type="radio"/>
I feel solidarity with people who are \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (2)	<input type="radio"/>						<input type="radio"/>
I feel committed to being \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (3)	<input type="radio"/>						<input type="radio"/>
I am glad to be \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (4)	<input type="radio"/>						<input type="radio"/>
I think that people who are \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} have a lot to be proud of (5)	<input type="radio"/>						<input type="radio"/>
It is pleasant to be \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (6)	<input type="radio"/>						<input type="radio"/>
Being \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} gives me a good feeling (7)	<input type="radio"/>						<input type="radio"/>
I often think about the fact that I am \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (8)	<input type="radio"/>						<input type="radio"/>
The fact that I am \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} is an important part of my identity (9)	<input type="radio"/>						<input type="radio"/>
Being \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} is an important part of how I see myself (10)	<input type="radio"/>						<input type="radio"/>
I have a lot in common with the average person who is \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (11)	<input type="radio"/>						<input type="radio"/>
I am similar to the average person who is \${Nationality/ChoiceGroup/SelectedChoicesTextEntry} (12)	<input type="radio"/>						<input type="radio"/>

People who are  
\${Nationality/ChoiceGroup/SelectedChoicesTextEntr  
y} have a lot in common with each other (13)



People who are  
\${Nationality/ChoiceGroup/SelectedChoicesTextEntr  
y} are very similar to each other (14)



---

Page Break

Nat Group Discrim To what extent to you think that people who are  
\${Nationality/ChoiceGroup/SelectedChoicesTextEntry} experience discrimination?

- 1 Not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 A great deal (7)
- 

Nat Per Discrim To what extent have you personally experienced discrimination for being  
\${Nationality/ChoiceGroup/SelectedChoicesTextEntry}?

- 1 Not at all (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 A great deal (7)

End of Block: National Identity

---

Start of Block: Manipulation Check

Q56 Please take a moment to answer a few final questions:



Q57 At the beginning of the study you completed a task designed to assess your 'cognitive style.' What was the name of your 'cognitive style'?

- Underestimator (1)
- Overestimator (2)
- Nonestimator (3)

Honest I tried to answer the questions honestly

- not at all (1)
- rarely (2)
- sometimes (3)
- most of the time (4)
- all the time (5)

End of Block: Manipulation Check

---

Start of Block: Debrief Consent Form

Q84  
Cognitive Styles and Identity Feedback Letter

Thank you for participating in this study!

This research is being conducted by Dr. John Sakaluk, an Assistant Professor in the Department of Psychology at the University of Victoria. We appreciate your time in participating in this study.

The study you completed will help us to better understand how people think and feel about different aspects of their identity (e.g., relationship status, sexual orientation, etc.). During the study, we asked you to complete a brief dot-estimation task that involved guessing the number of dots in three images. You were informed that performance on this task was indicative of individual differences in cognitive styles and that your cognitive style is that of an

"overestimator." In reality, this task is not indicative of individual differences in cognitive style. Instead, this task was purely used to assign you to a group based on arbitrary criteria. All participants were assigned to the same group (e.g., "overestimators"). You also completed ratings of the strength of your identification with different aspects of your identity (e.g., relationship status), including your identification with the arbitrarily assigned group. We will analyze these ratings to determine if there are meaningful differences in how people think and feel about different aspects of their identity. For example, we are interested in understanding how people's identification with their relationship status (e.g., single or in a relationship) compares to their identification with the other three aspects of identity (e.g., overestimators, sexual orientation, and nationality) assessed in this study. We apologize for misleading you. We hope you understand that we did not share our full hypothesis at the onset of the study because this knowledge would probably have shaped your responses throughout the experiment. It is possible that certain aspects of this study may have induced some uncomfortable memories, thoughts, or emotions. These feelings are completely normal. If you'd like to talk to someone about any issues that came to your attention today, you may wish to consider contacting a mental health counselor. Helpful services are widely available, usually for a reasonable cost. You may find a counselor near you by going to the Canadian Psychological Association website (<http://www.cpa.ca/public/findingapsychologist/>) or the American Psychological Association website ([http://locator.apa.org/?\\_ga=2.257391624.249047176.1507404128-1357245020.1472584550](http://locator.apa.org/?_ga=2.257391624.249047176.1507404128-1357245020.1472584550)), depending on your location. If you have any questions about the research, you may feel free and contact our lab director, John Sakaluk ([sakaluk@uvic.ca](mailto:sakaluk@uvic.ca)). If you have any questions about your rights or treatment as a participant in this research project, please contact the Human Research Ethics Office at the University of Victoria (250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca)).

### Q39 Cognitive Styles and Identity

Post-Debriefing Consent Form Project Title: Cognitive Styles and Identity Principal Investigator: Dr. John Sakaluk, [sakaluk@uvic.ca](mailto:sakaluk@uvic.ca) Dr. John Sakaluk is a faculty member in the department of Psychology at the University of Victoria. You may contact him at the email above if you have further questions. The purpose of this research was to better understand how people think and feel about different aspects of their identity (e.g., relationship status, sexual orientation, etc.). In the feedback form, it was explained to me why it was necessary for the researchers to use deception in this study. I was informed that having full information on the purpose of the study might have influenced my behaviour and/or responses, and invalidated the results of the study. For this reason, the purpose of the study that I was initially provided was a misrepresentation of the study's true purpose. I have now received a thorough written explanation as to the study's true purpose. I have also had the opportunity to ask any questions about this study, and to have these questions answered to my satisfaction. My participation in this research was completely voluntary. I understand that I may withdraw at any time without any explanation and without reprisal. If I decide to withdraw, I understand that for my data to be deleted I must contact Dr. John Sakaluk with the confirmation code that I will receive at the end of this study. I understand that if I do not consent for my survey responses to be used in this research (checkbox below), my survey responses will be destroyed and will not be used in this research.

I have been asked to give permission to the researchers to use my data in their study, and I hereby agree to this request. I realize that I may withdraw my consent at any time by notifying the Principal Investigator that I wish to do so. It is anticipated that the results of this study will be shared with others in the following ways: 1) conference oral and poster presentations; 2) press-releases and social media; and 3) peer-reviewed journal articles. In the course of dissemination, it may be necessary to share anonymized aggregated data, in order for external reviewers and readers to verify the accuracy of our analyses and research reports. This will be facilitated via Dr. Sakaluk's Open Science Framework page—a service for sharing research materials. Data from this study will be stored indefinitely, in order to maintain the verifiability of the findings to interested researchers and readers.

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca)).

