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## Abstract

Students underutilize mental health services on college campuses in the United States. More research is needed to fully understand barriers to service use among this at-risk population and interventions should be created to address these barriers. Current research and interventions do not address group-level social comparison processes that elevate lack of service use. Particularly, pluralistic ignorance has not been assessed—that is, the systematic misperception of others' cognitions and behaviors within a social group. It is possible that pluralistic ignorance contributes to the underutilization of services on college campuses. I began this assessment in three studies. In Study 1 ( $N = 198$ ) college students misperceived other students as being less willing to use mental health services and as harboring more service use stigma compared to the average self-reported attitudes of the sample. In Study 2 ( $N_{T1} = 260$ ,  $N_{T2} = 145$ ) these group-level misperceptions were replicated. Furthermore, individual-level indicators of pluralistic ignorance (i.e., personal attitudes, perceptions of others' attitudes, and their interaction) predicted later pluralistic ignorance-related behavioral and attitudinal implications (e.g., changes in alcohol use and perceptions of academic success). In Study 3 ( $N = 378$ ) I experimentally assessed the chief components of a pluralistic ignorance intervention. I found evidence for the effectiveness of an intervention that incorporates both a norm misperception correction *and* a lesson about pluralistic ignorance in addressing misperceptions and increasing service use interest. In this research I utilize cross-sectional, longitudinal, and experimental methods to expose and assess pluralistic ignorance in a new context, I highlight the usefulness of using individual-level indicators of pluralistic ignorance to predict pluralistic ignorance-related implications, and I begin the necessary process of developing a pluralistic ignorance intervention.

*Keywords:* attitudes, mental health services, pluralistic ignorance, college students

PLURALISTIC IGNORANCE OF ATTITUDES TOWARD MENTAL HEALTH SERVICES  
AMONG COLLEGE STUDENTS

by

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B.A., Shippensburg University of Pennsylvania, 2016  
M.S., Syracuse University, 2018

Dissertation

Submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy in Social Psychology.

Syracuse University  
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## **Pluralistic Ignorance of Attitudes Toward Mental Health Services Among College Students**

Students underutilize mental health services on college campuses (Gaddis et al., 2018). Although researchers have assessed barriers to service use that exist within individuals (individual-level barriers), they have not assessed social barriers that exist in the group (i.e., college students) as a whole (group-level barriers). Pluralistic ignorance, a group-level phenomenon, could be particularly informative in this context. Pluralistic ignorance is defined as a group-level, systematic misperception of others' cognitions and behaviors (Allport, 1924; Katz & Allport, 1931). In other words, pluralistic ignorance characterizes the situation wherein group members "mistakenly believe that others' cognitions (attitudes, beliefs, feelings) and/or behaviors differ systematically from their own (i.e., a directional misperception)" (Sargent & Newman, 2021, p. 4). College students (being a part of a social group) are at risk for negative social comparison processes and pressure to conform to perceived norms (Levitan & Verhulst, 2016). If students do not readily (or openly) use mental health services, then a collective misperception regarding willingness to use services and service use stigma could exist. Specifically, college students could incorrectly underestimate their peers' willingness to use services and incorrectly overestimate the extent to which their peers harbor service use stigma. These misperceptions could, in turn, influence personal service use and have long-term implications for mental health, physical health, substance use, and academic performance. An analysis of this issue from a pluralistic ignorance perspective will both contribute to the field's understanding of service underutilization *and* expand research on pluralistic ignorance.

This research has two overarching purposes, the first relating to applied implications concerning service underutilization and the second pertaining to an expansion of research on pluralistic ignorance. First, I will identify a potentially modifiable factor, pluralistic ignorance,

that will contribute to the field's understanding of and approach to underutilization of mental health services on college campuses in the United States. Second, I will expand research on pluralistic ignorance through the assessment of pluralistic ignorance in a new context, and, by taking a rigorous approach to study design and research question development, I will encourage more in-depth investigations of pluralistic ignorance moving forward. In particular, I highlight the usefulness of employing cross-sectional, longitudinal, and experimental research designs in assessments of pluralistic ignorance. I also emphasize the utility of diversifying assessments of pluralistic ignorance-related implications. Finally, I encourage the development and expansion of research assessing pluralistic ignorance-based interventions.

In this chapter, I first provide an overview of the context, attitudes toward mental health services and service underutilization, and emphasize why an assessment of pluralistic ignorance in this context would contribute to the field's understanding of the problem. Next I provide an overview of pluralistic ignorance and expand on the ways in which this research program advances pluralistic ignorance research. I conclude with a concrete description of the current research program.

## **Mental Health Service Use**

### ***Mental Health Issue Prevalence, Implications, and Service Use***

Among U.S. adults, young adults (aged 18-25 years old) have the highest prevalence of mental illness ( $\approx$  9.9 million individuals in 2019; 29.4% of the young adult population), yet a disparity exists such that this age group has the lowest rates of treatment utilization (38.9% of young adults with a mental illness received treatment in 2019; Substance Abuse and Mental Health Services Administration [SAMHSA], 2020). Furthermore, young adulthood encompasses the median age of onset for several illnesses (e.g., anxiety, substance use disorders; Kessler et al.,

2007), and delayed treatment of mental health issues, a pressing problem in the United States (Wang, Berglund, et al., 2005), predicts adverse outcomes (e.g., Drake et al., 2020; Perkins et al., 2005; Post et al., 2010). Moreover, adverse outcomes could be exacerbated by a frequent comorbidity between substance use and mental health issues (Brière et al., 2014; Jané-Llopis & Matytsina, 2006). This comorbidity is of increased concern among the young adult college student population, as college students often perceive other students as harboring pro-alcohol attitudes—even when students’ self-reported attitudes are less positive (Prentice & Miller, 1993)—and these perceptions predict increased alcohol use (Foster et al., 2015).

Adverse outcomes associated with mental illness include, but are not limited to, decreased quality of life, increased risk of disability and mortality, increased prevalence of other health conditions (e.g., cardiovascular disease, diabetes), and increased costs of treatment and economic burden as individuals with mental health issues miss work due to illness (Birnbaum et al., 2010; Chen et al., 2011; Prince et al., 2007). Considering societal implications, U.S. worker productivity losses due to depression are estimated at \$2 billion (Birnbaum et al., 2010). Productivity losses due to other mental illnesses can be expected to add to this already alarmingly large loss, both in relation to missed work due to illness and reduced productivity while at work (for a review see Burton et al., 2008). It is increasingly clear why it is vital to emphasize ways to encourage mental health service use and early treatment among college students, an arguably at-risk population who will presumably enter the workforce upon graduation.

Alarmingly though, and as previously noted, only 30-40% of U.S. young adults in need of mental health services receive treatment, with rates varying depending on the mental health issue assessed (Gaddis et al., 2018; Kessler et al., 2005; SAMHSA, 2020; Wang, Lane, et al.,

2005). College students in particular have increased access to mental health services available on campus and do appear to benefit from programs designed to improve student mental health (e.g., Conley et al., 2013; Eva, 2019). Even so, services remain underutilized. In college student samples, a mere 30% of students seek professional support, whereas 80% seek some form of informal support (Gaddis et al., 2018). Furthermore, in 2019 only 13.3% of students on campus (averaged across 562 campus counseling centers) utilized campus counseling services (LeViness et al., 2020), whereas 78% of college students (across more than 60 institutions) reported a need for support to address emotional or mental health problems (Eisenberg & Lipson, 2020). Thus, there is ample reason to believe that young adults, including college students, are not seeking the mental health treatment they need (and especially concerning, the treatment that is available to them).

College students serve as a unique sub-population of young adults wherein barriers to receiving mental health treatment can be efficiently measured, treatment-seeking behavior can be assessed with reduced influence of extraneous variables, and interventions can be effectively evaluated. As such, it is important to assess treatment-seeking behavior and the effectiveness of prevention intervention programs aimed at decreasing barriers to receiving mental health treatment among college students. In turn, findings from this research program could be modified and applied to broader, non-student populations in conjunction with other measures aimed at increasing access to services in the first place.

### ***Barriers to Mental Health Service Use***

As previously indicated, barriers to mental health service use can be both structural (e.g., availability of local providers) and personal/attitudinal (e.g., harboring negative attitudes toward services). Researchers have identified many of these individual-level barriers to mental health

service use (e.g., fear of embarrassment, denial of problems, lack of knowledge about available resources, cost/health insurance, disclosure concerns, desire to handle problems alone; Cage et al., 2020; Ebert et al., 2019; Vidourek et al., 2014), and barriers to continued use of mental health services (e.g., demographic variables, health insurance coverage; Oswalt et al., 2019). As Ebert et al. (2019) found attitudinal barriers (e.g., fear of embarrassment, desire to handle problems alone) to be more influential and common than structural barriers (e.g., cost, ease of access), it is logical to place emphasis on attitudinally-based barriers in research and intervention initiatives.

A primary individual-level socially-relevant barrier addressed, stigma (collapsed across stigma types<sup>1</sup>), has a weak negative relationship with help-seeking behavior (for a meta-synthesis, see Clement et al., 2015; see also Parcesepe & Cabassa, 2013, and Schnyder et al., 2017). Research on treatment stigma—that is, stigma associated with mental health service use—established differences in the predictive validity of personally endorsed stigma and perceptions of others’ stigma, such that only personal stigma, and not perceived stigma, consistently predicted help-seeking attitudes and behavior when adjusting for each stigma type (Eisenberg et al., 2009). These findings were partially replicated in a U.K. sample, where personal stigma was a stronger predictor of help-seeking intentions compared to perceptions of others’ stigma (Cage et al., 2020). When assessed without adjusting for one another, however, perceptions of others’ stigma and personal stigma both predicted attitudes toward mental health services, where more negative stigma perceptions and personal beliefs were associated with more negative attitudes

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<sup>1</sup> Clement et al.’s (2015) meta-synthesis included studies assessing, “anticipated stigma (anticipation of personally being perceived or treated unfairly); experienced stigma (the personal experience of being perceived or treated unfairly); internalized stigma (holding stigmatizing views about oneself); perceived stigma (participants views about the extent to which people in general have stigmatizing attitudes/behaviour towards people with mental illness); stigma endorsement (participants’ own stigmatizing attitudes/behaviour towards other people with mental illness); and treatment stigma (the stigma associated with seeking or receiving treatment for mental ill health)” (pp. 11-12). The most commonly researched stigmas were perceived stigma and treatment stigma. When assessed separately (and not collapsed across stigma types), only internalized stigma and treatment stigma revealed a weak negative association with help-seeking. The remainder of the stigma types had no relationship with help-seeking.

toward services (Pedersen & Paves, 2014; cf. Lally et al., 2013). Nonetheless, it is possible that personal stigma and perceptions of others' stigma interact to uniquely predict help-seeking behavior.<sup>2</sup> In other words, the benefits of harboring low service use stigma could be dampened by *misperceptions* of others as harboring service use stigma. If this is the case, and if these misperceptions exist at the group-level, researchers will have reason to address this attitudinally-based group-level barrier in subsequent studies and interventions.

This research program will advance knowledge regarding barriers to service use. Although there is research on the known, individual-level barriers to service use, there remain important knowledge gaps regarding socially-relevant barriers that exist at the group-level. Indeed, of the articles assessing barriers to mental health service use that I reviewed for this research, I found only one article that specifically sought to distinguish between the roles of individual- and group-level stigma as barriers to service use. Specifically, Keum et al. (2018) found that while reductions in individual-level personal stigma did not predict positive help-seeking attitudes, reductions in group-level personal stigma did. In turn, it is apparent that group-level processes are predictive of positive (and negative) outcomes, and, when negative, group-level barriers can serve as a red flag warning that issues exist within a group.

In relation to pluralistic ignorance, this red flag warning indicates that perceptions are moving in a specific, inaccurate direction. These group-level barriers color the environment in which individual-level barriers exist and, in turn, could assist in heightening lack of service use.<sup>3</sup> For example, researchers assessing pluralistic ignorance of attitudes toward paternity leave

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<sup>2</sup> While researchers have assessed self-stigma as mediating the relationship between perceptions of others' stigma and attitudes toward mental health services (e.g., Latalova et al., 2014), to my knowledge, researchers have not assessed the interactive effects of personal stigma and perceptions of others' stigma on attitudes/behaviors.

<sup>3</sup> Keum et al. (2018) did not assess the role of individual- and group-level changes in perceptions of others' stigma. Group-level changes in personal stigma could have occurred in unison with group-level changes in perceptions of others' stigma. As Keum et al. note, it is possible that reductions in individual-level personal stigma did not predict changes in help-seeking attitudes due to such group-level differences in perceived social norms.

established that individuals misperceived others as harboring more negative attitudes compared to the average self-reported attitudes of the sample (Miyajima & Yamaguchi, 2017). This established group-level misperception could activate individual-level processes, such as pressures to be socially desirable, and together could produce situations where individuals do not use paternity leave, even when it is personally desired. Considering the self-motivated nature of help-seeking, any barriers that would influence individual-level processes and actions, including group-level barriers, should be strongly considered and thoroughly investigated.

### ***Interventions to Encourage Mental Health Service Use***

Interventions developed in response to the identified individual-level barriers primarily focus on decreasing stigma associated with service use, advancing mental health screenings for early detection of mental illness, and increasing awareness of mental health problem symptomology (Hunt & Eisenberg, 2010); however, limited research on the effectiveness of these interventions is available (Hunt & Eisenberg, 2010; for an awareness-based intervention, see Pace et al., 2018). Researchers recently demonstrated the ability of two interventions (both stigma-focused) to increase help-seeking behavior, but subsequent treatment was sought by only 25% of the clinically diagnosed sample (Stanley et al., 2018). In addition, use of mental health services varies across college campuses, with some rates of service use being two to three times higher than on other campuses (Eisenberg et al., 2011). This inconsistency could indicate that interventions are either not being implemented consistently across campuses and/or are not generalizable to different environments (e.g., private vs. public institutions, institutions with different attitudinal norms or perceived attitudinal norms). There remains a need for the development of effective, easily implemented, and generalizable interventions.



This research program will advance knowledge on interventions created to address service underutilization. Pluralistic ignorance interventions are distinct from interventions addressing individual-level barriers (e.g., anti-stigma campaigns). Although pluralistic ignorance and individual-level barriers might lead to similar results among individuals within a group (e.g., reduced mental health service use), the interventions appropriate for addressing them differ. For example, anti-stigma campaigns focus on dispelling common stereotypes and addressing prejudice within individuals (Gronholm et al., 2017). These interventions do not address systematic misperceptions of others' attitudes, and individuals could still perceive others as harboring stigma beliefs even if they do not themselves after the intervention. In comparison, pluralistic ignorance interventions directly address systematic and maladaptive misperceptions of others' stigma by correcting misperceptions (e.g., Geiger & Swim, 2016; Schroeder & Prentice, 1998). Indeed, Pedersen and Paves (2014) explicitly call for modifications of existing stigma-based interventions that include "actual norms about public stigma against seeking care" (p. 148) and Pompeo-Fargnoli (2020) argues that such interventions should highlight that "often times...students' perceived stigma is much greater than their personal stigma...that this discrepancy is not unique to themselves, but occurring for the majority of students" (p. 6). In other words, individual-level barrier interventions attempt to negate existing beliefs and attitudes within individuals and pluralistic ignorance interventions attempt to reframe how people think about the social world around them, making the relevant interventions, and presumably the success of those interventions, distinct.<sup>4</sup> An integrated intervention that addresses previously

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<sup>4</sup> Perceived public service use stigma is associated with the development of self-stigma (e.g., Vogel et al., 2013). In turn, a pluralistic ignorance intervention could be effective in correcting norm misperceptions and promoting positive attitudes toward mental health services, including decreased self-stigma.

identified individual-level barriers and pluralistic ignorance might be most effective in increasing mental health service use.

## **Pluralistic Ignorance**

### *Definition*

This research program addresses a critical barrier to progress by highlighting a specific social psychological, group-level process: pluralistic ignorance. To reiterate, pluralistic ignorance occurs when individuals mistakenly believe others' cognitions and/or behaviors are systematically different from their own (Allport, 1924; Katz & Allport, 1931; Krech & Crutchfield, 1948; Miller & McFarland, 1991). Pluralistic ignorance is primarily operationalized by a directional misperception (e.g., people mistakenly believe that others' attitudes are systematically more positive or negative than their own).<sup>5,6</sup> In the current context, pluralistic ignorance would characterize the situation in which college students systematically misperceive other students as harboring either more negative or more positive attitudes toward mental health services than the average self-reported attitudes of the student sample.

It is often implied that there should be behavioral conformity (and ultimately attitudinal change) among individuals in accordance with the group-level misperceptions (Prentice &

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<sup>5</sup> Researchers have also proposed the illusion of universality as a definitional component of pluralistic ignorance (i.e., when the observed variability in personal attitudes is larger than perceived variability in perceptions of others' attitudes; Allport, 1924; Miller & McFarland, 1991; Prentice & Miller, 1993); however, this claim is inconsistently acknowledged (see Boon et al., 2014). I consider the presence of a directional misperception alone to be enough to claim that pluralistic ignorance exists within a population (for an extended discussion, see Sargent & Newman, 2021). As such, I deemphasize results pertaining to the illusion of universality in the current report. Instead, I describe (in footnotes) results from F-tests assessing equality of variances between personal and perceptions of others' attitudes, as these tests could provide preliminary evidence for (or against) the illusion of universality (Lambert et al., 2003; Prentice & Miller, 1993).

<sup>6</sup> Pluralistic ignorance could easily be confused with subjective norms (i.e., beliefs about what others approve or disapprove of; Ajzen, 1985). Subjective norms are determined by perceptions of others' expectations and one's personal motivation to comply with those expectations. Motivation to comply with expectations is not needed to make claims about pluralistic ignorance. Furthermore, the subjective norm construct exists at the individual-level and is used to predict individual-level behavior, whereas pluralistic ignorance is a group-level phenomenon used to characterize a situation involving a collective misperception among group members.