- I consent for my survey responses to be used in this research (1)
- I do not consent for my survey responses to be used in this research (2)

End of Block: Debrief Consent Form

---

Single Entitativity Study 2

---

Start of Block: Consent Form

*Q20 Letter of Information for Implied Consent*

### Perceptions of Others

You are invited to participate in a study entitled *Perceptions of Others* that is being conducted by Dr. John Sakaluk and his Methodology and Relationship/Sexual Science (MaRSS) Lab. Dr. Sakaluk is an Assistant Professor in the department of psychology at the University of Victoria and you may contact him if you have further questions by emailing [sakaluk@uvic.ca](mailto:sakaluk@uvic.ca).

### Purpose, Objectives, and Importance of Research

The purpose of this research project is to investigate how people perceive other people. In particular, we are interested in understanding which characteristics make some groups more or less 'group-like.' Research of this type is important because it will allow us to better understand how people form impressions of others and help to identify the factors that are important in group perception.

### Participants Selection and Involvement

You are being asked to participate in this study because of your availability on Amazon's Mechanical Turk Service. If you consent to participate in this research, your participation will include: 1) answering a brief number of demographic items; and (2) answering questions about your perceptions of different types of groups. All participation will take place online through this survey, and will require 20 minutes or less of your time.

### Risks

There are some potential risks to you by participating in this research and they include potentially feeling embarrassed answering some of the demographic questions. To prevent or to deal with these risks, you are free to skip any questions that might make you feel uncomfortable.

### Benefits and Compensation

The potential benefits of your participation in this research include learning about the process of research first hand and helping to advance the state of knowledge of groups. This research will help to improve understanding of people's perceptions and attitudes towards different groups. As a way to compensate you for any inconvenience related to your participation, you will be paid \$1.50 USD. If you consent to participate in this study, this form of compensation to you must not be coercive. It is unethical to provide undue compensation or inducements to research participants. If you would not participate if the compensation was not offered, then you should decline.

### Voluntary Participation

Your participation in this research must be completely voluntary. If you withdraw during survey completion, your responses will be discarded and will not be used in this research. If you wish to withdraw from the study after your survey responses have already been submitted, your data can be deleted if you contact Dr. Sakaluk with your confirmation code that is presented at the end of the study. If you do not retain this code, we will be unable to identify and delete your responses.

### Anonymity and Confidentiality

Your responses will be anonymous, as no one will be able to associate your individual answers with your identity. Your confidentiality and the confidentiality of the data will be via the security protocols in place for data collected through Qualtrics. All data collected through Qualtrics for this study will be stored on Qualtrics's protected Canadian servers which are located in Canada.

### Dissemination of Results and Disposal of Data

It is anticipated that the results of this study will be shared with others in the following ways: 1) conference oral and poster presentations; 2) press-releases and social media; and 3) peer-reviewed journal articles. In the course of dissemination, it may be necessary to share anonymized aggregated data, in order for external reviewers and readers to verify the accuracy of our analyses and research reports. This will be facilitated via Dr. Sakaluk's Open Science Framework page—a service for sharing research materials. Data from this study will be stored indefinitely, in order to maintain the verifiability of the findings to interested researchers and

readers.

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca)).

By completing and submitting the questionnaire, YOUR FREE AND INFORMED CONSENT IS IMPLIED and indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

*Please retain a copy of this letter for your reference.*

- I confirm that I am age 19 or older and consent to take part in this experiment. (1)
- I do not consent to take part in this experiment. (2)

*Skip To: End of Survey If Letter of Information for Implied Consent = I do not consent to take part in this experiment.*

*Perceptions of Others You are invited t...*

End of Block: Consent Form

---

Start of Block: Demographics

Q48

Background Information

Please tell us a bit about yourself. Results will only be reported in aggregate form. You may decline to answer these questions if you wish.

-----



Age What is your current age, in years?

▼ 19 (18) ... 90 (89)

-----

BirthSex What sex were you assigned at birth, meaning on your original birth certificate?

Male (1)

Female (2)

---

GenIdent Which best describes your current gender identity?

Male (1)

Female (2)

Indigenous or other cultural gender minority identity (e.g., two-spirit) (3)

Another term describes me better (e.g., gender fluid, non-binary; please specify) (4)

---

Ethnicity Which of the following best describes your ethnic background

- African (1)
  - Chinese (2)
  - European (3)
  - Filipino (4)
  - Indian (5)
  - Japanese (6)
  - Korean (7)
  - Southeast Asian (8)
  - Latino/Latina (9)
  - Indigenous (10)
  - Middle Eastern (11)
  - Multi-ethnic (12)
  - Something else (please specify) (13)
- 

-----

Nationality What is your nationality?

▼ Afghan (1) ... Something else (81)

-----

SO Which best describes your sexual orientation?

- Straight (e.g., heterosexual) (1)
  - Lesbian/Gay (2)
  - Bisexual (3)
  - Asexual (4)
  - Something else (please specify) (5)
- 

-----

Mono When it comes to relationships, I think of myself as:

- Monogamous (1)
  - Non-Monogamous (e.g., polyamorous, open relationships, swinging, etc.,) (2)
  - Questioning (3)
  - Something else (please specify) (4)
- 

-----

Rel Stat Are you...?

- single (1)
  - in a relationship (2)
- 

*Display This Question:*

*If Are you...? = in a relationship*

Relstat\_rel I am... (check all that apply)

- Casually dating (1)
  - Seriously dating (2)
  - Cohabiting (3)
  - Common-law union (4)
  - Married (5)
  - Something else (please specify) (6)
- 

-----  
*Display This Question:*

*If Are you...? = single*

Relstat\_sin I am... (check all that apply)

- Never married (1)
  - Casually dating (2)
  - Seriously dating (3)
  - Separated (4)
  - Divorced (5)
  - Widowed (6)
  - Not currently looking for a romantic partner (7)
  - Currently looking for a romantic partner (8)
  - Something else (please specify) (9)
- 

-----  
*Display This Question:*

*If Are you...? = single*

Sin Length How many years have you been single? In other words, how long has it been since your last serious relationship (e.g., 1.5, 1, 5, 10)

---

-----  
*Display This Question:*

*If Are you...? = in a relationship*

Rel Length If you are currently in a relationship (leave blank if not), for how many years have you been with your primary partner? (e.g., 1.5, 5, 10)

---

Friend R. Stat Most of my close friends are...

- single (1)
- in a relationship (2)

Single friend I have at least one close friend who is single

- Yes (1)
- No (2)

Sexual/Asexual In general, I consider myself to be:

- Sexual (i.e., someone who typically experiences sexual attraction and/or desire for partnered sexual activity) (1)
- Asexual (i.e., someone who does not typically experience sexual attraction and/or desire for partnered sexual activity) (2)
- Something else (please specify) (3)

---

Sex Act Have you been sexually active in the last year?

- Yes (1)
- No (2)

*Display This Question:*

*If Have you been sexually active in the last year? = No*

Sex Ever Have you been sexually active in the past?

- Yes (1)
  - No (2)
- 

Edu Please indicate your highest attained level of formal education

- High school diploma (1)
  - College/Trade-School diploma (2)
  - Undergraduate Degree (3)
  - Master's Degree (4)
  - Doctoral Degree (5)
  - Professional Degree (6)
- 

Polit I consider myself to be a(n)..

- Democrat (1)
  - Republican (2)
  - Independent (3)
  - Something else (please specify) (4)
- 

---

Attitudes Pol/Relig I think of myself as...

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	
Liberal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Conservative
Atheist	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Religious

SE Using the scale below, please indicate your agreement with the following statement:

"I have high self-esteem"

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

End of Block: Demographics

Start of Block: Canadian Entit



Can group Please answer the following statements regarding your perceptions of:

Canadians



How much do  
the group  
members  
interact with  
one another?  
(7)

To what  
extent are  
members of  
the group  
interdependent  
(i.e.,  
dependent on  
each other) for  
achieving the  
group's goals?  
(8)

Overall, how  
similar are  
members of  
this group to  
each other?  
(9)

---

Page Break

Canadians Still thinking about CANADIAN PEOPLE, please answer the following questions:

---

Can motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

Can control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

Can prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Canadian Entit

Start of Block: Rom Partners Entitativity



RomP Group Please answer the following statements regarding your perceptions of:

People in romantic relationships



How much do  
the group  
members  
interact with  
one another?  
(7)

To what  
extent are  
members of  
the group  
interdependent  
(i.e.,  
dependent on  
each other) for  
achieving the  
group's goals?  
(8)

To what  
extent are  
members of  
this group  
similar to one  
another? (9)

---

Page Break

RPs Still thinking about PEOPLE IN ROMANTIC RELATIONSHIPS, please answer the following questions

---

RP Motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

RP control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

RP Accept How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Rom Partners Entitativity

Start of Block: Single Entitativity



Single Group Please answer the following statements regarding your perceptions of:

Single people



How much do  
the group  
members  
interact with  
one another?  
(7)

To what  
extent are  
members of  
the group  
interdependent  
(i.e.,  
dependent on  
each other) for  
achieving the  
group's goals?  
(8)

To what  
extent are  
members of  
this group  
similar to one  
another? (9)

---

Page Break

Singles Still thinking about SINGLE PEOPLE, please answer the following questions:

---

Single Motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

Single Control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

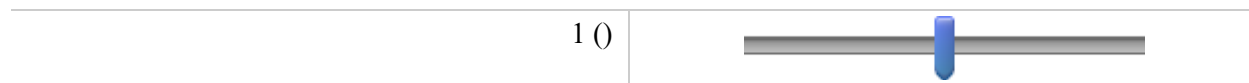
- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

Single Accept How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Single Entitativity

Start of Block: Minimal Group Entitativity



MG Group Please answer the following statements regarding your perceptions of:

People arbitrarily assigned to groups



How much do  
the group  
members  
interact with  
one another?  
(7)

To what  
extent are  
members of  
the group  
interdependent  
(i.e.,  
dependent on  
each other) for  
achieving the  
group's goals?  
(8)

Overall, how  
similar are  
members of  
this group to  
each other?  
(9)

---

Page Break

MGs Still thinking about PEOPLE ARBITRARILY ASSIGNED TO GROUPS, please answer the following questions:

---

MG motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

MG control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

MG prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Minimal Group Entitativity

---

Start of Block: Asexual Entit



Asexual Group Please answer the following statements regarding your perceptions of:

Asexual people (i.e., people who do not experience sexual desire or attraction)



How much do the group members interact with one another? (7)

To what extent are members of the group interdependent (i.e., dependent on each other) for achieving the group's goals? (8)

To what extent are members of this group similar to one another? (9)

---

Page Break

Asexuals Still thinking about ASEXUAL PEOPLE, please answer the following questions:

---

Asex motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

Asex control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

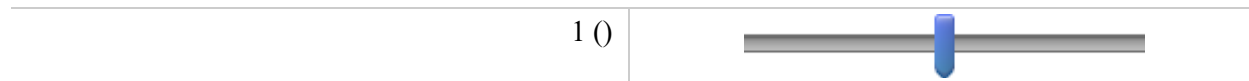
- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

Asex prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Asexual Entit

---

Start of Block: Sexual Entitativity



Sexual Group Please answer the following statements regarding your perceptions of:

Sexual people (e.g., people who experience sexual desire and attraction)



How much do the group members interact with one another? (7)

To what extent are members of the group interdependent (i.e., dependent on each other) for achieving the group's goals? (8)

To what extent are members of this group similar to one another? (9)

---

Page Break

Sexuals Still thinking about SEXUAL PEOPLE, please answer the following questions:

---

Sexuals Motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

Sexuals control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

Sexuals Prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Sexual Entitativity

Start of Block: GLB Entitativity



GLB Group Please answer the following statements regarding your perceptions of:

Gay, Lesbian, Bisexual (GLB) people



How much do  
the group  
members  
interact with  
one another?  
(7)

To what  
extent are  
members of  
the group  
interdependent  
(i.e.,  
dependent on  
each other) for  
achieving the  
group's goals?  
(8)

Overall, how  
similar are  
members of  
this group to  
each other?  
(9)

---

Page Break

GLBs Still thinking about GAY, LESBIAN, BISEXUAL (GLB) PEOPLE, please answer the following questions:

---

GLB motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

GLB control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

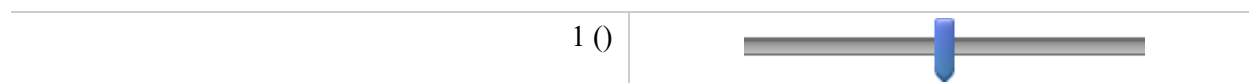
- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

GLB Prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: GLB Entitativity

Start of Block: Straight Entitativity



Heteros Group Please answer the following statements regarding your perceptions of:

Heterosexual people



How much do the group members interact with one another? (7)

To what extent are members of the group interdependent (i.e., dependent on each other) for achieving the group's goals? (8)

To what extent are members of this group similar to one another? (9)

---

Page Break

Heteros Still thinking about HETEROSEXUAL PEOPLE, please answer the following questions:

---

Het Motive To what extent do you believe group members' desire to be part of this group?

- 1 not at all (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 extremely (7)
- 

Het Control To what extent do you believe being a member of this group is caused by factors that people can control, or factors outside of people's control?