Miller, 1993); however, few researchers directly assess these implications (for examples of such assessments, see Mandeville et al., 2016, and Rinker et al., 2017; for a review, see Sargent & Newman, 2021). In the current context, shared misperceptions of other college students as harboring negative attitudes toward services could contribute to lack of service use among individuals, as well as decreased willingness to express positive attitudes toward services. Indeed, the assessment of implications in pluralistic ignorance research is vital to understanding how pluralistic ignorance ultimately affects attitudes and behaviors, as conformity with misperceived majorities could in turn facilitate the presence of pluralistic ignorance in the population. Over time, it is possible for this unnecessary conformity to produce attitudinal change in line with the misperceived majority, in part due to cognitive dissonance (Festinger, 1957). Once attitudinal change occurs, pluralistic ignorance will no longer exist in the population, and the once misperceived norm will in fact become the new norm. For example, individuals who decide to not use services (in part due to misperceptions of others' attitudes as being negative) could justify their decision by developing unwarranted negative attitudes toward services themselves. Over time the attitudes of the population would become more negative, and what was once a misperception would now be the reality. As such, it is of the utmost importance to conduct longitudinal assessments of pluralistic ignorance, both to assess pluralistic ignorance-related implications across time, but also to map fluctuations in pluralistic ignorance itself.

### ***Empirical Support for Assessing Pluralistic Ignorance of Attitudes Toward Services***

Although pluralistic ignorance of attitudes toward mental health services has not been directly assessed among a college student population, some previous research lends empirical support for pursuing the current research program. Only one study has directly investigated pluralistic ignorance in relation to willingness to use mental health services, and this research

was conducted using a police officer sample (Karaffa & Koch, 2016; for an earlier version of this work, see Karaffa & Tochkov, 2013). In this research, police officers misperceived other officers as being less willing to use mental health services compared to the average self-reported willingness of the sample (Karaffa & Koch, 2016). This study did not, however, assess pluralistic ignorance-related implications, nor did it assess pluralistic ignorance using a longitudinal design. Nonetheless, with mental health service use often being a private matter, it is plausible that the observed collective misperception also exists regarding willingness to use services on college campuses.

Furthermore, non-social psychologists, such as researchers associated with the Healthy Minds Network, have assessed personal attitudes and perceived norms related to mental health service use stigma. Although these researchers have not approached the topic from a pluralistic ignorance framework, inspection of the Healthy Minds Study data (collected through the Healthy Minds Network) highlight a disconnect between personal attitudes and perceptions of others' attitudes. For example, in a 2018-2019 data report, 6% of students personally agreed with a statement indicating stigmatizing beliefs, whereas 47% of students believed others would agree with the statement (Eisenberg & Lipson, 2019; see also Eisenberg et al., 2009). Pompeo-Fargnoli (2020) more directly assessed misperceptions of others' stigma among U.S. college students and found college students to overestimate others' stigma, but she did not connect her findings to the pluralistic ignorance phenomenon. As such, there is ample reason to believe that pluralistic ignorance of attitudes toward mental health services would be observed in a college student population.

Beyond attitudes toward mental health services, researchers have observed pluralistic ignorance in relation to other health-related topics. As previously mentioned, researchers

observed pluralistic ignorance of attitudes toward paternity leave (i.e., individuals underestimated others' willingness to use paternity leave), providing an explanation for low rates of paternity leave utilization (Miyajima & Yamaguchi, 2017). In a similar vein, researchers observed pluralistic ignorance of attitudes toward sexual harassment (i.e., individuals overestimated the extent to which others were comfortable with sexual harassment) and found pluralistic ignorance to be associated with lower likelihood of reporting sexual harassment (Halbesleben, 2009). Within a college student population, researchers found that students misperceived others as being more comfortable drinking alcohol and (at least some) students conformed to the misperceived majority through attitudinal and behavioral adaptation (e.g., Prentice & Miller, 1993; Rinker et al., 2017; Segrist et al., 2007). Thus, there is reason to believe that the previous research on pluralistic ignorance of health-related topics and pluralistic ignorance among college students would generalize to the current research program and be equally important in the context of college student attitudes toward mental health services.

### ***Expanding Research on Pluralistic Ignorance***

As previously noted, there are many ways in which the current research program contributes to an expansion of research on pluralistic ignorance. First and foremost, the current research program applies pluralistic ignorance to a new context, attitudes toward mental health services among college students. This research also takes a rigorous approach to study design and research question development that will encourage more in-depth investigations of pluralistic ignorance in the future (both in the current context and in assessments of other contexts). Specifically, I emphasize the use of multiple methods in pluralistic ignorance assessment (including cross-sectional, longitudinal, and experimental research designs), I highlight the use of individual-level indicators of pluralistic ignorance to predict individual-level

pluralistic ignorance-related attitudinal and behavioral outcomes, I underscore the importance of assessing other pluralistic ignorance-related factors that could moderate the relationships between individual-level indicators of pluralistic ignorance and outcomes, and I utilize experimental methods to refine components of effective pluralistic ignorance interventions.

**Methods used to assess pluralistic ignorance.** Most researchers assess pluralistic ignorance cross-sectionally (e.g., Prentice & Miller, 1993, Sandstrom & Bartini, 2010; Sandstrom et al., 2013; for a review of pluralistic ignorance research design variation, see Sargent & Newman, 2021). This approach is ideal for simply observing pluralistic ignorance. However, it does not speak to changes in pluralistic ignorance across time, nor does it allow for comprehensive observation of pluralistic ignorance-related implications. Indeed, temporal precedence cannot be established, and researchers using cross-sectional designs must rely on anticipated behavior, in-the-moment decisions, and/or retrospective accounts of behavior to assess pluralistic ignorance-related implications.

Some researchers have experimentally manipulated pluralistic ignorance and measured associated outcomes, effectively establishing temporal precedence and causality (e.g., Munsch et al., 2014). Establishing temporal precedence and eliminating the possibility of reverse causality is vital to the development of a deeper understanding of the relationships between constructs (e.g., determining if lack of service use is a function of perceptions of others' as harboring negative attitudes toward services or vice versa). A small group of researchers also placed an emphasis on measuring pluralistic ignorance and its implications longitudinally (e.g., Mandeville et al., 2016; Rinker et al., 2017), and Schroeder and Prentice (1998) conducted a longitudinal study with an experimental manipulation. No study, however, has utilized longitudinal or experimental methods in assessments of pluralistic ignorance of attitudes toward mental health

services. To expand research on pluralistic ignorance and thoroughly understand its implications in the current context, I use a combination of cross-sectional, longitudinal, and experimental methods (effectively highlighting the utility of each research design in relation to research on pluralistic ignorance).

Researchers are similarly inconsistent in how they measure pluralistic ignorance and, in turn, how they make claims about the existence of pluralistic ignorance—that is, they are inconsistent in the types of questions used to assess personal and perceptions of others’ attitudes (for a review, see Sargent & Newman, 2021). Some researchers use comparative or proportional questions (e.g., “compared to yourself, how do others...”; e.g., Prentice & Miller, 1993), whereas other researchers use discrete questions (e.g., “how do you...” and “how do others...”; e.g., Bourgeois & Bowen, 2001). When using comparative questions, researchers could categorize individuals based on perceptions of others as being more positive, more negative, or the same as oneself, and, in turn, could compare category frequencies to determine the existence of pluralistic ignorance. If researchers use discrete questions, they could, for example, run paired *t*-tests comparing personal and perceptions of others’ attitude scores to assess whether pluralistic ignorance exists. Sargent and Newman (2021) argue that discrete questions allow for the clearest pluralistic ignorance conclusions and are most commonly used when calculating specific individual-level indicators of pluralistic ignorance (see discussion below). I emphasize best practices by using discrete questions throughout the current research program.

### **Operationalizations of individual-level indicators of pluralistic ignorance.**

Researchers also differ in how they operationally define individual-level indicators of pluralistic ignorance (for a review, see Sargent & Newman, 2021). As previously mentioned, these operationalizations are dependent on the ways in which researchers measure pluralistic ignorance

and vary with the research question being addressed. When using individual-level indicators of pluralistic ignorance to predict pluralistic ignorance-related implications, some researchers use personal scores, perceptions of others scores, and their interaction in predictive models (e.g., Zhu & Westphal, 2011). Others use computed scores, such as accuracy scores (e.g., Buzinski et al., 2018) or self-other discrepancy scores (e.g., Flave-Novak & Coleman, 2019).

An accuracy score (calculated by subtracting the sample mean personal attitude score from the perception of others' attitude score, i.e., a linear transformation of the perception of others' attitude score) signifies how accurate each individual is in their perceptions of others. Self-other discrepancy scores (calculated by subtracting the perception of others' attitude score from the personal attitude score) signifies how subjectively different individuals view themselves from most others. But, as discussed by Sargent and Newman (2021), the most rigorous test of the relationship between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications involves a predictive model that does not include accuracy and self-other discrepancy scores, but instead includes the personal attitude score, the perception of others' attitude score, and their interaction. This model "partials out the variance accounted for by the main effects of self- and other-scores, allowing for a direct assessment of the unique variance displayed by their interaction" (p. 13). Moreover, this test speaks to whether the pattern of beliefs at the individual level that contributes to the observation of pluralistic ignorance at the group level has implications for individuals within the group. In other words, one can determine if individuals who are in the majority but misperceive others' attitudes to be in line with the pattern of pluralistic ignorance observed at the group level experience different outcomes than those who are either in the minority and/or those who do not misperceive others' attitudes. Meanwhile, it is beneficial to use accuracy scores specifically for comparisons of pluralistic



ignorance between groups and self-other discrepancy scores when they can assist in describing complex patterns to readers. I reflect these best practices in the current research program.

**Expansion of pluralistic ignorance-related implication assessment.** Researchers have primarily focused on pluralistic ignorance-related implications that directly relate to the pluralistic ignorance context under investigation. In turn, researchers have comparatively neglected to assess other plausible extended outcomes that are perhaps less directly related to pluralistic ignorance. For example, alcohol use is directly related to pluralistic ignorance of attitudes toward alcohol among college students, but other extended outcomes could be assessed, such as academic performance. Extended implication assessments can be very informative, as demonstrated by Munsch et al. (2018). In their assessment of pluralistic ignorance of attitudes toward masculine norms in the workplace (referred to as “the masculinity contest”), they assessed direct implications, such as job satisfaction, as well as extended implications, such as mental health and relationship conflict. These extended assessments are needed to fully understand the potential implications that pluralistic ignorance can have on individuals within the group, especially when considering that these implications could effectively serve to perpetuate misperceptions within that group. To highlight the importance of these investigations, I place emphasis on assessing implications both directly related to negative attitudes toward mental health services (i.e., less service use), as well as extended implications, including more mental distress, worse physical health, more risky behavior (e.g., substance use), and worse academic performance. Furthermore, in Study 2 I take an advanced approach to implication assessment through the use of a longitudinal research design, where I can specifically assess changes in implications across time, providing a more nuanced understanding of the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications.

**Moderators of the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications.** Researchers rarely empirically emphasize the constructs that could intensify or otherwise moderate the outcomes related to pluralistic ignorance. However, understanding such processes could assist in furthering the field's understanding of pluralistic ignorance and would be useful in the development of pluralistic ignorance-based interventions. For example, Schroeder and Prentice (1998) implemented a pluralistic ignorance intervention that involved students in the experimental condition of the study learning about (1) others' true attitudes toward alcohol use (i.e., correcting misperceptions) and (2) the pluralistic ignorance phenomenon. They found fear of negative evaluation to moderate the relationship between perceptions of others' attitudes and alcohol use in the control condition, but this moderation was not observed in the experimental condition (an indication that the intervention reduced the prescriptive strength of the misperceived norm). More research is needed to determine which factors relate to pluralistic ignorance processes, individual-level indicators of pluralistic ignorance, and in turn, pluralistic ignorance-related implications.

I begin this assessment by highlighting the roles of need to belong and public self-consciousness as they relate to relations between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications. Need to belong refers to the need to maintain strong, positive social relationships (Baumeister & Leary, 1995; Leary et al., 2013), thus avoiding social rejection and ostracism (Williams, 1997). Public self-consciousness refers to concern about how others will perceive and react to oneself (Fenigstein et al., 1975; Scheier & Carver, 1985). Need to belong and public self-consciousness are both integrally related to perceived norms and social comparisons, and in turn could amplify the implications of

misperceptions of others' attitudes toward mental health services and/or serve as additional barriers to service use beyond perceptions of others' attitudes. I underscore the importance of these assessments in the current research program.

**Pluralistic ignorance interventions.** Few researchers have directly assessed the viability of pluralistic ignorance-based intervention components. As previously noted, Schroeder and Prentice's (1998) intervention for pluralistic ignorance of attitudes toward alcohol use involved teaching individuals about pluralistic ignorance *and* correcting norm misperceptions. The intervention was successful in that (at least some) individuals who received the intervention drank less alcohol compared to those who did not receive the intervention. Importantly though, the intervention consisted of a focus-group in which trained personnel discussed the misperception and implemented the pluralistic ignorance lesson in-person (which takes extensive time and resources), and the two intervention components were not assessed separately. The effectiveness of each intervention component alone and implemented via a computer-administered task, which could be more widely employed and more generalizable across contexts, remains unknown in the existing literature.

Other researchers attempting to address pluralistic ignorance have focused solely on norm misperception corrections. For example, Geiger and Swim (2016) observed pluralistic ignorance of attitudes toward climate change, and, in a follow-up study, manipulated pluralistic ignorance by providing participants with (falsified) visual representations of others' opinions about climate change. In one condition, participants were led to believe that others shared increased concerns about climate change (a misperception correction addressing pluralistic ignorance), whereas, in another condition, participants were led to believe that others did not share increased concerns about climate change (no misperception correction). Compared to those

who did not receive a misperception correction, individuals in the misperception correction condition were more willing to express their attitudes toward climate change (for similar misperception correction procedures, see Munsch et al., 2014, and Van Grootel et al., 2018). As previously noted, no study has assessed the comparative and combined effectiveness of the two primary intervention components (a pluralistic ignorance lesson and a misperception correction), nor has a study assessed pluralistic ignorance-based interventions in the context of attitudes toward mental health services. I address both of these gaps in the literature in the final study of this research program, and in doing so, I provide the empirical evidence needed to confidently move forward with the development of online-administered interventions aimed at addressing pluralistic ignorance and its implications.

### **The Current Research Program**

This research program will identify a potentially modifiable factor that could impact utilization of mental health services on college campuses in the United States. This research will fill the identified gaps in the literature pertaining to use of mental health services and the pluralistic ignorance literature by being the first to apply pluralistic ignorance to the issue of mental health service underutilization in cross-sectional, longitudinal, and experimental studies among college students. This research program consists of three studies. Study 1 establishes the existence of pluralistic ignorance in the population using a cross-sectional survey. Study 2 uses longitudinal methods to assess pluralistic ignorance across time, specifically looking at how individual-level indicators of pluralistic ignorance predict longitudinal changes in direct and extended pluralistic ignorance-related implications, as well as the roles of need to belong and public self-consciousness in these longitudinal relationships. Finally, Study 3 uses an experimental design to assess the effectiveness of pluralistic ignorance intervention components

in correcting norm misperceptions and promoting positive mental health service use-related outcomes. Collectively, these studies will have applied implications for efforts addressing service underutilization as well as other public health issues characterized by pluralistic ignorance, and they will significantly expand research on pluralistic ignorance.

### **Study 1: A Cross-Sectional Study**

I conducted Study 1 to (primarily) establish the existence of pluralistic ignorance of attitudes toward mental health services among college students. Specifically, I sought to establish the existence of pluralistic ignorance of willingness to use mental health services and pluralistic ignorance of service use stigma. I expected individuals to (1) mistakenly believe others were less willing to use services compared to the average self-reported willingness of the sample and to (2) mistakenly believe others harbored more service use stigma compared the average self-reported stigma beliefs of the sample.

### **Method**

#### ***Participants and Design***

Two hundred and one undergraduate students completed this correlational/survey-based study for course credit. Requirements for participation included being 18 years of age or older and enrolled in a psychology course. I excluded three participants from analyses due to suspicion of duplicate study completion.<sup>7</sup> The final sample consisted of 198 participants.<sup>8</sup> The participants ranged in age from 18 to 24 years old ( $M = 18.8$  years old,  $SD = 1.2$  years) and were mostly female ( $n = 152$ ); 44 individuals identified as male, and two preferred not to answer. The

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<sup>7</sup> I matched childhood zip code and IP address and, where there were duplicates across both items, I retained the first survey completion for analyses.

<sup>8</sup> Using an a priori power calculation, I determined that 199 participants would provide sufficient power (power = .80) to detect effects of a small size (effect size  $d_z = .20$ ) with an alpha of .05 using a paired  $t$ -test (i.e., providing sufficient power to draw conclusions regarding the existence of pluralistic ignorance).

majority of the sample identified as White or European American ( $n = 113$ ), followed by Asian ( $n = 51$ ), Black or African American ( $n = 12$ ), multi-racial/mixed ( $n = 10$ ), Hispanic or Latino ( $n = 9$ ), American Indian or Alaska Native ( $n = 1$ ) and other race/ethnicity ( $n = 1$ ); one individual preferred not to answer. Most individuals were born in the United States ( $n = 151$ ).<sup>9</sup>

### ***Procedure and Measures***

I recruited participants for a study titled “Attitudes Toward Mental Health Services.” Upon registering to participate, participants received a link to complete the study on a personal electronic device (e.g., computer, phone). Participants responded to questions assessing personal and perceptions of others’ willingness to use mental health services, personal and perceptions of others’ mental health service use stigma, mental and physical health, substance use, mental health service use, and personal demographics. Upon completion of the study, participants were debriefed and provided compensation through course credit. For brevity, I provide detailed descriptions only for the primary measures used in analyses. For all study measures, see Appendix A.