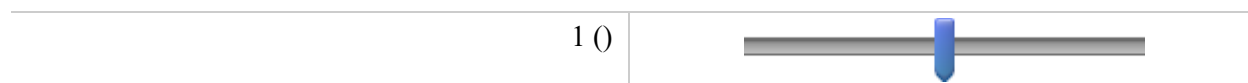
- 1 outside of individual control (1)
  - 2 (2)
  - 3 (3)
  - 4 (4)
  - 5 (5)
  - 6 (6)
  - 7 within individual control (7)
-

Het Prej How OK is it to have negative feelings about this group?

not okay (0)

perfectly ok (100)

0 10 20 30 40 50 60 70 80 90 100



End of Block: Straight Entitativity

Start of Block: Honesty Check

Q109 Please take a moment to answer one final question:

Honest I tried to answer the questions honestly

- not at all (1)
- rarely (2)
- sometimes (3)
- most of the time (4)
- all the time (5)

End of Block: Honesty Check

Start of Block: Feedback Form

Q61

Perceptions of Others Feedback Letter

Thank you for participating in this study!

This research is being conducted by Dr. John Sakaluk, an Assistant Professor in the Department of Psychology at the University of Victoria. We appreciate your time in participating in this study. The study you completed will help us to better understand how people perceive the nature of different types of groups. In this study, we asked you to rate a number of groups on how 'group-like' they are. We will analyze these ratings to determine the extent to which 'single people' are perceived as a group compared to other groups such as families or romantic partners,

which past research has found to be perceived as high in 'groupiness.' You were also asked to indicate how acceptable it would be to have negative feelings towards these groups. We will examine the relationship between peoples' perceptions of groups and the acceptability of negative feelings towards various groups. By comparing the relationship between perceived 'groupiness' and acceptability of prejudice across different groups, we hope to gain deeper insight into the nature of people's attitudes towards different groups. It is possible that thinking about these different groups may have induced some uncomfortable memories, thoughts, or emotions. These feelings are completely normal. If you'd like to talk to someone about any issues that came to your attention today, you may wish to consider contacting a mental health counselor. Helpful services are widely available, usually for a reasonable cost. You may find a counselor near you by going to the Canadian Psychological Association website (<http://www.cpa.ca/public/findingapsychologist/>) or the American Psychological Association website ([http://locator.apa.org/?\\_ga=2.257391624.249047176.1507404128-1357245020.1472584550](http://locator.apa.org/?_ga=2.257391624.249047176.1507404128-1357245020.1472584550)), depending on your location. If you have any questions about the research, you may feel free and contact our lab director, John Sakaluk ([sakaluk@uvic.ca](mailto:sakaluk@uvic.ca)). If you have any questions about your rights or treatment as a participant in this research project, please contact the Human Research Ethics Office at the University of Victoria (250-472-4545 or [ethics@uvic.ca](mailto:ethics@uvic.ca)).

End of Block: Feedback Form

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## Appendix B

### Supplemental Materials for Manuscript #1

#### Supplemental Materials

This document contains the supplemental information for *Are Single People a Stigmatized 'Group'? Evidence from Examinations of Social Identity, Entitativity, and Perceived Responsibility*.

#### Sample Demographics for Study 1 and Study 2

Table S1

*Sample characteristics for Study 1 and Study 2. M = mean, SD = standard deviation.*

	Study 1	Study 2
Age	M (SD)	M (SD)
	39.85 (13.21)	36.09 (11.60)
Relationship Status	%	%
Single	66	33
In a Relationship	34	67
Gender	%	%
Men	55	53
Female	44	46
Indigenous or other cultural gender minority identity	.3	
Another Gender Identity	.7	1
Sexual Orientation	%	%
Heterosexual	85	84
Gay/Lesbian	4	5
Bisexual	7	9
Asexual	2	1
Another Sexual Orientation	.3	1

Ethnicity	%	%
African	8	4
Chinese	2	3
European	70	78
Filipino	1	1
Indian	.6	1
Indigenous	.3	
Japanese	2	1
Korean	2	1
Latino/Latina	4	5
Middle Eastern	.7	
Southeast Asian	2	1
Multi-Ethnic	5	
Another Ethnicity	3	2

#### Latent Profile Analysis of Singles' Group Identification

Exploratory taxometric analyses. Before performing the LPA analysis, we conducted taxometric analyses (e.g., Meehl, 1995) to assess whether there was evidence for a categorical versus dimensional latent structure of group identification among singles. Using the RunCCFIPProfile function in the Rtaxometrics package (Ruscio & Wang, 2017) we computed Comparison Curve Fit Indices (CCFIs) using the first indicator of each group identification subscale. This function performs a series of taxometric analyses such as Mean Above Minus Below A Cut (MAMBAC), Maximum Eigenvalue (MAXEIG), and Latent-Mode (L-Mode; Meehl & Yonce, 1994; Waller & Meehl, 1998) using categorical comparison data that vary in taxon base rates. In this case, a taxon refers to a discrete latent class whose members are distinguishable from the complement profile (e.g., those not in the taxon; Ruscio, Ruscio & Carney, 2011). Thus, this method is not intended to test the number of latent dimensions

underlying a construct, but rather whether one taxon can be distinguished from the rest of the sample (e.g., whether at least 2 groups exist). The CCFI values for each analysis quantify the relative fit of a categorical model to a continuous model. A CCFI greater than .50 supports a categorical structure whereas a CCFI less than .50 supports a dimensional structure (values between .45 and .55 are ambiguous). The results of our taxometric analyses provided evidence for a dimensional latent structure of group identification, MAMBAC = 0.329, MAXEIG = 0.477, L-Mode = 0.396, Mean = 0.394. However, these results should be interpreted with caution because our total sample ( $N = 197$ ) was less than the recommended sample size for taxometrics ( $N > 300$ ) and our estimated taxon base rate, if our data were actually categorical, may also be lower ( $\text{MAXEIG}_{\text{base rate}} = 0.025$ ,  $\text{L-Mode}_{\text{base rate}} = 0.025$ ) than recommended taxon base rate and size ( $P > .05$ ,  $n = 50$ ; Ruscio, Ruscio, & Carney, 2011).

Latent profile analysis of singles' group identification (Hypotheses 4a and 4b). To examine whether latent profiles of singles with the predicted patterns of group identification were supported (*H4a*, *H4b*), we performed an LPA of group identification among singles. Specifically, we compared models using the four types of model parametrizations available in tidyLPA (Rosenberg et al., 2018): equal variances and covariances fixed to zero (EV/FC), varying variances and covariances fixed to zero (VV/FC), equal variances and equal covariances (EV/EC) and varying variances and varying covariances (VV/VC).

BICs for each model are displayed in Table S2. Models with one, six, or seven profiles were best supported according to the BIC, depending on which parameterization we employed. However, BICs for models involving more than 2-profile solutions were unable to be estimated using the VV/VC parameterization. Bootstrapped ( $n = 999$  resamples) likelihood ratio tests for models with differing numbers of profiles (1 vs. 2, 2 vs 3, etc.), within each type of model

parameterization, meanwhile, generally supported our extracting additional profiles. For the EV/FC parameterization, each additional profile from 1-profile to 9-profiles improved model fit (all  $ps = .001$ ). Similarly, for the VV/FC parameterization, each additional profile from 1-profile to 8-profiles improved model fit (all  $ps < .009$ ). For the VV/VC parameterization, the 2-profile solution fit the data better than the 1-profile solution ( $p = .001$ ). In contrast, for the EV/EC parameterization, 2-profile solution did not significantly improve upon the fit of the 1-profile solution ( $p = .63$ ).

Table S2

*BICs and LogLiks for each model parameterization and number of profiles*

Model	Number of Profiles								
	1	2	3	4	5	6	7	8	9
<hr/>									
EV/FC									
BIC	10790.78	10311.70	10096.06	9873.19	9829.25	9833.70	9776.58	9774.78	10070.06
LogLik	-5321.43	-5042.26	-4894.82	-4743.76	-4682.17	-4644.76	-4576.58	-4536.06	-4424.82
<hr/>									
VV/FC									
BIC	10790.78	10344.39	10105.34	10060.25	10039.86	9971.58	9993.99	10070.058	
LogLik	-5321.46	-5021.62	-4825.49	-4726.34	-4639.54	-4528.79	-4463.39	-4424.82	
<hr/>									
EV/EC									
BIC	8974.09	9024.83	9060.56	9087.24	9088.68	9153.18	9189.44	9290.67	9267.10
LogLik	-4172.69	-4158.44	-4136.68	-4110.40	-4071.49	-4064.12	-4042.63	-4053.61	-4002.21
<hr/>									
VV/VC									
BIC	8974.09	9299.53							
LogLik	-4172.69	-4018.42							
<hr/>									

Although the relative BICs and LRTS for the 1-profile vs 2-profile model under the EV/EC parameterization and the results of our exploratory taxometric analyses (see above exploratory taxometric analysis for details) suggested that distinct profiles of singles may not exist, we proceeded to evaluate the profile solutions for the EV/FC and VV/FC parameterizations given our a priori hypotheses regarding the existence of subgroups of singles (See Table S3). Based on the results of the LRTS, we decided to examine solutions containing no more than 9- and 8-profiles respectively for the EV/FC and VV/FC parameterizations.

Taken together, the BIC, LogLik and Entropy statistics for the 8-profile solution demonstrated the best fit for the data using the EV/FC parameterization whereas the 6-profile solution demonstrated the best fit for the data using the VV/FC parameterization (See Table S3.). Visually comparing the profile variances when unconstrained (VV/FC parameterization) to the profile variances when constrained to equality (EV/FC parameterization) suggested it was inappropriate to constrain them to equality. Thus, we rejected the EV/FC parameterization in favor of the VV/FC parameterization, which also provided a more parsimonious number of profiles. This decision was further supported by a significant  $\chi^2$  difference test of the logLik for the more complex VV/FC-6 profile model compared to the simpler EV/FC-6 profile model,  $\chi^2(70) = 231.94, p = < .001$ . The VV/FC-6 profile model also had the highest entropy statistic of all the profile solutions in Table 3. Granted, although the profiles yielded by this model were distinct, the sixth profile represented only 6% of the sample. Nonetheless, we decided to retain this profile because it was fairly consistent across models and represented a theoretically relevant and unique group of high-identifying singles. Accordingly, we retained the VV/FC-6 profile model as our final model.

Table S3

*Model comparison statistics for 1- to 9-profile solutions using the EV/FC and VV/FC parameterizations*

EV/FC				Average	Proportion
Parameterization				Posterior	in Profiles
Profile	BIC	LogLik	Entropy	Probabilities	(%)
1	10790.782	-5321.426	1	1.00	100
2	10311.698	-5042.26	0.962	0.96, 0.96	49, 51
3	10096.062	-4894.818	0.956	0.95, 0.96, 0.96	33, 52, 15
4	9873.189	-4743.757	0.961	0.95, 0.96, 0.95, 1	27, 17, 40, 16
5	9829.251	-4682.165	0.95	0.99, 0.95, 0.95, 0.93, 0.96	18, 17, 15, 36, 13
6	9833.697	-4644.764	0.939	0.92, 0.94, 0.93, 0.92, 0.98, 0.99, 0.98	30, 17, 11, 19, 17, 7
7	9776.583	-4576.582	0.946	0.93, 0.96, 0.95, 0.92,	18, 11, 13, 21, 15, 15,
					7

				0.95, 0.96,	
				0.98	
8	9774.78	-4536.06	0.953	0.95, 0.97,	4, 15, 11,
				0.97, 0.94,	22, 19, 15,
				0.92, 0.97,	7, 6
				0.96, 0.98	
9	10070.06	-4424.82	0.969	0.92, 0.97,	3, 6, 13,
				0.97, 0.94,	18, 13, 19,
				0.97, 0.93,	14, 6, 6
				0.97, 0.99,	
				0.95	

---

 VV/FC

Parameterization

Profile	BIC	LogLik	Entropy	Average Posterior Probabilities	Proportion in Profiles (%)
1	10790.782	-5321.46	1	1	100
2	10344.388	-5021.623	0.969	0.98, 0.96	51, 49
3	10105.337	-4825.491	0.969	0.96, 0.98, 0.99	42, 46, 12
4	10060.251	-4726.341	0.965	0.95, 0.97, 0.97, 1	28, 23, 41, 8
5	10039.86	-4639.539	0.97	0.95, 0.98, 0.96, 0.98, 1	28, 21, 10, 35, 6

6	9971.577	-4528.791	0.976	0.97, 0.97, 0.97, 0.98, 0.99, 1	21, 16, 9, 34, 14, 6
7	9993.978	-4463.385	0.967	0.97, 0.99, 0.99, 0.94, 0.95, 0.98, 0.98	15, 16, 8, 24, 17, 14, 6
8	10070.058	-4424.82	0.969	0.91, 0.97, 1, 0.95, 0.96, 0.99, 0.99, 0.99	5, 13, 8, 24, 16, 15, 6, 13

---

\*\*Note: Final selected model in bold.

Profile descriptions.

Next, we briefly describe each profile in terms of their identifying characteristics such as their average scores on the group identification subscales (see Table S4 for subscale information and Table S5 for demographic information for each profile), variability, and other characteristics.