**Willingness to use mental health services (pluralistic ignorance).** Participants completed an adapted version of Karaffa and Koch’s (2016) 10-item measure assessing personal willingness to use mental health services for various reasons (e.g., *I would want to use mental health services if I were experiencing problems in my family relationships*) using an 11-point response scale (1 = *Very Unwilling*; 11 = *Very Willing*). I averaged all items to compute a composite score of personal willingness to use mental health services ( $\alpha = .91$ , skew = -0.57,

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<sup>9</sup> Among those who indicated that they were born outside of the United States, the majority identified as Asian ( $n = 39$ ), followed by Black or African American ( $n = 3$ ), White or European American ( $n = 3$ ), Hispanic or Latino ( $n = 1$ ) and other race/ethnicity ( $n = 1$ ).

kurtosis = 0.12; Karaffa & Koch, 2016,  $\alpha = .83$ ), where higher scores indicate more personal willingness to use services.

Participants then completed a modified 10-item measure assessing perceptions of others' willingness to use services (e.g., *Other Syracuse students would want to use mental health services if they were experiencing problems in their family relationships*) using the same 11-point response scale. I averaged all items to compute a composite score of perception of others' willingness to use mental health services ( $\alpha = .88$ , skew = 0.08, kurtosis = 0.11; Karaffa & Koch, 2016,  $\alpha = .88$ ), where higher scores indicate perceptions of others as being more willing to use services.

**Mental health service use stigma (pluralistic ignorance).** To measure pluralistic ignorance of mental health service use stigma, I used items assessing attitudes toward mental health services that were previously adapted from the Discrimination-Devaluation (D-D) Scale (Link, 1987; Link et al., 1989) and used among a college student population (for recent iterations of items and coding, see Healthy Minds Network, 2019; for descriptions of early iterations of these scales, see Eisenberg et al., 2009). Participants completed the three-item scale used in the 2019-2020 Healthy Minds Study assessing personal service use stigma (e.g., *I would willingly accept someone who has received mental health treatment as a close friend*) using a 6-point response scale (1 = *Strongly Agree*; 6 = *Strongly Disagree*). After reverse-scoring two items, I averaged all items to compute a composite score for personal service use stigma ( $\alpha = .57$ , skew = 2.03, kurtosis = 6.22; Eisenberg et al., 2009,  $\alpha = .78$ ), where higher scores indicate more personal service use stigma.<sup>10</sup>

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<sup>10</sup> Nine individuals (5% of the sample) had a response set (e.g., responded *Disagree* or *Strongly Disagree* on all scale items). Scale reliability excluding those individuals increased dramatically ( $\alpha = .72$ ). I created a two-item

Participants then completed the 3-item scale assessing perceptions of others' mental health service use stigma (e.g., *Most Syracuse students would willingly accept someone who has received mental health treatment as a close friend*) using the same 6-point response scale. After reverse-scoring one item, I averaged all items to compute a composite score of perceptions of others' service use stigma ( $\alpha = .74$ , skew = 0.28, kurtosis = -0.60; Eisenberg et al., 2009,  $\alpha = .89$ ), where higher scores indicate perceptions of others as harboring more service use stigma.

As the personal service use stigma composite was non-normally distributed, I ran all analyses involving personal service use stigma untransformed and log transformed (transformed skew = 0.75). In all cases, the statistically significant relationships observed using the untransformed variable remained significant when using the log transformed variable. This pattern indicates that the significant findings observed using the untransformed models are not due to extreme observations. For simplicity, I report results from models using the untransformed variable (although I acknowledge that extreme values in the skewed distribution could produce underestimated effect sizes).

**Service use, mental health, and physical health.** Participants completed an item assessing mental health service use over the past year using a 5-point response scale (1 = *Never*; 5 = *4 or more times a week*). As this variable was non-normally distributed (skew = 1.98, kurtosis = 3.16), and standard transformations did not effectively eliminate the non-normality, I used a dichotomized version of the variable in analyses (0 = no service use; 1 = used services).

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averaged composite after removing the positively worded item (i.e., the item that did not load with the other two items). Both the three- and two-item composites similarly correlated with perceptions of others' stigma,  $r_s = .21$  and  $.23$ , respectively,  $p_s < .003$ . As such, I used the three-item composite for analyses.



Among the participants in the sample, 151 individuals (76.3%) reported no use of services in the past year and 47 individuals (23.7%) reported use of services in the past year.

Participants also completed the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), a 9-item scale assessing the prevalence of depressive symptoms over the past two weeks (e.g., *feeling down, depressed, hopeless*) using a 4-point response scale (0 = *Not at all*; 3 = *Nearly every day*). I summed all items to create a composite score for depression ( $\alpha = .88$ , skew = 0.91, kurtosis = 0.51; Kroenke et al., 2001,  $\alpha = .89$ ).

I assessed sleep interference on daily functioning as a measure of physical health, where participants indicated their perceptions of sleep interference on their daily functioning over the past two weeks using a 5-point response scale (1 = *Not at all interfering*; 5 = *Very much interfering*; skew = 0.29, kurtosis = -0.67).

Finally, participants also completed items assessing personal mental illness status (0 = no personal mental illness; 1 = personal mental illness) and family history of mental illness (0 = no family mental illness; 1 = family mental illness). Among the participants in the sample, 48 individuals (24.2%) identified as having a personal mental illness and 134 individuals (67.7%) identified as not having a personal mental illness; 16 individuals (8.1%) preferred not to answer. Regarding family history of mental illness, 74 individuals (37.4%) identified as having a family member with a mental illness and 114 individuals (57.6%) identified as not having a family member with a mental illness; 10 individuals (5.0%) preferred not to answer.

**Substance use.** Participants responded to several questions assessing tobacco and alcohol use based on the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001). The tobacco use item assessed general smoking behavior on a three-point response scale (1 = *Everyday*; 3 = *Not at all*). As few individuals reported using tobacco, I dichotomized the

variable for analyses (0 = no tobacco use; 1 = tobacco use). Among the participants in the sample, 181 individuals (91.4%) reported no use of tobacco products and 17 individuals (8.6%) reported use of tobacco products. For individuals who reported smoking, I measured typical frequency of daily cigarettes smoked (not used in analyses).

The alcohol use item assessed frequency of alcohol consumption over the past six months using a 5-point response scale (1 = *Never*; 5 = *4 or more times a week*; skew = 0.01, kurtosis = -1.23). For individuals who reported consuming alcohol, I measured typical frequency of drinks consumed and the tendency to drink five or more drinks on one occasion (neither used in analyses).

**Demographics.** Participants responded to several questions assessing demographic information, including year in school, political affiliation (American National Election Studies, 2019), objective socioeconomic status (SES), subjective social class (Adler et al., 2000), childhood zip code, childhood neighborhood classification, race/ethnic group identification, gender, age, where the participant was born, how many years the participant had lived in the United States, if English was the participant's first language, and English fluency. I used a subset of these variables in exploratory analyses assessing group differences in misperceptions of others' attitudes (see exploratory results below).

## **Results**

In Table 1 I provide means and standard deviations for the variables used in the current confirmatory and exploratory implication assessment analyses, as well as zero-order correlations among the variables.

### *Pluralistic Ignorance*

**Pluralistic ignorance of willingness to use mental health services.** I observed pluralistic ignorance of willingness to use mental health services, such that individuals mistakenly believed others were less willing to use services ( $M = 6.55$ ,  $SD = 1.75$ ) compared to the self-reported average willingness of the sample ( $M = 6.90$ ,  $SD = 2.14$ ), paired  $t(197) = 2.33$ ,  $p = .021$ , 95% confidence interval (CI) [0.05, 0.65].<sup>11</sup>

**Pluralistic ignorance of mental health service use stigma.** I observed pluralistic ignorance of mental health service use stigma, such that individuals mistakenly believed others harbored more service use stigma ( $M = 2.61$ ,  $SD = 0.88$ ) compared to the self-reported average stigma beliefs of the sample ( $M = 1.67$ ,  $SD = 0.83$ ), paired  $t(197) = -12.29$ ,  $p < .001$ , 95% CI [-1.09, -0.79].<sup>12</sup>

### *Exploratory Analyses: Implication Assessments*

I conducted several exploratory analyses to inform the development of Studies 2 and 3. In these exploratory analyses I aimed to better understand the relationships between personal attitudes and perceptions of others' attitudes (individual-level indicators of pluralistic ignorance), and their relationships with service use, willingness to use services, mental and physical health (specifically, depression and sleep interference on daily functioning, respectively), and substance use (specifically, tobacco and alcohol use).

**Service use.** As previously noted, the service use variable (in the continuous form) was highly skewed, where 151 participants (76%) reported never using mental health services. As

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<sup>11</sup> As a reminder, F-tests assessing equality of variances between personal attitudes and perceptions of others' attitudes could provide preliminary results relating to the illusion of universality (Lambert et al., 2003; Prentice & Miller, 1993). There was more variance in the willingness of the sample ( $s^2 = 4.57$ ) compared to estimations of others' willingness ( $s^2 = 3.07$ ),  $F(197, 197) = 1.49$ ,  $p = .005$ , 95% CI [1.13, 1.97].

<sup>12</sup> The variance of the sample ( $s^2 = 0.70$ ) was not significantly different than the variance observed in estimations of others' stigma ( $s^2 = 0.77$ ),  $F(197, 197) = 0.90$ ,  $p = .470$ , 95% CI [0.68, 1.19].

such, I used logistic regression analyses to assess the odds of individuals using mental health services based on personal attitudes, perceptions of others' attitudes, and their interaction (see Table 2).

Adjusting for one another, personal willingness to use services predicted service use, such that the odds of using services were greater for each one-unit increase in personal willingness (OR = 1.56), whereas perceptions of others' willingness did not predict service use, nor did I observe an interaction between the variables.

Adjusting for one another, personal service use stigma and perceptions of others' service use stigma predicted service use. Individuals were 0.55 times as likely to use services for each one-unit increase in personal service use stigma, and, interestingly, the odds of using services were *greater* for each one-unit increase in perceptions of others' stigma (OR = 1.52). I did not observe an interaction between the variables.

**Willingness to use services.** Using linear regression analyses, I predicted personal willingness to use services as a function of personal service use stigma, perceptions of others' service use stigma, and their interaction (see Table 3). Adjusting for one another, higher levels of personal service use stigma were associated with lower levels of personal willingness to use services, whereas perceptions of others' service use stigma were not associated with personal willingness to use services. Furthermore, I did not observe an interaction between the variables.

**Mental and physical health.** I used a series of linear regression analyses to predict mental and physical health (specifically, depression and sleep interference on daily functioning, respectively) as a function of personal attitudes, perceptions of others' attitudes, and their interaction (see Table 4). Below I describe these relationships, starting with the willingness-

related individual-level indicators of pluralistic ignorance and followed by the stigma-related individual-level indicators of pluralistic ignorance.

**Willingness to use services.** Adjusting for one another, personal willingness to use services did not predict depression, whereas perceptions of others' willingness to use services did, such that greater perceptions of others' willingness to use services were associated with lower levels of depression. I also observed an interaction between the variables. I am most interested in the relationships between personal willingness to use services and depression on the basis of perceptions of others' willingness to use services; however, post hoc simple slope analyses indicated that these relationships were too small to reliably detect.<sup>13</sup> Instead I describe the interaction in terms of the relationship between perceptions of others' willingness to use services and depression on the basis of personal willingness to use services. For people who reported higher levels of personal willingness to use services (1 *SD* above the mean), perceptions of others as being more willing to use services was associated with less depression,  $b = -1.00$ ,  $SE_b = 0.31$ ,  $t(194) = -3.18$ ,  $p = .002$ , 95% CI [-1.62, -0.38]. On the other hand, for people who reported lower levels of personal willingness to use services (1 *SD* below the mean), perceptions of others' willingness to use services was not associated with depression,  $b = -0.16$ ,  $SE_b = 0.29$ ,  $t(194) = -0.56$ ,  $p = .576$ , 95% CI [-0.74, 0.41]. Put another way, for people who were more willing to use services (i.e., in the majority regarding willingness to use services), perceptions of others as being more willing to use services was related to less depression, but for people who were less willing to use services (i.e., in the minority regarding willingness to use services),

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<sup>13</sup> For people who perceived others as being more willing to use services (1 *SD* above the mean), personal willingness to use services was not associated with depression,  $b = -0.27$ ,  $SE_b = 0.26$ ,  $t(194) = -1.05$ ,  $p = .294$ , 95% CI [-0.77, 0.24]. For people who perceived others as being less willing to use services (1 *SD* below the mean), personal willingness to use services was also not associated with depression,  $b = 0.41$ ,  $SE_b = 0.24$ ,  $t(194) = 1.73$ ,  $p = .085$ , 95% CI [-0.06, 0.89].

perceptions of others' willingness to use services was not related to depression. Regarding sleep interference on daily functioning, neither personal willingness nor perceptions of others' willingness to use services were statistically significant predictors (adjusting for one another). I also did not observe an interaction between the variables.

*Service use stigma.* Adjusting for one another, personal service use stigma did not predict depression, whereas perceptions of others' service use stigma did, such that greater perceptions of others' service use stigma were associated with higher levels of depression. I did not observe an interaction between the variables. Adjusting for one another, personal service use stigma and perceptions of others' service use stigma did not predict sleep interference on daily functioning. I did, however, observe an interaction between the variables. Here (and moving forward) I describe the interaction in terms of the simple slopes of personal service use stigma at high and low levels of perceptions of others' service use stigma. Post hoc simple slope analyses indicated that, for people who perceived others as harboring low service use stigma (1 *SD* below the mean), low personal service use stigma was not associated with sleep interference on daily functioning,  $b = 0.01$ ,  $SE_b = 0.12$ ,  $t(194) = 0.06$ ,  $p = .956$ , 95% CI [-0.23, 0.24]. On the other hand, for people who perceived others as harboring more service use stigma (1 *SD* above the mean), low personal service use stigma was associated with more sleep interference on daily functioning,  $b = -0.42$ ,  $SE_b = 0.13$ ,  $t(194) = -3.34$ ,  $p = .001$ , 95% CI [-0.67, -0.17]. Put another way, for people who perceived others as harboring less service use stigma (an accurate perception), low personal stigma was not related to sleep interference on daily functioning, but for people who perceived others as harboring more service use stigma (an inaccurate perception), low personal stigma was related to more sleep interference on daily functioning.

**Substance use.** I used a series of logistic and linear regression analyses to predict tobacco use (see Table 5) and alcohol consumption (see Table 6), respectively, as a function of personal attitudes, perceptions of others' attitudes, and their interaction. Adjusting for one another, neither personal willingness to use services nor perceptions of others' willingness to use services predicted tobacco use or alcohol consumption. I also did not observe an interaction between the variables in predicting either substance use outcome. Similarly, adjusting for one another, neither personal service use stigma nor perceptions of others' service use stigma predicted tobacco use or alcohol consumption. Again, I did not observe an interaction between the variables in predicting either substance use outcome.

In all, personal attitudes and perceptions of others' attitudes (when adjusting for one another) were associated with (collectively) service use, willingness to use services and depression. Furthermore, personal attitudes and perceptions of others' attitudes interacted to predict implications twice. Specifically, willingness-related individual-level indicators of pluralistic ignorance interacted to predict depression, and stigma-related individual-level indicators of pluralistic ignorance interacted to predict sleep interference on daily functioning. I further discuss these findings below.

### ***Exploratory Analyses: Group Differences***

It is possible for some subpopulations to harbor stronger misperceptions than others, and these differences highlight which groups are at a greater risk for experiencing pluralistic ignorance-related implications. To assess group differences, I created accuracy scores for perceptions of others' willingness to use services and for perceptions of others' service use stigma (i.e., linear transformations of the perception of others' attitude scores, where I subtracted the average willingness and stigma beliefs of the full sample from each individual's estimate).

I explored the possibility of various group differences in misperceptions (e.g., groups based on race and gender); however, the only consistent group difference that prevailed across willingness- and stigma-related estimate accuracy was between those who identified as having a mental illness ( $n = 48$ ) and those who identified as not having a mental illness ( $n = 134$ ). People who identified as having a mental illness underestimated others' willingness to use services by, on average, 1.14 scale points ( $SD = 1.50$ ), whereas individuals who did not identify as having a mental illness underestimated others' willingness by, on average, 0.14 scale points ( $SD = 1.78$ ). The difference in underestimation was statistically significant,  $t(180) = 3.47$ ,  $p < .001$ , 95% CI [0.43, 1.57]. Similarly, people who identified as having a mental illness overestimated the extent to which others harbor service use stigma by, on average, 1.19 scale points ( $SD = 0.84$ ), whereas individuals who identified as not having a mental illness reported overestimations by, on average, 0.84 scale points ( $SD = 0.86$ ). Again, the difference in overestimation was statistically significant,  $t(180) = -2.44$ ,  $p = .016$ , 95% CI [-0.63, -0.07].

I did observe additional group-based differences in estimate accuracy for perceptions of others' service use stigma, specifically on the basis of race and college year.<sup>14</sup> Students who identified as Asian ( $n = 51$ ) overestimated the extent to which others harbor service use stigma by, on average, 1.16 scale points ( $SD = 0.84$ ), whereas individuals who identified as White

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<sup>14</sup> I explored differences between participants who identified as Asian and White for two primary reasons. First, the second largest racial identification category among the sample (behind White) was Asian. This was the case for all three studies reported in this paper. In turn, in this study and in the following studies, I had the most power to detect differences between those who identified with these two racial categories. Second, although Asian is a heterogeneous racial category, previous research lends support to grouping individuals in this way. For example, previous research demonstrated that Asian Americans (vs. White Americans) harbor more negative attitudes toward mental illness and mental health treatment (e.g., Jimenez et al., 2013) and utilize fewer mental health services (e.g., Yang et al., 2020). These U.S. trends reflect larger cross-cultural differences in attitudes toward mental illness. For example, individuals residing in Eastern countries (e.g., China, Korea) report more mental illness stigma than individuals residing in Western countries (e.g., the United States, Germany; Krendl & Pescosolido, 2020). On the basis of this previous research, it is reasonable to explore and report differences between Asian and White-identifying individuals' attitudes toward mental health services. Importantly, there were no cases across all three studies in which the observed racial differences were further moderated by birthplace.