*Profile 1: Central-yet-otherwise-low identifiers.* Profile 1 represents 21% of singles in our sample. This profile is characterized by above average centrality, below-average scores on the other four subscales of group identification, and similarity in variability of responses across items. Members of this profile had been single for an average of 8.32 years ( $SD = 13.43$ ) and the vast majority (82.5%) reported having at least one friend who was also single. These singles were also the most ethnically diverse of the profiles we extracted. Most of these singles identified as never married (82.5%), followed by widowed (15%), and separated (2.5%).

*Profile 2: Low-Identifiers.* Profile 2 represents 16% of singles in our sample. This profile is characterized by low scores on all indicators of group identification and the lowest mean scores of all the profiles on the centrality, in-group homogeneity, and self-stereotyping subscales, and vary little from one another in terms of their low centrality. Singles in this profile had been single for an average of 8.74 years ( $SD = 10.42$ ) and only  $\frac{3}{4}$  reported having at least one close friend who was single. Ninety percent of members of this profile had never been married and the remaining ten percent were widowed.

*Profile 3: Sad and Single-Conscious.* Profile 3 represented 9% of singles and was characterized by mostly low centrality scores except for the centrality item reflecting a greater tendency to think a lot about being single. This profile also had overall low satisfaction but slightly above-average solidarity, in-group homogeneity, and self-stereotyping, and singles within this profile were fairly similar to one another. These singles had been single for an average of 8.32 years ( $SD = 13.43$ ) and nearly all (94%) singles in this profile had at least one close friend who was single. Most of these singles (94%) had never been married and the remaining were widowed.

*Profile 4: Moderate-Identifiers.* Profile 4 is the largest profile representing 34% of the sample of singles. This profile had moderate, slightly above-average scores on all subscales of group identification. Furthermore, the standard deviations in this group suggested less variability for in-group homogeneity and self-stereotyping. Singles in this profile had been single for an average of 7.40 years ( $SD = 9.49$ ) and 88% reported having at least one close single friend. Seventy-three percent reported having never married and 19% were divorced.

*Profile 5: Happy-A-Loners.* Fourteen percent of the sample was represented by profile 5. Individuals in this profile had very high satisfaction scores, moderate centrality scores, and

below-average solidarity, in-group homogeneity, and self-stereotyping scores. The standard deviations indicated that members of this profile were highly similar to one another in their satisfaction but varied more in centrality and solidarity they felt with other singles. Singles in this profile had been single for the longest ( $M = 10.00$  years,  $SD = 8.73$ ) and 82% had at least one single friend in their social network. More than one quarter of these singles were divorced (28%) and the remaining had never been married.

*Profile 6: High-Identifiers.* Profile 6 represented the smallest number (6%) of singles in our sample. This profile was characterized by very high scores on all the subscales of group identification, as well as especially little variability on the centrality and satisfaction subscales. Singles in this profile had been single for the least amount of time ( $M = 6.64$  years,  $SD = 6.02$ ) and almost all (91.7%) had at least one close friend who was also single. Most (83%) of these high-identifying singles were never married.

Table S4

*Means (and standard deviations) for each profile of singles.*

Profile	Group Identification			In-Group	Self-
	Centrality	Satisfaction	Solidarity	Homogeneity	Stereotyping
1: Central-but-otherwise-Low	4.18 (.99)	3.25 (1.05)	3.33 (1.15)	2.79 (.99)	3.12 (1.19)
2: Low	1.84 (.69)	3.39 (1.17)	2.08 (.94)	2.47 (1.25)	2.73 (1.12)
3: Sad and Single-Conscious	2.90 (.81)	2.18 (.55)	4.78 (.85)	3.65 (.68)	3.91 (.73)
4: Moderate	4.00 (1.07)	4.40 (1.04)	4.70 (.92)	4.54 (.73)	4.82 (.73)
5: Happy-A-Loners	3.83 (1.57)	6.14 (.63)	3.33 (1.44)	2.52 (.96)	2.95 (1.01)
6: High	6.47 (.48)	6.46 (.47)	5.81 (1.02)	6.08 (.97)	6.08 (.95)
All Singles	3.72 (1.5)	4.18 (1.55)	3.88 (1.5)	3.58 (1.43)	3.87 (1.40)

Table S5

*Demographic information for the six profiles of singles.*

	Profile					
	1: Central- yet- otherwise- low identifiers	2: Low- Identifiers	3: Sad and Single- Conscious	4: Moderate- Identifiers	5: Happy- A- Loners	6: High- Identifiers
Age	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
	40.33 (14.15)	35.19 (12.37)	32.88 (6.98)	40.62 (14.39)	45.96 (13.16)	42.75 (16.85)
Gender	%	%	%	%	%	%
Male	60	62.5	59	70.5	35.7	41.7
Female	37.5	37.5	41	29	64	58
Another Gender Identity	2.5	-	-	-		
Sexual Orientation	%	%	%	%	%	%
Heterosexual	78	81	100	88	78.5	75
Gay/Lesbian	7.5	3		5.8	7	8
Bisexual	7.5	6		5.8	7	17
Asexual	7	9				
Another Sexual Orientation	0					
Ethnicity	%	%	%	%	%	%
African	7.5	13	11.7	10	3.5	42
Chinese	2.5	3	6	6		50
European	62.5	72	65	72	85.7	
Filipino	5					
Indian			6			8
Japanese	2.5					
Korean	5					
Latino/Latina		9	6	4	7.14	
Middle Eastern					4	

Southeast Asian	2.5		6	1.5
Multi-Ethnic	7.5			3
Another Ethnicity	5	3		3

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## Appendix C

### Supplemental Materials for Manuscript #2

#### Supplemental Materials

This document contains the supplemental information for *Singlehood and psychological attunement to the friendship bond*.

Other Variables in the Study (Not all variables were included at all waves)

- Body image
- Academic performance
- Adverse life events (i.e., death, health problems, financial problems)
- Year at University
- Living Situation
- New friend
- Friend conflict
- Parent closeness & conflict
- Romantic partner investment
- Romantic partner closeness
- Romantic relationship quality
- Romantic partner conflict
- New relationship initiation behaviors
- Expressions of romantic interest
- Partner religion
- Multiple partners
- Partner commitment
- Desire for commitment
- Partner conflict
- Relationship end (& partner who ended it)
- Romantic rejection
- Unsuccessful relationship initiation attempts
- New job
- Dieting behavior
- Positive life events
- Attachment figure
- Satisfaction with life
- Satisfaction with academics
- Satisfaction with career
- Satisfaction with weight
- Satisfaction with appearance
- Satisfaction with sex
- Best friend quality
- Self-ratings of communal and status qualities
- Stress
- Friendship conflict
- Friendship closeness
- Friendship dependence
- Reason for breakup
- Parent ethnicity and years in Canada
- Partner weight
- Partner height
- Partner gender
- Partner ethnicity
- Self standards
- Attitudes toward attachment figure
- Parents conflict
- Parents divorced

### Additional Information for Measures Reported in the Manuscript

Relationship status. At each Wave, participants reported if they were in a romantic relationship (“Are you currently in a romantic relationship?”), to which they answered “yes” (1) or “no” (0).