( $n = 113$ ) reported overestimation by, on average, 0.80 scale points ( $SD = 0.87$ ),  $t(162) = 2.42$ ,  $p = .017$ , 95% CI [0.06, 0.64]. Sophomores, Juniors, and Seniors ( $n = 48$ ) overestimated the extent to which others harbor service use stigma by, on average, 1.19 scale points ( $SD = 0.77$ ), whereas Freshmen ( $n = 150$ ) reported overestimations by, on average, 0.86 scale points ( $SD = 0.90$ ),  $t(196) = 2.26$ ,  $p = .025$ , 95% CI [0.04, 0.61].

## **Discussion**

The primary purpose of Study 1 was to establish the existence of pluralistic ignorance of willingness to use mental health services and pluralistic ignorance of service use stigma among college students. My hypotheses were supported, and in both cases individuals harbored mistaken perceptions of others' attitudes (providing support for the continuation of this line of research).

Exploratory results emphasize the need to further investigate individual-level indicators of pluralistic ignorance as predictors of service use. Personal willingness to use services was associated with higher odds of using services; perceptions of others' willingness was not a significant predictor. Personal and perceptions of others' service use stigma predicted the odds of using services, such that higher odds of using services were associated with lower personal stigma and with *higher* perceptions of others' stigma. These findings counter research suggesting that primarily personal stigma, and not perceptions of others' stigma, predict service use (e.g., Eisenberg et al., 2009), and support Cage et al.'s (2020) finding of a positive relationship between perceptions of others' stigma and help-seeking intentions. Individuals who use services could be hyper-aware of the potential stigma associated with service use and mental illness and/or could have personally experienced negative stigma-based reactions from others in the past (for related discussions see Quinn & Earnshaw, 2011, and Wu et al., 2017). In turn, these

individuals could perceive more negative attitudes toward services among others. If this is the case, service users might be inclined to not discuss their service use with others (see related literature on “passing”; e.g., Goffman, 1963), which could further facilitate pluralistic ignorance in the population. Moreover, one avenue for intervention could include mental health practitioners addressing these misperceptions directly with their clients (for a discussion of this point see Pompeo-Fargnoli, 2020). Nonetheless, these relationships would be better explained in a longitudinal study, where individual-level indicators of pluralistic ignorance can be measured before, after, and/or during service use.

Exploratory analyses investigating individual-level indicators of pluralistic ignorance as predictors of extended pluralistic ignorance-related implications also revealed interesting findings that are worthy of further investigation. Willingness- and stigma-related individual-level indicators collectively predicted depression, sleep interference on daily functioning, and alcohol use, highlighting the need to continue the assessment of these and other extended implications (e.g., academic performance). Furthermore, some relations were foreseeable (e.g., the perception of others as being more willing to use services was associated with lower levels of depression among those who were willing to use services), whereas others were more surprising (e.g., higher personal service use stigma was associated with lower levels of alcohol consumption, according to their zero-order correlation). It is possible that unanticipated findings are a function of studying a college student population in particular (e.g., alcohol use among college students differs from non-college students; Slutske, 2005). However, it is also possible that using a cross-sectional design simply does not give justice to the complexities underlying these relationships. A longitudinal study is needed to better understand these relationships.

In two cases, personal attitudes and perceptions of others' attitudes interacted to predict pluralistic ignorance-related implications, specifically when predicting depression and sleep interference on daily functioning. The pattern was similar in both cases. For people who were more willing to use services (those in the majority), higher levels of depression were associated with lower perceived levels of others' willingness to use services (in line with the direction of pluralistic ignorance observed in the population), but this relationship was not observed for people who were less willing to use services (those in the minority).<sup>15</sup> Similarly, for people who perceived others as harboring more service use stigma (an inaccurate perception), higher levels of sleep interference on daily functioning were associated with lower levels of personal service use stigma (in line with the direction of pluralistic ignorance observed in the population), but this relationship was not observed for people who perceived others as harboring less service use stigma (an accurate perception).<sup>16</sup> Together, these findings indicate that the existence of pluralistic ignorance can serve as a warning sign that individuals within the population could be experiencing negative implications from the misperception, and that these implications could become exaggerated as personal attitudes and misperceptions increasingly reflect the pattern observed at the group-level. Of course, more research is needed to better understand the complexities underlying these relationships.

Finally, exploratory analyses highlighted the possibility of certain subpopulations experiencing stronger misperceptions than others, making them more at risk for negative pluralistic ignorance-related implications and, in turn, promising potential targets for future

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<sup>15</sup> People who are less willing to use services might have less of a need to use services in the first place (e.g., less depression), which could speak to the null relationship between depression and perceptions of others' willingness to use services among these individuals.

<sup>16</sup> People who perceive others as harboring less service use stigma might seek more support for issues that could contribute to sleep interference on daily functioning (especially considering that the misperception of others' service use stigma barrier is not at play), which could speak to the null relationship between sleep interference and personal service use stigma among these individuals.

interventions. For example, individuals who self-identified as having a mental illness (compared to those who identified as not having a mental illness) harbored stronger misperceptions of others' willingness to use services and misperceptions of others' service use stigma. Thus, this population might be especially vulnerable to negative pluralistic ignorance-related implications, which is alarming considering this population might experience the most benefit from using services and, if services were used and successful, individuals in this population could serve as catalysts in changing norm misperceptions.

### *Limitations*

In combination with previous research, the evidence presented in this study justifies proceeding with further investigation of pluralistic ignorance in this context and pluralistic ignorance-related implications. Nonetheless, there are several limitations that I should address. First, the participants in this study were enrolled in an Introductory Psychology course, and, although individuals across majors on campus enroll in this course, it is possible that the sample represented a subset of students who were especially attuned to mental health issues, who might be less likely to stigmatize people who seek out services, and who could (potentially) be more willing to seek services themselves. As such, there is a possibility that their estimates of other students' attitudes, while still different from their own, were not as inaccurate as they appear. Study 2 corrects for this limitation by recruiting students across campus (and not just those enrolled in an Introductory Psychology course).

In addition, this study used a cross-sectional design that did not allow for observation of attitudinal and behavioral change over time. Study 2 directly addresses this limitation by implementing a longitudinal design, where attitudinal and behavioral change can be measured and individual-level indicators of pluralistic ignorance used to predict changes in service use and

pluralistic ignorance-related implications across time. This study also did not assess constructs that could moderate the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications. Study 2 addresses this limitation by measuring and testing the moderating roles of need to belong and public self-consciousness, as both could be related to the pluralistic ignorance-related processes and implications assessed. Finally, this study highlighted the prevalence of a problematic pattern of beliefs but did not begin to assess the ways in which to address the issue. Study 3 addresses this limitation by assessing the effectiveness of pluralistic ignorance intervention components in correcting misperceptions and, in turn, limiting the negative consequences associated with pluralistic ignorance.

### **Study 2: A Longitudinal Study**

In Study 2 I aimed to confirm the existence of pluralistic ignorance with a new sample of college students and to fill a gap in the literature by being the first to apply pluralistic ignorance to the issue of mental health service underutilization in a two-wave longitudinal study on a college campus. I also aimed to emphasize the assessment of pluralistic ignorance-related constructs (i.e., need to belong and public self-consciousness) that could amplify pluralistic ignorance-related implications (i.e., implications for service use, mental and physical health, substance use, and academic performance) and serve as additional barriers to positive health outcomes. Of note, I specifically broaden implication assessment in this study by highlighting risky behavior and academic performance as extended pluralistic ignorance-related implications (adding to the service use, mental/physical health, and limited substance use consequences previously assessed; see discussion below).<sup>17</sup> Importantly, the longitudinal nature of this study

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<sup>17</sup> As previously noted, research on pluralistic ignorance that has assessed pluralistic ignorance-related implications has primarily assessed implications closely related to the pluralistic ignorance context assessed (e.g., pluralistic ignorance of attitudes toward drinking and assessment of changes in drinking behavior). This study is unique in that

allows for (1) the assessment of pluralistic ignorance across time and (2) the ability to predict *changes* in pluralistic ignorance-related implications as a function of individual-level indicators of pluralistic ignorance.

## Hypotheses

I detail the primary hypotheses in Table 7 and preregistered them on Open Science Framework (OSF) prior to data collection.<sup>18</sup> I provide general summaries of the basic hypotheses below, with detailed (directional) hypotheses available in Table 7.

Hypotheses 1 and 2: I expected to replicate the pluralistic ignorance findings observed in Study 1 at Time 1 (T1) and Time 2 (T2), and I expected T1 individual-level indicators of pluralistic ignorance (i.e., personal and perceptions of others' attitudes) to positively correlate with their respective T2 measurements.

Hypothesis 3 and 4: I anticipated T1 individual-level willingness-related and stigma-related indicators of pluralistic ignorance (i.e., personal attitudes, perceptions of others' attitudes, and their interaction) to predict T2 pluralistic ignorance-related implications, including service use, willingness to use services (for the stigma-related individual-level indicators of pluralistic ignorance only), mental and physical health, substance use, and academic performance, adjusting for T1 implications (see analysis plan below and see Table 7 for directional predictions).

Hypothesis 5: I anticipated T1 need to belong and public self-consciousness to interact with individual-level indicators of pluralistic ignorance (i.e., personal and perceptions of others'

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it encourages and emphasizes the assessment of extended implications, thus broadening the field's understanding of the scope of pluralistic ignorance's influence. Of course, the process by which the individual-level indicators of pluralistic ignorance relate to the pluralistic ignorance-related implications could be complex and could differ across implication assessed (see discussion below), but I leave this more intricate investigation to future, targeted research.

<sup>18</sup> The hypotheses on OSF refer to the individual-level indicators of pluralistic ignorance and the pluralistic ignorance-related implications as "increasing" and "decreasing." Although described in terms of "higher" and "lower", "more" and "less", etc., in this manuscript, the anticipated relationships are the same. OSF link: [https://osf.io/qchdm/?view\\_only=638a4dc80ae94a769c8f251382788265](https://osf.io/qchdm/?view_only=638a4dc80ae94a769c8f251382788265)

attitudes) to amplify the implications described in Hypotheses 3 and 4 (see analysis plan below). For clarity and to expand on the directional relationships I describe in Table 7, I expected the most positive outcomes (i.e., more service use, better mental health, physical health, and academic performance, and less substance use), to occur for participants with positive attitudes toward services (willingness to use services and low levels of service use stigma) combined with perceptions of others as harboring more positive attitudes toward services *and* low levels of need to belong/public self-consciousness (as these individuals will be less influenced by any potential negative social-related implications associated with service use). I expected (comparatively) less positive outcomes to occur for participants with positive attitudes toward services combined with perceptions of others as harboring more negative attitudes toward services *and/or* high levels of need to belong/public self-consciousness (as these individuals, although reporting positive personal attitudes, will be more influenced by any potential negative social implications associated with service use).

As previously mentioned (in Footnote 17), this research emphasizes the important first step of identifying the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related outcomes. In all cases, I expected negative individual-level indicators of pluralistic ignorance (i.e., harboring negative attitudes toward services, misperceiving others as harboring negative attitudes toward services, and/or having a combination of personal attitudes and perceptions of others' attitudes that reflect the pattern of pluralistic ignorance observed at the group level) to be associated with negative pluralistic ignorance-related outcomes (i.e., less service use, worsened mental and physical health, more substance use, worsened academic performance), a set of findings that would replicate and extend previous research. Once these foundational relationships are uncovered, researchers can

then utilize the information in investigations of the likely complex processes that underlie them. For example, it is possible that individual-level indicators of pluralistic ignorance predict mental health service utilization, which, if services are not utilized, could result in unalleviated distress. This unalleviated distress could amount itself in worsened mental and physical health, and in turn, individuals could suffer declines in academic success, self-medicate, etc. It is also possible that mental health status would moderate this path model. As another example, individuals who misperceive others as being different from themselves might feel negatively about themselves and/or feel ashamed discussing their attitudes with others. In turn, these students might experience worsened mental health over time, and could find other ways to identify with their peers (e.g., more substance use), both of which could amount to worsened academic performance. Understanding the processes that underlie these relationships will require tailored investigations and knowing which pluralistic ignorance-related implications are associated with individual-level indicators of pluralistic ignorance will assist in the development of such future investigations.

### ***Implication Assessment Analysis Plan***

For the analyses associated with Hypotheses 3 and 4, I predicted the pluralistic ignorance-related implications measured at T2 as a function of personal attitudes and perceptions of others' attitudes measured at T1 and their interaction, adjusting for pluralistic ignorance-related implications measured at T1. As demonstrated in the Study 1 exploratory analyses, this analysis plan emphasizes the main effects of personal and perceptions of others' attitudes on changes in the implications assessed, as well as how personal and perceptions of others' attitudes might combine to uniquely predict changes in the implications assessed. The interaction component is of particular interest in this research, as certain combinations of attitudes



(especially those that reflect the pattern of pluralistic ignorance observed at the group level) could dampen the positive outcomes associated with having high personal willingness to use services and harboring low personal service use stigma. If so, pluralistic ignorance-based interventions might be especially useful in mitigating negative implications, as opposed to interventions that focus solely on personal attitudes or perceptions of others' attitudes.

The analyses associated with Hypothesis 5 emphasize the three-way interaction between personal attitudes measured at T1, perceptions of others' attitudes measured at T1, and need to belong/public self-consciousness measured at T1 (depending on whether the model assessed need to belong or public self-consciousness) on pluralistic ignorance implications measured at T2, adjusting for those same implications measured at T1. Once again, the interaction component is of interest in this research, as high levels of need to belong and/or public self-consciousness could further lessen the positive outcomes associated with having high personal willingness to use services and harboring low personal service use stigma, effectively coloring the environment in which personal attitudes and perceptions of others' attitudes interact to predict changes in the implications assessed. Furthermore, these findings could be useful in assessing the effectiveness of pluralistic ignorance-based interventions in reducing the prescriptive strength of norms (see Schroeder & Prentice, 1998), and they could indicate the potential for need to belong and public self-consciousness to serve as additional points of intervention.

Of note, these analyses allow me to highlight the longitudinal nature of the study—that is, to assess how individual-level indicators of pluralistic ignorance predict *changes* in pluralistic ignorance-related implications across time.

### ***Exploratory Analyses***

I also assessed group differences in misperceptions within subgroups of the college student population. Based on the diversity of the sample, and to expand on findings from Study 1, I highlight differences in misperceptions based on mental illness status, gender (female vs. male), class year (for undergraduate students only; Freshmen vs. Sophomores, Juniors, and Seniors), undergraduate vs. graduate student status, and racial/ethnic group (specifically, White vs. Asian).

### **Method**

#### ***Recruitment and Participants***

I recruited participants at the start of the Spring 2020 semester using email and social media announcements and a campus-wide flyer campaign. Participants were recruited to participate in an online study titled “Attitudes Toward Mental Health Services.” Eligible participants were 18 years of age or older and enrolled in at least one course at Syracuse University. Participants were asked to complete two 30-minute online surveys; the first survey (T1) was available between January 13<sup>th</sup>, 2020, and February 14<sup>th</sup>, 2020, and the second survey (T2) was available between April 14<sup>th</sup>, 2020, and May 6<sup>th</sup>, 2020, with a possible 8.5- to 17-week gap between surveys ( $M_{gap} = 77.3$  days;  $SD_{gap} = 8.6$  days).<sup>19</sup> Participants were compensated through entry into raffles to win Amazon gift cards.

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<sup>19</sup> The COVID-19 pandemic struck the United States between T1 and T2. Syracuse University transitioned to online learning before T2 data collection—that is, T2 data collection occurred when most students were not residing on campus and did not have access to in-person campus mental health resources. However, participants could still access campus counseling services virtually.

**T1 participants.** Two hundred and sixty eligible students completed the first survey.<sup>20,21</sup> Most individuals were undergraduate students ( $n = 151$ ; participants identified as Freshman [ $n = 56$ ], Sophomores [ $n = 33$ ], Juniors [ $n = 22$ ], or Seniors [ $n = 40$ ]). One hundred and nine individuals identified as “Other,” with open-ended responses overwhelmingly reflecting that they were graduate students. I coded all individuals who identified as “Other” as graduate students for analyses.

The participants ranged in age from 18 to 45 years old ( $M = 22.7$  years old,  $SD = 4.7$  years) and were mostly female ( $n = 186$ ), followed by male ( $n = 68$ ), and “other” identification ( $n = 5$ ); one individual preferred not to answer. Individuals in the sample mostly identified as White or European American ( $n = 140$ ), followed by Asian ( $n = 59$ ), Black or African American ( $n = 23$ ), Hispanic or Latino ( $n = 15$ ), multi-racial/mixed ( $n = 14$ ), other race/ethnicity ( $n = 5$ ), and American Indian or Alaska Native ( $n = 3$ ); one individual preferred not to answer. Most individuals were born in the United States ( $n = 191$ ); 68 individuals were not born in the United States and one individual preferred not to answer.<sup>22</sup>

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<sup>20</sup> I considered several a priori power analyses when determining the appropriate sample size for this research. The most complex planned analyses included multiple linear regressions and logistic regressions predicting T2 pluralistic ignorance-related implications from T1 personal attitudes, T1 perceptions of others’ attitudes, T1 pluralistic ignorance-related constructs (i.e., need to belong or public self-consciousness), and their three-way interaction, adjusting for T1 implications. A sample size of 550 participants would be needed to provide sufficient power (power = .80) to detect effects of a small size (effect size  $f^2 = .02$ ) with an alpha of .05 using multiple linear regression with three predictors. I used this a priori power analysis, as predetermined odds ratios and null probabilities for service use with respect to the pluralistic ignorance-related constructs were unavailable. Although the field as a whole is moving toward online-administered, high powered analyses with large sample sizes, not all researchers have the means to access such large samples and not all research questions can (or should) be answered using those approaches (Sassenberg & Ditrich, 2019). In turn, and noting the constraints on participant recruitment (e.g., time constraints and attrition), I took an “as many as possible” approach to sample size.

<sup>21</sup> There were no cases of suspected duplicate study completion in this sample (i.e., no participants matched on childhood zip code and IP address).

<sup>22</sup> Among those who indicated that they were born outside of the United States, the majority identified as Asian ( $n = 45$ ), followed by White or European American ( $n = 10$ ), Black or African American ( $n = 5$ ), Hispanic or Latino ( $n = 5$ ) and other race/ethnicity ( $n = 2$ ); one individual preferred not to answer.