Friendship quality. At each Wave, participants reported their comfort being close to their friends (“I am comfortable being close to my friends”), their relational doubts about their friendships (“I wonder whether my friends really care for me;” reverse-coded), and friendship satisfaction (“In general, I am satisfied with my friendships”). Participants indicated their agreement with all three statements using a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). These items were averaged to form a composite measure of *friendship quality* (average  $\alpha = .71$ ).

Family quality. At each Wave, participants reported their comfort depending on their family (“I am comfortable depending on my family”), their relational doubts about their family relationships (“I worry that my family members don’t love me;” reverse-coded), and satisfaction with their relationship with their parents (“In general, I am satisfied with my relationship with my parents”). Participants indicated their agreement with all three statements using a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). These three items were averaged to form a composite measure of *family relationship quality* (average  $\alpha = .74$ ).

Romantic relationship quality. Participants responded to seven-items, including three items similar to those used to measure friendship quality and family quality, as well as additional items such as “My partner is exactly the type of person I want as a life-long partner”, “In general, my romantic partner is able to make me feel better when I am upset”, and “I’m confident that my partner thinks I’m a valuable person.” Participants indicated their agreement with each statement

using a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). These items were averaged to form a composite measure of romantic relationship quality (average  $\alpha = .83$ ).

Self-esteem. At each Wave, participants' self-esteem was measured using a four-item version of Rosenberg's Self-Esteem Scale (1965), consisting of the items "I feel I am a person of worth, at least on an equal basis with others;" "I feel that I have a number of good qualities;" "I certainly feel useless at times;" and "At times, I think I am no good at all." The latter two items were reverse coded prior to calculation of an average global self-esteem score. Participants indicated their agreement with each of these statements using a 7-point response format (from 1, *strongly disagree*, to 7, *strongly agree*). These four items were averaged to form a global measure of *self-esteem* (average  $\alpha = .73$ ).

Friendship investment. During Wave 5 only, participants answered four items adapted from Rusbult and colleagues' (1998) Investment Model of Commitment: "I have put a great deal into my friendship that I would lose if my friendship were to end;" "Compared to other people I know, I have invested a great deal in my relationship with my friend;" "It would take me a fairly long time to find another friendship as good as my current one;" and "It would be somewhat difficult for me to find another friend who meets my needs the way my close friend does." Participants indicated their agreement with each of these statements using a 7-point scale (from 1, *strongly disagree*, to 7, *strongly agree*). These four items were averaged to form a composite measure of *friendship investment* ( $\alpha = .84$ ).

## Descriptive Statistics for Singles and Partnered People at Each Wave

Supplemental Table 1. Descriptive Statistics of Measured Variables for Single and Partnered Participants at Each Wave

Variable	Wave	Single			Partnered			Group Differences (t-tests)		
		<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>CI</i> <sub>95%</sub>	<i>d</i>	<i>p</i>
Friendship Quality	1	5.49	1.12	152	5.69	1.13	117	-.47, .07	.18	.15
	2	5.57	1.18	126	5.54	1.21	127	-.27, .32	.02	.88
	3	5.36	1.16	118	5.63	1.02	101	-.56, .03	.24	.07
	4	5.44	1.08	85	5.45	1.16	85	-.35, .33	.01	.95
	5	5.30	1.15	68	5.52	1.07	82	-.57, .14	.20	.23
	6	5.57	1.18	59	5.66	.85	87	-.42, .25	.08	.62
	7	5.60	1.08	70	5.54	1.13	89	-.29, .42	.06	.70
Family Quality	1	5.73	1.25	153	6.04	.96	119	-.58, -.04	.27	.03
	2	5.75	1.10	127	5.77	1.26	127	-.32, .27	.02	.86
	3	5.89	1.02	120	5.85	1.12	101	-.25, .32	.04	.79
	4	5.98	.96	85	6.01	1.07	85	-.34, .28	.03	.84
	5	6.09	.70	68	5.98	1.11	84	-.19, .42	.12	.47
	6	6.01	1.09	59	5.96	1.06	85	-.32, .40	.04	.82
	7	6.09	.90	69	6.16	.89	87	-.36, .21	.08	.63
Rom. Rel. Quality	1				6.10	.71	121			
	2				6.06	.78	129			
	3				5.99	.80	107			
	4				6.03	.77	88			
	5				6.12	.71	83			
	6				6.01	.73	87			
	7				6.10	.79	86			
Self-Esteem	1	4.99	1.20	152	5.44	1.07	118	-.72, -.17	.39	.002
	2	5.08	1.31	130	5.30	1.13	128	-.52, .07	.19	.14
	3	4.90	1.25	120	5.38	.98	103	-.77, -.17	.42	.002
	4	5.07	1.25	86	5.40	1.14	85	-.69, .03	.28	.07
	5	4.94	1.20	68	5.54	1.17	82	-.99, -.22	.51	.002
	6	5.06	1.31	58	5.38	1.12	86	-.72, .08	.27	.12
	7	4.99	1.29	70	5.52	1.12	88	-.91, -.15	.44	.006

### Testing Exploratory Questions and Alternative Models

Can we flip friendship quality and friendship investment in our model?

*Tldr:* No. Friendship quality did not predict changes in friendship investment or subsequent self-esteem.

Although we believe that it is less plausible than our proposed model, whereby investment leads to improved friendship quality, it is possible that investment follows from exposure to a high-quality relationship instead. Such a model is in line with the recursive nature of psychological attunement that we propose. We therefore test whether friendship quality and friendship investment can be swapped in our original model, as doing so will provide some insight into the causal order of these variables.

Because not every measure was included at every wave, we had to use an earlier measure of relationship status (Wave 3) to predict friendship quality at Wave 4, and subsequent friendship investment at Wave 5. However, in this flipped model, relationship status did not directly predict friendship quality,  $b = -.37$ ,  $B = -.16$ ,  $SE = .26$ ,  $t(75) = -1.40$ ,  $p = .17$ , nor was there an indirect effect of relationship status on friendship investment via friendship quality,  $b = -.12$ ,  $95\% CI [-0.35, 0.04]$ ,  $p = .18$ . There was also no direct pathway from Wave 5 friendship investment to Wave 6 self-esteem,  $b = -.03$ ,  $B = -.06$ ,  $SE = .05$ ,  $t(72) = -1.07$ ,  $p = .29$ . These results lend support to our model over the alternative model.