**T2 participants.** One hundred and forty-six students completed the second survey (a 56% response rate); however, I excluded one individual from analyses as their responses could not be matched to T1 responses, leaving the final T2  $N = 145$ . Most individuals were undergraduate students ( $n = 76$ ; participants identified as Freshman [ $n = 23$ ], Sophomores [ $n = 21$ ], Juniors [ $n = 15$ ], or Seniors [ $n = 17$ ]). Sixty-eight individuals identified as “Other,” with open-ended responses again reflecting that they were graduate students; one individual did not report their year in college at T2; however, they reported being a Senior at T1.

The participants ranged in age from 18 to 48 years old ( $M = 23.5$  years old,  $SD = 5.4$  years)<sup>23</sup> and mostly identified as female ( $n = 110$ ), followed by male ( $n = 31$ ), and “other” identification ( $n = 3$ ); one individual preferred not to answer. The sample mostly identified as White or European American ( $n = 83$ ), followed by Asian ( $n = 26$ ), multi-racial/mixed ( $n = 14$ ), Black or African American ( $n = 8$ ), Hispanic or Latino ( $n = 7$ ), other race/ethnicity ( $n = 2$ ), and American Indian or Alaska Native ( $n = 2$ ); three individuals preferred not to answer. Most individuals were born in the United States ( $n = 115$ ); 28 individuals were not born in the United States and two individuals preferred not to answer.<sup>24</sup>

### ***Design, Procedure, and Measures***

Participants completed identical online surveys at two time points, making this research correlational, survey-based, and longitudinal. The surveys contained measures described in Study 1, as well as several additional and/or modified measures. To summarize the procedure, participants reported their willingness and their perception of other students’ willingness to use mental health services for several reasons (e.g., anxiety, family issues), their service use stigma

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<sup>23</sup> The T1 and T2 age range differs because the oldest individual indicated they were 45 at T1 and 48 at T2.

<sup>24</sup> Among those who indicated that they were born outside of the United States, the majority identified as Asian ( $n = 18$ ), followed by White or European American ( $n = 6$ ), Hispanic or Latino ( $n = 2$ ), Black or African American ( $n = 1$ ), and multi-racial/mixed ( $n = 1$ ).

and their perception of other students' service use stigma, and answered questions assessing their attitudes toward services, use of services, current mental health, substance use, and classroom performance, among other demographics. For brevity, I describe only new or modified measures and provide detailed descriptions only for the primary measures used in analyses.<sup>25</sup> For all study materials, see Appendix B.

As discussed below, several of the continuous measures used in analyses were skewed (skew > 1.0), including personal service use stigma, two measures of physical health (i.e., gastrointestinal problems and respiratory illness), and three measures of substance use (i.e., tobacco and cannabis use among tobacco and cannabis users, respectively, and alcohol use). As in Study 1, I ran all analyses involving these variables untransformed and transformed. For simplicity and consistency, I report results from models using the untransformed variables, and I specify the few cases where statistically significant relationships using the untransformed variables are not significant when using the transformed variables. I again acknowledge that extreme values in the skewed distribution could lead to underestimated effect sizes in analyses using the untransformed variables.

**Willingness to use mental health services (pluralistic ignorance).** Described in Study 1; however, I changed the 11-point response scale to a 7-point response scale to increase the online accessibility of the questionnaire. I averaged all items in each subscale to create composite scores for personal willingness to use services (T1/T2  $\alpha = .93/.92$ , skew = -0.65/-0.78,

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<sup>25</sup> For averaged composites, I included individuals who responded to 80% or more of the items on the scale in relevant analyses (averaged across missing data cells). For summed composites, I included individuals who responded to 80% or more of the items on the scale in relevant analyses, with missing values replaced with the individual's mean on the completed items (rounded to the nearest scale point). To allow for comparison to previous research using the scales, summary statistics (i.e., means and standard deviations) for the summed composites *exclude* individuals who skipped questions. In all cases, I excluded individuals who responded to less than 80% of scale items from relevant analyses.

kurtosis = -0.17/0.32) and perceptions of others' willingness to use services to use services (T1/T2  $\alpha$  = .91/.90, skew = -0.28/-0.05, kurtosis = 0.53/-0.39), where higher scores indicate more personal willingness to use services and perceptions of others as being more willing to use services for each subscale, respectively.

**Mental health service use stigma (pluralistic ignorance).** Described in Study 1. Two items were added per subscale (*I [most Syracuse students] believe that people who use mental health services can significantly benefit from the services they receive; I [most Syracuse students] believe that people who use mental health services are unstable and/or dangerous*), and with the response scale direction reversed (1 = *Strongly Disagree*; 6 = *Strongly Agree*).<sup>26</sup> After reverse-scoring negatively worded items, I averaged all items in each subscale to create composite scores for personal service use stigma (T1/T2  $\alpha$  = .77/.83, skew = 1.53/1.69, kurtosis = 2.10/2.36) and perception of others' service use stigma (T1/T2  $\alpha$  = .79/.82, skew = 0.36/0.13, kurtosis = -0.33/-0.34), where higher scores indicate more personal service use stigma and perceptions of others as harboring more service use stigma for each subscale, respectively. As the personal stigma composite was non-normally distributed, I ran all analyses involving personal service use stigma untransformed and inverse transformed (this transformation best addressed the skew; transformed T1/T2 skew = 0.30/0.48).<sup>27</sup>

**General attitudes toward mental health services.** I incorporated items assessing attitudes toward mental health services from measures that had been previously used among a college student population (Healthy Minds Network, 2019). These measures assessed attitudes

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<sup>26</sup> The additional items were added to improve the scale reliability, as the reliability was sub-optimal in Study 1. The response scale direction was reversed because disagree-to-agree scales seem more intuitive than agree-to-disagree scales (Rammstedt & Krebs, 2007).

<sup>27</sup> To maintain the same scale direction as the untransformed variable, I reflected the inverse transformed variable for analyses.

toward campus services (e.g., *if I needed to seek professional help for my mental or emotional health, I would know where to go on my campus*) and beliefs about the effectiveness of mental health care (e.g., *how helpful on average do you think medication is, when provided competently, for people your age who are clinically depressed?*) using various response scales depending on the item assessed. Participants also completed a series of items designed to assess ambivalence toward mental health services (adapted from Priester et al., 2007). I designed these items to assess more general attitudes toward mental health services (e.g., ambivalence about mental health services in general) as well as attitudes toward previously identified barriers to mental health service use (e.g., ambivalence about treatment effectiveness, time/location inconvenience). Participants responded using 7-point response scales with scale point labels adapted to each question. I did not use these measures in the current analyses.

**Mental health service use.** Participants completed the mental health service use item used in Study 1, as well as additional items assessing mental health service use that researchers have previously used among a college student population (Healthy Minds Network, 2019). These measures assessed use of therapy or counseling services, type of provider (if services were used), use of any health professional services, help-seeking from nonclinical sources (e.g., friends, family), and barriers to seeking help (e.g., *difficulty finding an available appointment*), using various response scales depending on the item assessed.

The current analyses required one of the two items assessing past-year mental health service use—specifically, either the measure assessing past-year use of general mental health services (used in Study 1) or the new measure assessing past-year use of counseling or therapy services, which utilized a different 5-point response scale (0 = 0 visits; 4 = 10 or more visits). The two items were highly correlated (T1/T2  $r = .78/.83$ , both  $p < .001$ ), and both were skewed

at T1 (for both items, T1 skew > 1.25; T2 skew < 0.87). To assess changes in degree of use among those who used services at T1, I required the use of a continuous version of one of the variables. Among those in the full longitudinal sample ( $N = 145$ ) who reported using services at T1, responses were less skewed for the therapy-specific item ( $n = 67$ , T1/T2 skew = 0.19/-0.17) compared to the general service item ( $n = 65$ , T1/T2 skew = 1.13/-0.15). As such, and to follow up on the results presented in Study 1, I used a dichotomized version of the therapy-specific item for analyses using the full longitudinal sample (0 = did not use services; 1 = used services). I then used the therapy-specific item in its continuous form for the analyses involving only those who reported using services at T1, where higher scores indicate more mental health service use. Among the T1 sample, 150 individuals (57.7%) reported no use of services in the past year and 110 individuals (42.3%) reported use of services in the past year. Among the T2 sample, 72 individuals (49.7%) reported no use of services in the past year and 73 individuals (50.3%) reported use of services in the past year.

**Mental health.** Participants completed the measures used in Study 1 for depression (the PHQ-9; Kroenke et al., 2001), personal mental illness status, and family history of mental illness, and, in addition to the Study 1 measures, medication use for mental health. I created a composite score for depression by summing all items in the PHQ-9 (T1/T2  $\alpha = .89/.90$ , skew = 0.82/0.76, kurtosis = -0.08/-0.02), where higher scores indicate greater depressive symptoms. Also in addition to the Study 1 measures, participants completed the 20-item Self Report Questionnaire (SRQ-20; Beusenbergh & Orley, 1994; van der Westhuizen et al., 2016), a scale assessing state mental health and probability of mental disorder (e.g., *do you feel nervous, tense, or worried*) answered in a binary fashion (1 = yes; 0 = no). I summed all items to compute a composite score



(T1/T2  $\alpha = .89/.87$ , skew = 0.32/0.14, kurtosis = -0.85/-1.03; van der Westhuizen et al., 2016,  $\alpha = .84$ ), where higher scores indicate more mental health distress.

The current analyses required one of the two measures of mental health—specifically, either the measure assessing depression (the PHQ-9; used in Study 1) or the new measure assessing state mental health (the SRQ-20). The two measures were highly correlated (T1/T2  $r = .83/.78$ , both  $p < .001$ ). Although the SRQ-20 was less skewed than the PHQ-9, the PHQ-9 skew was not extreme. As such, and to allow for comparison with Study 1 results, I used the PHQ-9 for analyses.

**Physical health.** Participants completed the item assessing sleep interference on daily functioning used in Study 1. Participants also completed the Physical Health Questionnaire (PHQ; Schat et al., 2005), a 14-item scale assessing gastrointestinal problems, headaches, sleep disturbance, and respiratory illness (Schat et al., 2005, subscale  $\alpha$ s range from .70 to .90) using a 7-point response scale (1 = symptoms not experienced at all; 7 = symptoms experienced all of the time). After reverse-scoring one item, I summed all relevant subscale items to compute composite scores for each subscale, and I used these subscales in analyses (T1/T2 gastrointestinal problems subscale  $\alpha = .85/.87$ , skew = 1.00/0.68, kurtosis = 0.56/-0.29; headaches subscale  $\alpha = .89/.90$ , skew = 0.57/0.29, kurtosis = -0.70/-1.17; sleep disturbance subscale  $\alpha = .70/.63$ , skew = 0.61/0.10, kurtosis = -0.21/-0.50; respiratory illness subscale  $\alpha = .78/.76$ , skew = 1.17/1.04, kurtosis = 1.05/0.63). The gastrointestinal problems and respiratory illness composites were slightly skewed at T1. To address this, I ran all analyses involving gastrointestinal problems and respiratory illness untransformed and log transformed (transformed gastrointestinal problems and respiratory illness T1/T2 skew = 0.05/-0.16 and 0.21/0.17, respectively).

**Substance use.** Participants completed the items used in Study 1 assessing cigarette/cigar use, a similar item assessing e-cigarette/vape use, and two additional scales. The first scale was the Alcohol, Smoking, and Substance Involvement Screening Test Version 3.0 (ASSIST; Humeniuk et al., 2006, 2008; World Health Organization, 2020; WHO ASSIST Working Group, 2002), an 8-item scale assessing substance use (e.g., *In the past three months, how often have you used the substances you mentioned?*) using various response scales depending on the question asked. I summed relevant items to compute composite scores for each substance class, and I specifically used the tobacco and cannabis subscales in analyses (T1/T2 tobacco subscale  $\alpha = .89/.91$ , skew = 2.79/3.46, kurtosis = 7.7/12.39; T1/T2 cannabis subscale  $\alpha = .74/.81$ , skew = 2.07/3.18, kurtosis = 4.55/11.81; Humeniuk et al., 2008, Version 2.0  $\alpha = .80$  and  $.86$ , respectively).<sup>28</sup>

As both scales were highly skewed, I dichotomized the composites (0 = no substance use/risk; 1 = substance use/risk) and used the dichotomized variables in full sample analyses. Among the T1 sample, 192 individuals (73.8%) reported no tobacco use/risk and 68 individuals (26.2%) reported tobacco use/risk. Among the T2 sample, 114 individuals (78.6%) reported no tobacco use/risk and 31 individuals (21.4%) reported tobacco use/risk. Regarding cannabis, at T1 156 individuals (60.0%) reported no cannabis use/risk and 104 individuals (40.0%) reported cannabis use/risk. Among the T2 sample, 85 individuals (58.6%) reported no cannabis use/risk and 60 individuals (41.4%) reported cannabis use/risk. To assess changes in degree of use among those identified as at risk at T1 (i.e., those who, at T1, had used substances in the past three months, reported previous concern from others, and/or attempted to control personal use), I used

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<sup>28</sup> For individuals who did not report using the substance, I gave them lowest possible score on the scale—that is, the same scale point provided to those who had used the substance in the past but did not report substance use in the last three months, past concern from others, nor past attempts to control personal use (i.e., those with no risk of problematic substance use).

the continuous versions of the variables. The continuous versions were still skewed for the subsamples (tobacco use and cannabis use among users T1/T2 skew = 0.98/1.20 and 1.65/1.92, respectively). In turn, I ran all subsample analyses untransformed and log transformed with an added constant of one (transformed tobacco use and cannabis use among users T1/T2 skew = 0.07/-0.20 and 0.08/-0.30, respectively).

Because alcohol use was of increased interest in this research, participants also completed the Alcohol Use Disorders Identification Test (AUDIT; Babor et al., 2001; Hays et al., 1995), a 10-item scale specifically assessing alcohol use (e.g., *How often do you have a drink containing alcohol?*) using several versions of a 5-point response scale depending on the question assessed. I summed items to compute a composite score for drinking behavior (T1/T2  $\alpha = .84/.82$ , skew = 1.78/1.91, kurtosis = 3.70/4.39; Hays et al., 1995,  $\alpha = .83$ ), where higher scores indicate more alcohol use.<sup>29</sup> As the AUDIT was skewed at both T1 and T2, I ran all analyses untransformed and log transformed with an added constant of one (transformed T1/T2 skew = -0.12/-0.09).

**Self-consciousness.** Participants completed the Self-Consciousness Scale-Revised (SCS-R; Scheier & Carver, 1985), a 16-item scale assessing private and public self-consciousness (e.g., *I'm always trying to figure myself out*) using a 4-point response scale (0 = *not like me at all*; 3 = *a lot like me*). I used the public self-consciousness composite in the current analyses. I computed the public self-consciousness composite by averaging the subscale

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<sup>29</sup> At T1 the first response option for the item assessing alcohol consumption on a typical day should have read “0-2 drinks” but instead read “1-2 drinks.” Nine individuals did not respond to this question. These nine individuals indicated on the first scale item that they “never” drank alcohol. It is clear why these individuals skipped the question, and that they would have marked “0-2 drinks” if the response option had been displayed correctly. I changed the missing values for these individuals accordingly (which did not change the final AUDIT score), and I corrected the response option on the T2 survey.

items (T1/T2  $\alpha = .86/.85$ , skew = -0.24/-0.45, kurtosis = -0.79/-0.32; Scheier & Carver, 1985,  $\alpha = .84$ ), where higher scores indicate more public self-consciousness.

**Need to belong.** Participants completed the Need to Belong Scale (Leary et al., 2013), a 10-item scale assessing the need to belong (e.g., *I want other people to accept me*) using a 5-point response scale (1 = *not at all*; 5 = *extremely*). After reverse scoring three items, I averaged all items to compute a composite score (T1/T2  $\alpha = .80/.81$ , skew = 0.06/0.15, kurtosis = -0.34/-0.63; Leary et al., 2013,  $\alpha = .81$ ), where higher scores indicate more need to belong.

**Classroom performance.** Participants reported their current GPA (i.e., GPA as of the previous semester) and anticipated GPA for the current semester. Participants also reported subjective perceptions of classroom performance, as individuals with differing GPAs might feel equally satisfied with their performance (e.g., a student with a 3.5 GPA and a student with a 2.5 GPA might feel equally academically successful), and perceptions of classroom impairment due to mental/emotional distress (Lipson & Eisenberg, 2018). I used the latter two items, subjective classroom performance (T1/T2 skew = -0.56/-0.54, kurtosis = -0.45/-0.07) and perceived classroom impairment (T1/T2 skew = 0.77/0.33, kurtosis = -0.38/-1.22) in the current analyses.

**Demographics.** Participants responded to the Study 1 demographic questionnaire and three additional items assessing current zip code, objective SES, and subjective social class. I used items assessing gender, college year, and race/ethnicity in secondary analyses assessing individual differences.

## Results

See Table 8 and Table 9 for primary full-sample measure summary statistics and zero-order correlations among variables at T1 and T2, respectively. In addition to the full-sample

measures displayed in Tables 8 and 9, I also report secondary analyses using continuous versions of the service use (T1/T2  $M = 2.37/2.42$ ,  $SD = 1.30/1.48$ ), tobacco use (T1/T2  $M = 8.84/7.91$ ,  $SD = 5.47/8.83$ ), and cannabis use (T1/T2  $M = 7.84/6.25$ ,  $SD = 5.77/6.57$ ) variables among subsamples of individuals who reported using services at T1, were identified as being at risk from problematic tobacco use at T1, or were identified as being at risk for problematic cannabis use at T1, respectively, *and* who completed the T2 survey.