Does friendship investment predict changes in friendship quality and self-esteem?

*Tldr:* There was no indirect path from relationship status to change in self-esteem through friendship investment and change in friendship quality.

We tested the same model as in the main manuscript, this time however, we examined how relationship status and friendship investment predict change in friendship quality and

subsequent self-esteem (Relationship Status [Wave 5] → Friendship Investment [Wave 5] →  $\Delta$ Friendship Quality [Wave 6] →  $\Delta$ Self-Esteem [Wave 6]). To assess change in friendship quality and self-esteem, we controlled for friendship quality at Wave 4 (there was no such measure in wave 5) and self-esteem at Wave 5 in the respective models.

First we entered gender (control variable), friendship quality at Wave 4 (control variable), and relationship status at Wave 5 into a regression predicting friendship investment at Wave 5, and relationship status still predicted investment,  $b = -.82$ ,  $B = -.26$ ,  $SE = .34$ ,  $t(75) = -2.44$ ,  $p = .02$ . We then added friendship investment at Wave 5 into the same regression predicting friendship quality at Wave 6, but Friendship investment at Wave 5 did not predict friendship quality at Wave 6 when Wave 4 friendship quality was controlled,  $b = .08$ ,  $B = .12$ ,  $SE = .06$ ,  $t(75) = 1.38$ ,  $p = .17$ . In other words, investment did not predict change in friendship quality between Waves 4 and 6. Furthermore, there was no indirect path from relationship status to change in friendship quality via investment,  $b = -.07$ ,  $95\% CI [-.20, .03]$ . When we added self-esteem at Wave 5 and friendship quality at Wave 6 to the same regression predicting self-esteem at Wave 6, Friendship quality at Wave 6 did predict self-esteem at Wave 6,  $b = .53$ ,  $B = .24$ ,  $SE = .10$ ,  $t(72) = 5.18$ ,  $p < .001$ . This suggests that change in friendship quality between Waves 4 and 6 predicted change in self-esteem between waves 5 and 6 (this is just the attunement effect we reported in the main manuscript, but wearing a different hat). However, there was no indirect effect from relationship status to change in self-esteem via friendship investment and change in friendship quality,  $b = -.03$ ,  $SE = .03$ ,  $95\% CI [-.11, .02]$ , most likely due to the lack of association between investment and change in friendship quality. As it turns out, there was a high degree of stability in Friendship quality over time (i.e.,  $r = 0.73$ ), thus controlling for Wave 4 friendship quality left little variance in Wave 6 friendship quality to explain in our analyses.

Are partnered people more attuned to romantic bonds than friendship bonds?

*Tldr:* People in relationships are not more attuned to their romantic relationships than their friendships.

We explored whether people are more psychologically attuned to their romantic relationships than their friendships when they are partnered. To evaluate this possibility, we added between- and within-person romantic relationship quality in the original model predicting partnered participants' self-esteem. Because we are collapsing across all timepoints, participants without romantic relationship quality data were dropped during analysis. The results are presented in Supplemental Table 2. Within-person changes in romantic relationship quality (i.e., PMC relationship quality) and within-person changes in friendship quality (i.e., PMC friendship quality) each independently predicted self-esteem, suggesting that when people are in romantic relationships, their self-esteem is attuned to both their romantic bond and their friendships. To test whether partnered participants' self-esteem was more strongly attuned to their romantic relationships than their friendships, we compared this model to a new model where person-mean centered friendship quality and person-mean centered romantic relationship quality were summed and included as a new predictor (see Judd & McClelland, 1998). Comparing the logLik of these two models suggests that psychological attunement to friendships and psychological attunement to romantic relationships do not differ,  $X^2(1) = 1.47, p = .23$ . Therefore it is not necessarily the case that partnered people are more psychologically attuned to their romantic relationships than their friendships.

Supplemental Table 2. Self-esteem as a function of between- and within- person friendship quality and romantic relationship quality for partnered people

Fixed Effects	Dependent Variable: Self-esteem				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>df</i>	95% <i>CI</i>
Intercept	1.34*	0.61	2.20	394	0.15, 2.52
Time in Study	0.14**	0.05	2.79	394	0.04, 0.24
Gender	0.38*	0.19	2.06	171	0.02, 0.75
PM Friendship Quality	0.51***	0.07	7.00	171	0.36, 0.65
PMC Friendship Quality	0.14**	0.04	3.33	394	0.06, 0.23
PM Romantic Relationship Quality	0.18	0.10	1.78	171	-0.02, 0.38
PMC Romantic Relationship Quality	0.23***	0.06	4.13	394	0.12, 0.34

Does romantic partner investment negatively predict friendship investment?

*Tldr:* Romantic partner investment did not predict friendship investment.

Qualitative data suggests that people might perceive their important relationships in a limited, zero-sum manner (Cronin, 2015). In other words, they may perceive that time invested in their friendships is time taken away from their romantic partner, and vice versa. If this is indeed the case, we would expect that psychological investment in a romantic partner would be inversely related to psychological investment in friendships. We tested a model investigating whether investment in a romantic partner negatively predicted investment in friendships among partnered people. Interestingly, romantic partner investment at Wave 5 was not a significant predictor of friendship investment at Wave 5,  $b = .01$ ,  $B = .009$ ,  $SE = .16$ ,  $t(78) = 0.08$ ,  $p = .94$ .

Therefore, it is not necessarily the case that partnered people view their relationships in a zero-sum way. Instead, both types of relationships appear to be distinct and have their own implications for well-being.

Does romantic quality predict friendship quality independent of time?

*Tldr:* Romantic relationship quality and friendship quality are positively associated. At times when romantic relationship quality increases, friendship quality also increases.

By the same zero-sum logic, we might expect that as romantic relationship quality increases (a signal of greater investment in this relationship), friendship quality may decrease. To test this, we entered time in study (measured in years) and romantic relationship quality into a model predicting friendship quality. We included both the average romantic relationship quality for each partnered participant over the course of the study (i.e., person mean [PM] romantic relationship quality) as well as each participant's deviation around their own mean level of romantic relationship quality (i.e., person-mean centered [PMC] romantic relationship quality) as predictors.

Both between- and within-person romantic relationship quality were positively associated with friendship quality. In other words, partnered participants with above average romantic relationship quality also tended to have above average friendship quality,  $b = .39$ ,  $SE = .10$ ,  $t(172) = 3.82$ ,  $p < .001$ . Within-person increases in romantic relationship quality also predicted within-person increases in friendship quality,  $b = .18$ ,  $SE = .06$ ,  $t(78) = 2.76$ ,  $p < .001$ .