### ***Pluralistic Ignorance***

**Pluralistic ignorance of willingness to use mental health services (H1).** I observed pluralistic ignorance of willingness to use mental health services at T1, such that individuals mistakenly believed others were less willing to use services ( $M = 4.59$ ,  $SD = 1.06$ ) compared to the self-reported average willingness of the sample ( $M = 4.85$ ,  $SD = 1.33$ ), paired  $t(258) = 3.06$ ,  $p = .002$ , 95% CI [0.09, 0.42].<sup>30</sup> I also observed pluralistic ignorance of willingness to use mental health services at T2, such that individuals mistakenly believed others were less willing to use services ( $M = 4.74$ ,  $SD = 0.97$ ) compared to the self-reported average willingness of the sample ( $M = 5.11$ ,  $SD = 1.15$ ),  $t(144) = 3.82$ ,  $p < .001$ , 95% CI [0.18, 0.56].<sup>31</sup> As expected, personal willingness at T1 ( $M = 5.12$ ,  $SD = 1.25$ ) was positively correlated with personal willingness at T2 ( $M = 5.11$ ,  $SD = 1.15$ ),  $r = .68$ ,  $p < .001$ , 95% CI [.58, .76], and perceptions of others' willingness at T1 ( $M = 4.61$ ,  $SD = 1.03$ ) was positively correlated with perceptions of others' willingness at T2 ( $M = 4.74$ ,  $SD = 0.97$ ),  $r = .42$ ,  $p < .001$ , 95% CI [.28, .55]. I conducted a post hoc analysis to determine if willingness self-other discrepancies increased over time. Self-other

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<sup>30</sup> There was more variance in the willingness of the sample ( $s^2 = 1.78$ ) compared to estimations of others' willingness ( $s^2 = 1.13$ ),  $F(259, 258) = 1.58$ ,  $p < .001$ , 95% CI [1.24, 2.01].

<sup>31</sup> There was more variance in the willingness of the sample ( $s^2 = 1.33$ ) compared to estimations of others' willingness ( $s^2 = 0.95$ ),  $F(144, 144) = 1.40$ ,  $p = .043$ , 95% CI [1.01, 1.95].

discrepancies did not significantly increase from T1 ( $M = 0.51$ ,  $SD = 1.27$ ) to T2 ( $M = 0.37$ ,  $SD = 1.15$ ), paired  $t(144) = 1.34$ ,  $p = .184$ , 95% CI [-0.07, 0.35].

**Pluralistic ignorance of mental health service use stigma (H2).** I observed pluralistic ignorance of mental health service use stigma at T1, such that individuals mistakenly believed others harbored more service use stigma ( $M = 2.56$ ,  $SD = 0.78$ ) compared to the self-reported average stigma beliefs of the sample ( $M = 1.56$ ,  $SD = 0.68$ ), paired  $t(257) = -17.11$ ,  $p < .001$ , 95% CI [-1.12, -0.88].<sup>32</sup> I also observed pluralistic ignorance of service use stigma at T2, such that individuals mistakenly believed others harbored more service use stigma ( $M = 2.54$ ,  $SD = 0.79$ ) compared to the self-reported average stigma beliefs of the sample ( $M = 1.52$ ,  $SD = 0.67$ ), paired  $t(144) = -13.99$ ,  $p < .001$ , 95% CI [-1.17, -0.88].<sup>33</sup> As expected, personal service use stigma at T1 ( $M = 1.45$ ,  $SD = 0.60$ ) was positively correlated with personal service use stigma at T2 ( $M = 1.52$ ,  $SD = 0.67$ ),  $r = .67$ ,  $p < .001$ , 95% CI [.57, .75], and perceptions of others' service use stigma at T1 ( $M = 2.61$ ,  $SD = 0.79$ ) was positively correlated with perceptions of others' service use stigma at T2 ( $M = 2.54$ ,  $SD = 0.79$ ),  $r = .52$ ,  $p < .001$ , 95% CI [.39, .63]. I again conducted a post hoc analysis to determine if stigma self-other discrepancies changed over time. Self-other discrepancies became significantly *smaller* in magnitude from T1 ( $M = -1.16$ ,  $SD = 0.91$ ) to T2 ( $M = -1.02$ ,  $SD = 0.88$ ), paired  $t(144) = -2.02$ ,  $p = .045$ , 95% CI [-0.28, -0.00]. This appears to be due to slight, but nonsignificant, increase in personal service use stigma from T1 ( $M = 1.45$ ,  $SD = 0.60$ ) to T2 ( $M = 1.52$ ,  $SD = 0.67$ ), paired  $t(144) = -1.70$ ,  $p = .092$ , 95% CI [-0.16, 0.01], and a slight, but again nonsignificant, decrease in perceptions of others' service use

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<sup>32</sup> There was less variance in the service use stigma of the sample ( $s^2 = 0.46$ ) compared to estimations of others' service use stigma ( $s^2 = 0.60$ ),  $F(259, 257) = 0.76$ ,  $p = .029$ , 95% CI [0.60, 0.97].

<sup>33</sup> There was less variance in the service use stigma of the sample ( $s^2 = 0.45$ ) compared to estimations of others' service use stigma ( $s^2 = 0.62$ ),  $F(144, 144) = 0.72$ ,  $p = .050$ , 95% CI [0.52, 1.00].

stigma from T1 ( $M = 2.61$ ,  $SD = 0.60$ ) to T2 ( $M = 2.54$ ,  $SD = 0.79$ ), paired  $t(144) = 1.03$ ,  $p = .305$ , 95% CI [-0.06, 0.19].<sup>34</sup>

### ***Implication Assessment***

See Table 7 for the detailed hypotheses assessed in this section, and Tables 10-20 for the associated statistical results using untransformed variables.<sup>35</sup> I first discuss analyses using the willingness-related individual-level indicators of pluralistic ignorance (H3<sub>a-c</sub>). I then discuss analyses using the stigma-related individual-level indicators of pluralistic ignorance (H3<sub>d-f</sub>). The following two subsections address Hypotheses 4 and 5.

**Implications of willingness-related individual-level indicators of pluralistic ignorance (H3<sub>a-c</sub>).** To assess the implications of willingness-related individual-level indicators of pluralistic ignorance, I independently predicted T2 service use, mental health (depression), physical health (the PHQ subscales), substance use and academic performance as a function of T1 personal willingness to use services, perceptions of others' willingness to use services, and their interaction, adjusting for the assessed T1 implication measure.

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<sup>34</sup> It might be of interest to readers to know how those who only completed the first survey differed from those who completed both the T1 and T2 survey on the primary measures of interest (i.e., measures assessing attitudes toward mental health services). First, individuals who only completed the first survey reported less personal willingness to use services at T1 ( $M = 4.50$ ,  $SD = 1.37$ ) compared to those who completed both surveys ( $M = 5.12$ ,  $SD = 1.25$ ),  $t(258) = -3.80$ ,  $p < .001$ , 95% CI [-0.94, -0.30]. Similarly, individuals who only completed the first survey reported more personal service use stigma ( $M = 1.70$ ,  $SD = 0.74$ ) compared to those who completed both surveys ( $M = 1.45$ ,  $SD = 0.60$ ),  $t(258) = 3.09$ ,  $p = .002$ , 95% CI [0.09, 0.42]. The groups did not differ, however, in their perceptions of others' willingness and stigma,  $ps > .225$ . Furthermore, the proportion of individuals who identified as having a mental illness differed—26% of individuals who only completed the first survey identified as having a mental illness, whereas 43% of those who completed both surveys identified as having a mental illness. Of note, these findings indicate that participant dropout after T1 does not provide an explanation for the longitudinal changes in stigma self-other discrepancy scores. To expand, individuals who only completed the first survey reported more service use stigma than those who completed both surveys, yet, when comparing average levels of service use stigma among the full T1 sample and full T2 sample, stigma increased across time. If individuals did not change their stigma-related attitudes from T1 to T2, average levels of service use stigma should have presumably decreased from T1 to T2.

<sup>35</sup> For this block of tests (i.e., tests assessing implications) one could consider the use of a Bonferroni correction, adjusted  $\alpha = .001$ .

**Service use.** Adjusting for one another, neither personal willingness to use services nor perceptions of others' willingness to use services predicted changes in the odds of using services (using the dichotomized service use variable), nor did I observe a significant interaction between the variables (see Table 10). Similarly, among those who reported service use at T1, neither personal willingness to use services nor perceptions of others' willingness to use services predicted changes in the frequency of service use at T2, and their interaction was also not significant (see Table 11).

**Mental and physical health.** Adjusting for one another, neither personal willingness to use services nor perceptions of others' willingness to use services predicted changes in mental health (specifically, depression), nor did I observe a significant interaction between the variables (see Table 12). Similarly for physical health, I did not observe significant main effects of personal willingness or perceptions of others' willingness (adjusting for one another) in predicting gastrointestinal problems or sleep disturbance, nor did I observe a significant interaction between the variables for any of the four physical health indicators (see Table 13). I did observe main effects of personal willingness (adjusting for perceptions of others' willingness) in predicting T2 headache symptomology and respiratory illness (adjusting for T1 headache symptomology and respiratory illness, respectively), such that higher levels of personal willingness to use services were associated with lower levels of headache symptomology and respiratory illness. However, the latter significant main effect was not replicated when using the log transformed version of the respiratory illness variable; the main effect of personal willingness in the transformed model (adjusting for perceptions of others' willingness) was  $b = -0.05$ ,  $SE_b = 0.03$ ,  $t(140) = -1.75$ ,  $p = .083$ , 95% CI [-0.11, 0.01]. I did not observe main effects of perceptions of others' willingness (adjusting for personal willingness) in either model.



**Substance use.** To assess substance use implications I ran a series of logistic and linear regression analyses independently predicting tobacco use risk (dichotomized), tobacco use among tobacco users at T1 (continuous), cannabis use risk (dichotomized), cannabis use among cannabis users at T1 (continuous), and alcohol use (continuous) as a function of personal and perceptions of others' willingness to use services and their interaction. Personal and perceptions of others' willingness did not predict changes in the odds of tobacco use risk (adjusting for one another), nor did they interact to predict changes in the odds of tobacco use risk (see Table 14). Similarly, among those who reported tobacco use at T1, neither personal willingness nor perceptions of others' willingness predicted changes in tobacco use at T2 (adjusting for one another), nor was their interaction significant (see Table 15). In predicting changes in cannabis use risk, I also did not observe significant main effects for personal or perceptions of others' willingness (adjusting for one another), nor did I observe an interaction between the variables (see Table 16). Similarly, among those who reported cannabis use at T1, neither personal or perceptions of others' willingness predicted changes in cannabis use at T2, nor was their interaction significant (see Table 17). Regarding alcohol use, neither personal willingness nor perceptions of others' willingness predicted changes in alcohol use at T2 (adjusting for one another), nor was their interaction significant (see Table 18).

**Academic performance.** Finally, to assess academic performance implications, I ran multiple linear regressions predicting changes in subjective feelings of academic success and perceptions of classroom impairment due to mental/emotional distress. Adjusting for one another, neither personal willingness to use services nor perceptions of others' willingness predicted changes in subjective feelings of academic success, and their interaction was not statistically significant (see Table 19). In predicting changes in academic impairment, I also

observed non-significant main effects of personal and perceptions of others' willingness (adjusting for one another), and a non-significant interaction between the variables (see Table 19).

### **Implications of stigma-related individual-level indicators of pluralistic ignorance**

**(H3a-f).** To assess the implications of stigma-related individual-level indicators of pluralistic ignorance, I independently predicted T2 service use, mental health (depression), physical health (the PHQ subscales), substance use and academic performance as a function of T1 personal service use stigma, perceptions of others' service use stigma, and their interaction, adjusting for the assessed T1 implication measure.

**Service use.** Adjusting for one another, neither personal service use stigma nor perceptions of others' stigma predicted changes in the odds of using services (using the dichotomized service use variable), nor did I observe a significant interaction between the predictors (see Table 10). Similarly, among those who reported service use at T1, neither personal service use stigma nor perceptions of others' service use stigma predicted changes in the frequency of service use at T2 (adjusting for one another), nor was their interaction significant (see Table 11).

**Mental and physical health.** Adjusting for one another, neither personal service use stigma nor perceptions of others' stigma predicted changes in mental health (specifically, depression), nor was their interaction statistically significant (see Table 12). For physical health, I did not observe significant main effects of personal service use stigma or perceptions of others' stigma (adjusting for one another) in predicting changes in gastrointestinal problems, headache symptomology, sleep disturbance, or respiratory illness (see Table 13). I also did not observe

significant interactions between personal and perceptions of others' stigma in predicting any of the four health conditions.

**Substance use.** To assess substance use implications I ran a series of logistic and linear regression analyses independently predicting changes in tobacco use risk (dichotomized), tobacco use among tobacco users at T1 (continuous), cannabis use risk (dichotomized), cannabis use among cannabis users at T1 (continuous), and alcohol use (continuous) as a function of personal and perceptions of others' service use stigma and their interaction. Personal and perceptions of others' service use stigma did not predict changes in the odds of tobacco use risk (adjusting for one another), nor did they interact to predict tobacco use risk (see Table 14). Similarly, among those who reported tobacco use at T1, neither personal nor perceptions of others' stigma predicted changes in tobacco use at T2 (adjusting for one another), nor was their interaction significant (see Table 15). I also did not observe main effects of personal and perceptions of others' stigma on changes in the odds of cannabis use risk (adjusting for one another), nor was their interaction significant (see Table 16). Similarly, among those who reported cannabis use at T1, neither personal nor perceptions of others' stigma predicted cannabis use at T2 (adjusting for one another), nor was their interaction significant (see Table 17).

Adjusting for one another, neither personal nor perceptions of others' service use stigma predicted changes in alcohol use at T2 (see Table 18). I did, however, observe a significant interaction between the predictors. On average, individuals decreased their alcohol use by 0.17 scale points ( $SD = 4.37$ ) from T1 to T2 (likely because many students were no longer on campus at T2 due to the coronavirus pandemic). Post hoc simple slope analyses indicated that, for people who perceived others as harboring low service use stigma (1  $SD$  below the mean), low personal

service use stigma was associated with steeper declines in alcohol use from T1 to T2,  $b = 1.76$ ,  $SE_b = 0.89$ ,  $t(139) = 1.98$ ,  $p = .050$ , 95% CI [0.00, 3.52]; however, this simple effect is non-significant when using transformed versions of the variables (simple slope for personal service use stigma  $p = .590$ ). On the other hand, for people who perceived others as harboring more service use stigma (1 *SD* above the mean), low personal service use stigma was associated with weaker declines alcohol use from T1 to T2,  $b = -1.64$ ,  $SE_b = 0.72$ ,  $t(139) = -2.29$ ,  $p = .024$ , 95% CI [-3.06, -0.22]. Put another way, for people who perceived others as harboring less service use stigma (an accurate perception), low personal stigma was weakly (if not at all) related to steeper declines in alcohol use from T1 to T2, but for people who perceived others as harboring more service use stigma (an inaccurate perception), low personal stigma was related to weaker declines in alcohol use from T1 to T2.

***Academic performance.*** Finally, to assess implications for academic performance, I ran multiple linear regressions predicting subjective feelings of academic success and perceptions of classroom impairment due to mental/emotional distress as a function of personal and perceptions of others' stigma and their interaction. Personal service use stigma did predict changes in perceptions of academic success (adjusting for perceptions of others' stigma), such that T2 academic success was associated with lower personal service use stigma (see Table 19); however, this effect was non-significant using the transformed version of personal service use stigma,  $b = -0.35$ ,  $SE_b = 0.26$ ,  $t(140) = -1.35$ ,  $p = .181$ , 95% CI [-0.87, 0.16]. There was no main effect of perceptions of others' service use stigma, nor was there an interaction between the predictors. In predicting academic impairment, I observed non-significant main effects for personal and perceptions of others' service use stigma (adjusting for one another), and a non-significant interaction between the predictors (see Table 19).

The results associated with H3 were overwhelmingly inconclusive, with few relationships assessed resulting in statistically significant findings. To recap, higher personal willingness to use services (adjusting for perceptions of others' willingness to use services) predicted lower levels of headache symptomology and respiratory illness, and lower levels of personal service use stigma (adjusting for perceptions of others' service use stigma) predicted greater perceptions of academic success. Additionally, personal and perceptions of others' service use stigma interacted to predict changes in alcohol use. Below I discuss these findings further.

**Stigma-related individual-level indicators of pluralistic ignorance as predictors of willingness to use services (H4).** To assess the stigma-related individual-level indicators of pluralistic ignorance as predictors of personal willingness to use services, I predicted T2 personal willingness to use services as a function of T1 personal service use stigma, perceptions of others' service use stigma, and their interaction, adjusting for T1 personal willingness to use services (see Table 20). Personal service use stigma did predict changes in willingness to use services (adjusting for perceptions of others' stigma), such that lower levels of personal service use stigma were associated with more willingness to use services at T2. There was, however, no main effect of perceptions of others' service use stigma, nor was there a significant interaction between the predictors.

**Need to belong and public self-consciousness (H5).** To assess roles of need to belong and public self-consciousness as moderators of the relationships between individual-level indicators of pluralistic ignorance and associated implications, I predicted T2 pluralistic ignorance-related implications as a function of T1 personal attitudes, perceptions of others' attitudes, need to belong or public self-consciousness (depending on the model), and their interaction, adjusting for the T1 implication measure. Considering the lack of power to run these

analyses, I only pursued the 46 models that included the full longitudinal sample (i.e., I did not include models assessing changes in service use among those who used services, changes in substance use among those who used substances, etc.). Due to the sheer volume of results associated with these analyses, I only detail models resulting in statistically significant three-way interactions ( $ps < .05$ ). I acknowledge that this procedure selects for the largest three-way interactions, which could result in spurious simple effects and could fail to observe lower-order results (e.g., two-way interactions) that support the anticipated pattern. I first discuss the models assessing need to belong. I then discuss the models assessing public self-consciousness.

***Need to belong.*** In all but one model, need to belong did not interact with personal and perceptions of others' willingness to use services (for all three-way interaction terms in non-significant models,  $ps > .147$ ). Need to belong did interact with personal and perceptions of others' willingness to use services to predict changes in alcohol use from T1 to T2,  $b = 1.11$ ,  $SE_b = 0.25$ ,  $t(135) = 4.34$ ,  $p < .001$ , 95% CI [0.60, 1.61]. As previously noted, individuals on average decreased their alcohol use by 0.17 scale points ( $SD = 4.37$ ) from T1 to T2. I conducted a series of post hoc analyses to determine the simple slope of personal willingness to use services when combined with varying levels of perceptions of others' willingness to use services and personal need to belong. For people who perceived others as harboring low willingness to use services (1  $SD$  below the mean), personal willingness to use services was not associated with declines in alcohol use from T1 to T2 at both low levels of need to belong (1  $SD$  below the mean),  $b = 0.19$ ,  $SE_b = 0.46$ ,  $t(135) = 0.42$ ,  $p = .673$ , 95% CI [-0.72, 1.10], and high levels of need to belong (1  $SD$  above the mean),  $b = 0.64$ ,  $SE_b = 0.42$ ,  $t(135) = 1.52$ ,  $p = .131$ , 95% CI [-0.19, 1.46]. For people who perceived others as harboring more willingness to use services (1  $SD$  above the mean), high personal willingness to use services was associated with steeper

declines in alcohol use from T1 to T2 for people who had low need to belong (1 *SD* below the mean),  $b = -2.26$ ,  $SE_b = 0.50$ ,  $t(135) = -4.50$ ,  $p < .001$ , 95% CI [-3.25, -1.27], whereas high personal willingness to use services was associated with weaker declines in alcohol use for people who had high need to belong (1 *SD* above the mean),  $b = 1.62$ ,  $SE_b = 0.55$ ,  $t(135) = 2.95$ ,  $p = .004$ , 95% CI [0.53, 2.70] (however, this simple effect was not statistically significant using the log transformed alcohol use variable,  $b = 0.14$ ,  $SE_b = 0.09$ ,  $t(135) = 1.62$ ,  $p = .107$ , 95% CI [-0.03, 0.31]). Put another way, for people who perceived others as harboring less willingness to use services (an inaccurate perception), high personal willingness to use services was not related to changes in alcohol use (regardless of need to belong), but for people who perceived others as harboring more willingness to use services (an accurate perception), high personal willingness to use services was associated with steeper declines in alcohol use from T1 to T2 only for people with low need to belong, as expected.

Need to belong did not interact with personal and perceptions of others' service use stigma in any model (for all three-way interaction terms,  $ps > .185$ ).

**Public self-consciousness.** Public self-consciousness did not interact with personal and perceptions of others' willingness to use services in any model (for all three-way interaction terms,  $ps > .096$ ).

In all but one model, public self-consciousness did not interact with personal and perceptions of others' service use stigma (for all three-way interaction terms in non-significant models,  $ps > .071$ ). Public self-consciousness did interact with personal and perceptions of others' service use stigma to predict changes in perceptions of academic success from T1 to T2,  $b = -0.46$ ,  $SE_b = 0.20$ ,  $t(135) = -2.30$ ,  $p = .023$ , 95% CI [-0.85, -0.06]. On average, individuals reported decreases in perceptions of academic success by 0.13 scale points ( $SD = 0.76$ ) from T1

to T2. I conducted a series of post hoc analyses to determine the simple slope of personal service use stigma when combined with varying levels of perceptions of others' service use stigma and personal public self-consciousness. For people who perceived others as harboring more service use stigma (1 *SD* above the mean), personal service use stigma was not associated with declines in perceptions of academic success from T1 to T2 at both low levels of public self-consciousness (1 *SD* below the mean),  $b = -0.08$ ,  $SE_b = 0.15$ ,  $t(135) = -0.54$ ,  $p = .587$ , 95% CI [-0.39, 0.22], and high levels of public self-consciousness (1 *SD* above the mean),  $b = -0.25$ ,  $SE_b = 0.23$ ,  $t(135) = -1.07$ ,  $p = .288$ , 95% CI [-0.71, 0.21]. For people who perceived others as harboring less service use stigma (1 *SD* below the mean), low personal service use stigma was associated with weaker declines in perceptions of academic success from T1 to T2 for people who had low public self-consciousness (1 *SD* below the mean),  $b = -0.50$ ,  $SE_b = 0.18$ ,  $t(135) = -2.88$ ,  $p = .005$ , 95% CI [-0.85, -0.16], whereas low personal service use stigma was not associated with declines in perceptions of academic success for people who had high public self-consciousness (1 *SD* above the mean),  $b = 0.36$ ,  $SE_b = 0.34$ ,  $t(135) = 1.07$ ,  $p = .286$ , 95% CI [-0.30, 1.02]. Put another way, for people who perceived others as harboring more service use stigma (an inaccurate perception), low personal service use stigma was not related to changes in perceptions of academic success (regardless of public self-consciousness), but for people who perceived others as harboring less service use stigma (an accurate perception), low personal service use stigma was associated with weakened declines in perceptions of academic success from T1 to T2 only for people low in public self-consciousness, as expected.

### ***Group Differences in Misperceptions***

Based on the diversity of the sample and to expand on Study 1, I assessed group differences in T1 misperceptions across mental illness status, gender (female vs. male), class



year (for undergraduate students only; Freshman vs. Sophomores, Juniors, and Seniors), undergraduate vs. graduate student status, and racial/ethnic group (White vs. Asian). To assess these differences, I again created accuracy scores for T1 perceptions of others' willingness to use services and T1 perceptions of others' service use stigma (i.e., linear transformations of perceptions of others scores, where the willingness and stigma beliefs of the full sample were subtracted from each individuals' estimate).

Ninety-three individuals (35.8%) identified as having a mental illness and 151 (58.1%) identified as not having a mental illness; 16 individuals (6.1%) preferred not to answer. Unlike in Study 1, there was no difference in willingness accuracy scores between people who had a mental illness ( $M = -0.29$ ,  $SD = 1.02$ ) and people who did not have a mental illness ( $M = -0.21$ ,  $SD = 1.10$ ),  $t(241) = 0.59$ ,  $p = .556$ , 95% CI [-0.20, 0.36]. There was also no difference in stigma accuracy scores between people who had a mental illness ( $M = 1.04$ ,  $SD = 0.81$ ) and people who did not have a mental illness ( $M = 0.96$ ,  $SD = 0.75$ ),  $t(241) = -0.76$ ,  $p = .448$ , 95% CI [-0.28, 0.12].<sup>36</sup>

Sixty-eight individuals (26.2%) identified as male and 186 (71.5%) identified as female; six individuals (2.3%) identified with a different term or preferred not to answer. There was no difference in willingness accuracy scores between people who identified as male ( $M = -0.29$ ,  $SD = 1.09$ ) and people who identified as female ( $M = -0.22$ ,  $SD = 1.05$ ),  $t(251) = 0.46$ ,  $p = .646$ , 95% CI [-0.23, 0.37]. There was also no difference in stigma accuracy scores between people

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<sup>36</sup> To supplement these null findings, I also explored accuracy estimates among those who indicated mild to severe depression at T1 (i.e., those with scores greater than or equal to 5 on the PHQ-9;  $n = 159$ ) in comparison to those who indicated no depression or minimal depression (i.e., those with scores less than or equal to 4 on the PHQ-9;  $n = 101$ ). Willingness accuracy scores did not differ on the basis of depression,  $t(257) = 1.16$ ,  $p = .248$ , 95% CI [-0.11, 0.42]. However, stigma accuracy scores did differ. People who reported mild to severe depression overestimated others' service use stigma by, on average, 1.08 scale points ( $SD = 0.79$ ), whereas individuals who reported no depression to minimal depression reported overestimates by, on average, 0.86 scale points ( $SD = 0.73$ ),  $t(256) = -2.26$ ,  $p = .024$ , 95% CI [-0.42, -0.03].

who identified as male ( $M = 0.94$ ,  $SD = 0.83$ ) and people who identified as female ( $M = 1.00$ ,  $SD = 0.74$ ),  $t(250) = 0.55$ ,  $p = .583$ , 95% CI [-0.15, 0.27].

Fifty-six individuals (21.54%) identified as Freshman and 95 identified as Sophomores, Juniors, or Seniors (36.54%); 109 individuals (41.92%) identified as “other” (see below). In comparing Freshman to Sophomores, Juniors, and Seniors (individuals who had been at the University longer and had more exposure to other college students), there was no difference in willingness accuracy scores between Freshman ( $M = -0.30$ ,  $SD = 0.97$ ) and Sophomores, Juniors, and Seniors ( $M = -0.43$ ,  $SD = 1.12$ ),  $t(149) = -0.76$ ,  $p = .451$ , 95% CI [-0.49, 0.22]. There was also no difference in stigma accuracy scores between Freshman ( $M = 0.83$ ,  $SD = 0.69$ ) and Sophomores, Juniors, and Seniors ( $M = 1.01$ ,  $SD = 0.75$ ),  $t(149) = 1.46$ ,  $p = .147$ , 95% CI [-0.06, 0.42].

One hundred and nine individuals (41.9%) identified as “other” in response to a question assessing year in college. Upon review of text responses to the question, it appeared that the majority of these individuals were graduate students (reflected in their mean age of 26.54 years old). I concluded that those who did not identify as an undergraduate student were in fact graduate students. The remaining 151 individuals (58.1%) identified as undergraduate students. Undergraduate students underestimated the extent to which others were willing to use services by, on average, 0.38 scale points ( $SD = 1.07$ ), whereas individuals who identified as graduate students reported underestimation by, on average, 0.09 scale points ( $SD = 1.04$ ). The difference between these underestimations was statistically significant,  $t(257) = -2.23$ ,  $p = .027$ , 95% CI [-0.56, -0.03]. There was, however, no difference in stigma accuracy scores between undergraduate ( $M = 0.94$ ,  $SD = 0.73$ ) and graduate students ( $M = 1.07$ ,  $SD = 0.83$ ),  $t(257) = -1.31$ ,  $p = .193$ , 95% CI [-0.32, 0.06].

One hundred and forty individuals (53.8%) identified as White or European American and 59 individuals (22.7%) identified as Asian; 61 individuals (23.5%) identified with a different racial/ethnic category. Students who identified as Asian overestimated the extent to which others were willing to use services by, on average, 0.12 scale points ( $SD = 1.05$ ), whereas individuals who identified as White reported underestimation by, on average, 0.39 scale points ( $SD = 1.00$ ). Once again, the difference in perception accuracy of others' willingness to use services was statistically significant,  $t(197) = 3.22, p = .002, 95\% \text{ CI } [0.20, 0.82]$ . There was again, however, no difference in stigma accuracy scores between Asian ( $M = 0.94, SD = 0.69$ ) and White students ( $M = 0.96, SD = 0.82$ ),  $t(196) = -0.16, p = .874, 95\% \text{ CI } [-0.26, 0.22]$ .

## **Discussion**

This research was the first to assess pluralistic ignorance of attitudes toward mental health services in a longitudinal study on a college campus, and, in doing so, effectively expanded on the findings observed in Study 1. In replication of Study 1's pluralistic ignorance findings, I again observed systematic, group-level misperceptions of others' willingness to use mental health services and others' harbored service use stigma. Individuals mistakenly believed others were less willing to use services and they mistakenly believed others harbored more service use stigma compared to the self-reported average willingness and stigma beliefs of the sample, respectively, at both T1 and T2. Interestingly, stigma self-other discrepancies became smaller in magnitude from T1 to T2. This appeared to reflect slight (and nonsignificant) increases in personal service use stigma and decreases in perceptions of others' service use stigma from T1 to T2, which could reflect changing attitudes during the coronavirus pandemic (however, this is speculative). Altogether these findings (1) confirm the prevalence of pluralistic ignorance among students on Syracuse University's campus, (2) indicate that the misperceptions

are persistent across time, and (3) highlight the need to address these misperceptions in pluralistic ignorance-based interventions.

This research also emphasized the importance of assessing individual-level indicators of pluralistic ignorance as predictors of pluralistic ignorance-related implications across time. The cross-sectional findings from Study 1 were informative but were lacking in their ability to gauge longitudinal relationships, particularly those that pertain to long-term changes in attitudes and behaviors. Although this study was designed to measure such changes, the hypothesized relationships were overwhelmingly not supported, as the majority of analyses resulted in null findings (which I primarily attribute to the limitations of the study; see limitations section below). However, all of the statistically significant relationships observed (at  $p < .05$ ) supported my hypotheses.

Of importance is the assessment of how personal attitudes and perceptions of others' attitudes uniquely predict changes in the implications assessed (specifically, their main effects), as these assessments can provide guidance for future research and interventions aimed at promoting positive outcomes among college students. The four statistically significant main effects observed in the current study begin to shed light on these processes. Higher levels of T2 headache symptomology and respiratory illness were significantly and negatively (as expected) predicted by personal willingness to use services (adjusting for perceptions of others' willingness to use services); however, the relationship with respiratory illness could be driven by extreme values for the respiratory illness measure. Personal service use stigma significantly and negatively (as expected) predicted improvements in perceptions of academic success from T1 to T2 (adjusting for perceptions of others' service use stigma); however this relationship could also be driven by extreme values for the personal service use stigma variable. Higher levels of T2

personal willingness to use services were significantly and negatively (as expected) predicted by personal service use stigma (adjusting for perceptions of others' stigma). Of note, I did not observe any statistically significant main effects for perceptions of others' attitudes. These findings indicate that personal attitudes (relative to perceptions of others' attitudes) might be especially important in regard to their direct and unique relationships with the implications assessed in this research.

While a deeper understanding of the main effects of personal and perceptions of others' attitudes is certainly important, I was particularly interested in how the constructs would interact when predicting the implications assessed. Indeed, I sought to determine whether certain combinations of attitudes (especially those that reflect the pattern of pluralistic ignorance at the group level) would lessen the positive outcomes associated with harboring positive personal attitudes toward mental health services. I observed one statistically significant interaction between personal attitudes and perceptions of others' attitudes. Specifically, personal service use stigma interacted with perceptions of others' service use stigma to predict the extent to which individuals decreased their alcohol use from T1 to T2. In line with expectations, low service use stigma was associated with steeper declines in alcohol use among individuals who accurately perceived others' as harboring less service use stigma (noting that this could be driven by extreme values), whereas low service use stigma was associated with weaker declines in alcohol use among those who inaccurately perceived others as harboring more service use stigma. In other words, the potential benefits of harboring less personal service use stigma (i.e., reduced alcohol use) could be dampened when combined with the barrier of inaccurately perceiving others as harboring more service use stigma.

This study also showcased the potential importance of assessing pluralistic ignorance-related constructs (specifically, need to belong and public self-consciousness) that could work to further amplify pluralistic ignorance-related implications. These processes could serve as an additional barrier to healthy living (e.g., more service use, less alcohol use), and could be avenues for intervention in addition to addressing negative attitudes toward services and misperceptions of others' attitudes toward services. Noting that these analyses were underpowered (one of the primary limitations of this research), I was not surprised to again find overwhelmingly non-significant findings. Only in two cases did I observe significant three-way interactions between personal attitudes, perceptions of others' attitudes, and either need to belong or public self-conscious (depending on the model) in predicting changes in the implications assessed.

Specifically, personal willingness to use services, perceptions of others' willingness to use services, and need to belong interacted to predict changes in alcohol use. Also, personal service use stigma, perceptions of others' service use stigma, and public self-consciousness interacted to predict changes in perceptions of academic success. In both cases, those who harbored positive attitudes toward services (i.e., high personal willingness to use services, low service use stigma) and perceived others as having positive attitudes toward services reported better outcomes (steeper declines in alcohol use and weaker declines in perceived academic success) only when they also reported low levels of need to belong and public self-consciousness. Personal attitudes toward services were not related to the outcomes when combined with perceptions of others as having negative attitudes toward services, regardless of levels of need to belong and public self-consciousness. These findings indicate that personal negative attitudes toward services, misperceptions of others as having negative attitudes toward

services, and higher levels of need to belong and public self-consciousness can all serve as barriers to positive health outcomes. Of course, a follow-up study that is better powered is certainly needed, as the sample for this study was much smaller than desired and, given the number of analyses run, the possibility of Type I errors is high. Nonetheless, these findings serve as a first step in developing a deeper understanding of these relationships, which are vital to informing prevention intervention programs that address not only personal attitudes and misperceptions, but also additional related barriers that could speak to why people might behave in accordance with misperceived norms.

Finally, I placed an emphasis on assessing group differences in misperceptions, as understanding how perceptions differ within subgroups of the population can assist in developing and implementing targeted interventions. Unlike in Study 1, I did not observe differences in pluralistic ignorance based on mental illness status (however, the stigma accuracy results from Study 1 were conceptually replicated when assessing depression as an indicator of mental illness; see Footnote 36), nor did I observe differences based on gender (an interesting finding considering the numerous reports of gender differences in the literature on pluralistic ignorance; e.g., Lambert et al., 2003; Munsch et al., 2018). I also did not observe differences between Freshman and non-Freshman (Sophomores, Juniors, and Seniors). However, I did observe an undergraduate vs. graduate student status difference in accuracy of perceptions of others' willingness to use mental health services, where undergraduate students were more inaccurate in their perceptions of others' willingness compared to graduate students—that is, they reported greater underestimations of others' willingness compared to graduate students (an interesting finding that differs from what would be expected given the stigma-related trends in Study 1). I also observed a racial difference in accuracy of perceptions of others' willingness to use mental

health services, where White individuals underestimated others' willingness to use services, while Asian individuals did not (an again interesting finding that is inconsistent with the stigma-related trends observed in Study 1). It is possible that graduate students and Asian students on Syracuse University's campus are engaged in conversations about mental health more frequently than undergraduate students and White students (especially in relation to others' desires to use services as opposed to service use stigma, where differences were observed in Study 1). These conversations could produce more accurate/positive perceptions of others' willingness. It is also possible that these findings are in part driven by sample overlap—that is, the subsamples included overlapping participants, where 30.3% of the 109 graduate students identified as Asian and 46.8% as White, while only 17.2% of the 151 undergraduate students identified as Asian and 58.9% as White. In other words, there could be something unique about the Asian graduate students' perceptions that drive the findings.<sup>37</sup> Nonetheless, more research is needed to replicate these trends and better understand why specific subgroups of students might be more inaccurate in their perceptions of others' attitudes.

In all, Study 2 contained various novel components that have broader impacts on pluralistic ignorance research and mental health service use research. Regarding pluralistic ignorance research, in Study 2 I assessed a new context using a longitudinal design and made theoretical contributions by (1) emphasizing the importance of assessing a battery of pluralistic ignorance-related implications and (2) assessing the role of need to belong and public self-consciousness as related to the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications. Moreover, in this study I confirmed the

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<sup>37</sup> The Asian-White difference remained significant when adjusting for student status,  $b = -0.46$ ,  $SE_b = 0.16$ ,  $t(196) = -2.86$ ,  $p = .005$ , 95% CI [-0.77, -0.14]. However, the undergraduate-graduate student difference was not significant when adjusting for race,  $b = 0.26$ ,  $SE_b = 0.15$ ,  $t(196) = 1.78$ ,  $p = .077$ , 95% CI [-0.03, 0.55].



presence of pluralistic ignorance among college students with a new sample of college students, thus providing the evidence needed to move forward with targeted pluralistic ignorance-based intervention programs. Regarding mental health service use research, this study confirms and makes explicit the clear group-level misperceptions in willingness to use services *and* service use stigma (see Pompeo-Fagnoli, 2020), tying the sporadic previous literature assessing these constructs to an overarching social psychological phenomenon, pluralistic ignorance. The analyses predicting pluralistic ignorance-related implications that resulted in statistically significant findings supported previous research indicating that personal service use-related attitudes, as opposed to perceptions of others' attitudes, are more consistent predictors of personal attitudes and behaviors (e.g., Eisenberg et al., 2009; Lally et al., 2013). Trends derived from the few interaction analyses resulting in statistical significance did indicate that the best pluralistic ignorance-related outcomes (e.g., decreased alcohol use) arise when positive personal attitudes toward services are combined with perceptions of others as having positive attitudes toward services (replicating trends observed in exploratory analyses from Study 1) *and* low levels of need to belong and public self-consciousness. These trends indicate that misperceiving others as having negative attitudes toward services and having high levels of need to belong and public self-consciousness can hinder the positive outcomes related to harboring positive attitudes toward mental health services. Although I did not reach my target sample size and the study was underpowered, these results are intriguing enough to move forward with this line of research and begin the assessment of pluralistic ignorance-based interventions (see Study 3).

### ***Limitations***

While the findings from this study certainly prompt the need for continued research, there are limitations that must be addressed moving forward. I observed an abundance of null findings,

and it is quite possible that these null observations were due to the sample size. The sample size used for the longitudinal analyses was small (at most  $N = 145$ ), and it is possible that the analyses were too underpowered to observe existing effects. I also aimed to predict several pluralistic ignorance-related implications that were tangentially related to the pluralistic ignorance context, and it is possible that the relationships between individual-level indicators of pluralistic ignorance and these extended outcomes are small and more complex than I initially anticipated. Future research should more carefully consider each implication and the process by which willingness- and stigma-related individual-level indicators of pluralistic ignorance would impact them (notably, this research did not aim to shed light on these underlying processes, but rather to uncover the foundational relationships and, in turn, provide direction for future assessment). In addition, I sought to conduct this research within a semester specifically to avoid extended periods where students left campus and could have become less attuned to their peers, have different levels of access to outside services, etc. As such, the time between T1 and T2 survey completion was, on average, 77.3 days (approximately 11 weeks or 2.75 months). It is possible that this gap was not long enough to observe meaningful changes in the implications measured. In other words, T1 implications accounted for a substantial portion of variance explained in the T2 implications, leaving little room for other predictors (i.e., personal and perceptions of others' attitudes) to explain unique variance.

As previously mentioned (in Footnote 19), T2 data collection occurred during the COVID-19 pandemic. During this time, Syracuse University had transitioned to online learning, the majority of students left campus, in-person campus services were unavailable, and students were living with the reality of a pandemic. For any of these reasons responses to the T2 survey could have been biased, outcome variables assessed could have been impacted (e.g., mental

health, physical health, substance use), and the effects of interest could have been masked (contributing to the inconclusive results). Moreover, it might be difficult to generalize some of these findings to non-pandemic settings. As such, a conceptual replication of this research with an extended study duration (e.g., more time between T1 and T2, a third time point) and conducted post-pandemic would certainly clarify some of these relationships and provide more conclusive results.

Importantly, there still remains a possibility that the implication changes observed are not truly a function of individual-level indicators of pluralistic ignorance, but rather a function of other associated/confounded variables. For example, individuals who harbor low service use stigma but perceive others as harboring high service use stigma could have, at the start of the pandemic, returned to environments that facilitate or encourage alcohol use (relative to those who harbor low service use stigma and perceive others as harboring low service use stigma). This environmental factor could provide an alternative explanation for the alcohol use findings. Or perhaps these individuals are simply the *kinds* of people who drink more alcohol when a pandemic occurs or when off campus. As another example, I found a negative association between personal willingness to use services and headache symptomology, and there are other variables that could potentially account for this relationship (e.g., people who are more willing to use services might also be more likely to take medications for their headaches). Nonetheless, these findings still inform future research and call for a need to better understand *why* individual-level indicators of pluralistic ignorance are related to and/or appear to be related to these outcomes of interest.

As mentioned earlier, I also did not report results from models that examine the likely complex processes underlying relationships between individual-level indicators of pluralistic

ignorance and pluralistic ignorance-related implications. Of course, some of the implicit assumptions about mediation and moderation are, at face value, less complex, and could conceivably be tested within this longitudinal sample. For example, the analyses assessing some of the relationships described in Hypotheses 3 and 4 could adjust for service use, mental health, and/or mental illness status. I could also assess some relationships while including service use, mental health, and mental illness status as moderators, or I could assess the relationships only among the subsample of individuals who had not used services or did not identify as having a mental illness at T1. It is also conceivable that some of the hypotheses might make most sense among those who showed signs of possibly needing services at T1, as well-adjusted students (i.e., students who do not have a mental illness and/or report depressive symptoms) might not have a need for services in the first place, and they might not commonly consider their peers' attitudes toward mental health services. However, these proposed models are either more complex (which is a matter of concern considering the reduced sample size) or they would require excluding certain individuals from analyses (thus further reducing the sample size). For example, if the primary analyses for Hypotheses 3 and 4 were conducted only among those in the longitudinal sample who identified as having a mental illness at T1 ( $n = 63$ ) or among those who reported mild to severe depressive symptoms at T1 ( $n = 90$ ), the full longitudinal sample would be reduced by 57% and 38%, respectively.<sup>38</sup> Considering the reduced sample size and the aforementioned limitations of the study, it would arguably be more appropriate to consider these additional models in future, tailored investigations.

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<sup>38</sup> In the event that some readers are nonetheless curious about these findings, primary results from analyses using untransformed versions of the variables are available in a supplemental file on OSF. Of note, there was no pattern in the results that would indicate a clear, directional discrepancy in the conclusions made (i.e., in some cases the observed full sample effects were replicated among the subsamples, whereas in other analyses effects were lost, and in some cases trends emerged among the subsamples that were not observed when using the full sample).

Although I broadened recruitment in this study, participants were still aware that the study was about “Attitudes Toward Mental Health Services,” and as such, there could have been some degree of selection bias in participation. In turn, there still remains the possibility that estimates of other students’ attitudes were not as inaccurate as they appear, as the individuals who participated could have had more positive attitudes toward services relative to the general student population. Study 3 addressed this limitation by recruiting participants for a study titled “Attitudes Toward Services on Campus,” without mentioning of mental health services.

Finally, similar to the limitations from Study 1, this study did not begin to assess concrete ways to address pluralistic ignorance of attitudes toward mental health services. Study 3 was designed to specifically address this limitation by assessing two basic pluralistic ignorance intervention components, thus setting a necessary foundation for future research on pluralistic ignorance interventions.

### **Study 3: An Experimental Study on Pluralistic Ignorance Interventions**

This study fills a gap in the literature by being the first to apply pluralistic ignorance to the issue of mental health service underutilization in an experimental study among college students. Furthermore, this work adds to the limited literature on pluralistic ignorance interventions by assessing the viability of pluralistic ignorance-related intervention components in promoting positive mental health service use-related outcomes. This study effectively expands on the work of Schroeder and Prentice (1998) and Geiger and Swim (2016) by combining the intervention approaches used in their research. To expand, Schroeder and Prentice (1998) established a pluralistic ignorance-based intervention to address pluralistic ignorance of attitudes toward alcohol use that involved teaching individuals about pluralistic ignorance while also correcting the norm misperception. Geiger and Swim (2016) established a pluralistic ignorance-

based intervention for pluralistic ignorance of attitudes toward climate change that involved teaching individuals about the “true” attitudes in the population through visual data representation of the “true” attitudes in the population (for similar interventions, see Munsch et al., 2014, and Van Grootel et al., 2018). In this research, I directly assess the viability of a generalized pluralistic ignorance lesson *and* a targeted misperception correction procedure, as well as their additive effects in producing positive outcomes (i.e., correcting misperceptions and increasing service use interest).

## Hypotheses

The primary aim of this research was to assess the viability of pluralistic ignorance intervention components in a particular context, attitudes toward mental health services. I specifically assessed the effectiveness of the intervention components in decreasing pluralistic ignorance (i.e., correcting the norm misperception, increasing accurate/desirable perceptions of others as harboring positive attitudes toward mental health services) and promoting positive mental health service use-related outcomes. This research was experimental, where participants were randomly assigned to one of four conditions: (1) no intervention (the control condition), (2) pluralistic ignorance lesson intervention, (3) misperception correction intervention, or (4) a combined pluralistic ignorance lesson and misperception correction intervention. I detail the primary hypotheses below and preregistered them on OSF prior to accessing the data.<sup>39</sup>

Specifically, I hypothesized that:

H1<sub>a-c</sub>: (H1<sub>a</sub>) Individuals in the intervention conditions, compared the control condition, will report more accurate perceptions of others’ attitudes (i.e., less pluralistic ignorance).

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<sup>39</sup> The hypotheses on OSF separate H1 and H2 into four hypotheses, with the first two comparing the intervention conditions to the control condition and the second two assessing differences among the intervention conditions. Although structured differently in this manuscript, the expected relationships are the same. OSF link: [https://osf.io/rzs7n/?view\\_only=fd6383656e7347daa5c7633f1735ffac](https://osf.io/rzs7n/?view_only=fd6383656e7347daa5c7633f1735ffac)

(H1<sub>b</sub>) Individuals who receive the combined intervention, compared to those who receive the pluralistic ignorance lesson intervention or the misperception correction intervention, will report more accurate perceptions of others' attitudes, as misperceptions will be corrected *and* individuals will be more aware of their systematic errors in perceiving others' attitudes and possibly correct for them. (H1<sub>c</sub>) Individuals who receive the misperception correction intervention, compared to those who receive the pluralistic ignorance lesson intervention, will report more accurate perceptions of others' attitudes, as these individuals will have the misperception more blatantly corrected. (Notably, accuracy in perceptions of others' attitudes serves as a manipulation check for the misperception correction intervention procedure.) Taken together, these hypotheses imply that the conditions in order from lowest to highest accuracy would be as follows: control, pluralistic ignorance lesson, misperception correction, combined intervention.

H2<sub>a,b</sub>: (H2<sub>a</sub>) Individuals in the intervention conditions, compared to the control condition, will display more service use interest (i.e., support for a friend's use of services, willingness to volunteer in a campaign to promote service use awareness, interest in receiving information about available services). (H2<sub>b</sub>) Individuals who receive the combined intervention, compared to those who receive the pluralistic ignorance lesson intervention or the misperception correction intervention, will display more service use interest, as misperceptions will be corrected *and* individuals will be less inclined to behave in ways that would have previously been influenced by perceptions of others.<sup>40</sup>

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<sup>40</sup> I expected the two intervention components to combine additively to produce the best service use interest outcomes (see H2<sub>b</sub>). I will conduct exploratory analyses assessing the comparative effectiveness of the components alone in increasing service use interest.

Importantly, while I assess accuracy of perceptions as one primary outcome variable in this research (see H1), I want to make clear that I view overestimations of others' positive attitudes toward services as reflective of a desirable perception. In other words, some individuals will (1) have negative misperceptions, where they underestimate others' positive attitudes toward mental health services, (2) have truly accurate perceptions, where they accurately perceive others' positive attitudes toward mental health services, and (3) have positive "misperceptions," where they overestimate others' positive attitudes toward mental health services. For the purposes of this research, I view the latter category as a desirable perception (and, in turn, a successful outcome)—perceptions of a positive attitudes among the population is vital to eliminating pluralistic ignorance in this context and encouraging service use.

## **Method**

### ***Participants and Design***

I recruited three hundred and eighty participants online through Prolific.ac (effectively avoiding participant overlap with Studies 1 and 2). Requirements for participation included being 18 years of age or older, located in the United States, and a current college student. Three hundred and eighty one eligible participants fully completed the study, and after removing individuals who wished to have their data discarded ( $n = 3$ ), the final sample consisted of 378 participants.<sup>41</sup> The participants ranged in age from 18 to 56 years old ( $M = 22.3$  years old,  $SD = 5.5$  years, median age = 21 years). About 50% of the participants identified as women ( $n = 188$ ) and 47% identified as men ( $n = 179$ ); the remaining individuals identified as non-binary/gender fluid ( $n = 7$ ), preferred a different term ( $n = 2$ ), or preferred not to answer ( $n = 2$ ).

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<sup>41</sup> An a priori power analysis indicated that a sample size of 376 participants would be needed to provide sufficient power (power = .80) to detect effects of a small-to-moderate size (effect size  $f = 0.172$ ) with an alpha of .05 using an analysis of variance (ANOVA).



The sample consisted of mostly White or European American participants ( $n = 190$ ), followed by Asian ( $n = 93$ ), Hispanic or Latinx ( $n = 38$ ), Black or African American ( $n = 33$ ), multi-racial/mixed ( $n = 17$ ), and “other” ( $n = 5$ ); one individual identified as American Indian or Alaska Native and one individual identified as Native Hawaiian or Other Pacific Islander. Most individuals were born in the United States ( $n = 336$ ); 42 individuals were not born in the United States.<sup>42</sup> For a breakdown of demographic representation across condition, see Table 21. The conditions had fairly equal representation across age, gender, race, and mental health service use history.

### ***Design, Procedure, and Measures***

Participants completed this experimental research study online. Upon providing informed consent, participants were randomly placed into one of four conditions: no intervention (control), pluralistic ignorance lesson intervention, misperception correction intervention, or a combined intervention. Participants in the three intervention conditions first reviewed the materials designed for the condition. They then completed some of the measures described in Studies 1 and 2 and responded to several additional measures (described below). Participants in the control condition did not review any intervention-related material; instead, they were immediately prompted to complete the remainder of the survey. For brevity, I describe only new or modified measures and provide detailed descriptions only for the primary measures used in analyses. For all study materials, see Appendix C.

As discussed below, two of the continuous measures used in analyses were skewed (skew > 1.0); specifically, personal service use stigma and willingness to support a friend’s use

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<sup>42</sup> Among those who indicated that they were born outside of the United States, the majority identified as Asian ( $n = 26$ ), followed by Black or African American ( $n = 5$ ), White or European American ( $n = 5$ ), and Hispanic or Latino ( $n = 4$ ); two individuals preferred not to answer.

of services. As in Studies 1 and 2, I ran all analyses involving these variables untransformed and transformed. I report results from models using the untransformed variables, as there were no cases in which statistically significant relationships resulting from confirmatory analyses using the untransformed variables were not significant when using the transformed variables. I again acknowledge that extreme values in the skewed distributions could lead to underestimated effect sizes in analyses using the untransformed variables.

**Pluralistic ignorance intervention (experimental manipulation).** As previously noted, the experimental manipulation consisted of three intervention conditions and one control condition. In the pluralistic ignorance lesson intervention condition, participants reviewed materials designed to teach individuals about pluralistic ignorance. In the misperception correction intervention condition participants reviewed materials demonstrating that most university students (1) are willing to use services and (2) have positive attitudes toward service use. In an effort to make the norm-correction as “real” and generalizable as possible, I utilized the college student personal attitude distributions observed in Study 1. In the combined pluralistic ignorance lesson and misperception correction intervention condition participants reviewed all of the materials presented in the previously described conditions.

These materials were pretested for comprehension using an online sample prior to the implementation of this research (recruited and compensated through Amazon’s Mechanical Turk). These comprehension questions were also included in the current study. Participants had three opportunities to answer all comprehension questions correctly. After up to three attempts, participants were shown the correct answers.<sup>43</sup>

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<sup>43</sup> I did not exclude any participants from analyses for failing to correctly answer the comprehension questions, as they reviewed the correct answers before proceeding with the study. For the pluralistic ignorance lesson intervention condition, two individuals (2%) incorrectly answered one comprehension question after three attempts. For the

**Willingness to use mental health services (pluralistic ignorance).** I used the same scale as described in Study 2; however, the “Syracuse” student descriptor was removed from the perception of others’ attitudes subscale (e.g., *Other students would want to use mental health services if they were experiencing problems in their family relationships*). I averaged all items in each subscale to create composite scores, where higher scores indicate more personal willingness to use services (full sample  $M = 4.98$ ,  $SD = 1.23$ ,  $\alpha = .91$ , skew = -0.52, kurtosis = -0.19) and perceptions of others’ as being more willing to use services (full sample  $M = 4.89$ ,  $SD = 1.08$ ,  $\alpha = .90$ , skew = -0.41, kurtosis = 0.07).

**Mental health service use stigma (pluralistic ignorance).** I used the same scale as described in Study 2; however, the “Syracuse” student descriptor was again removed from the perception of others’ attitudes subscale (e.g., *Most students would willingly accept someone who has received mental health treatment as a close friend*). After reverse-scoring negatively worded items, I averaged all items in each subscale to create composite scores, where higher scores indicate more personal service use stigma (full sample  $M = 1.57$ ,  $SD = 0.74$ ,  $\alpha = .86$ , skew = 1.72, kurtosis = 2.75) and perceptions of others’ as harboring more service use stigma (full sample  $M = 2.40$ ,  $SD = 0.94$ ,  $\alpha = .87$ , skew = 0.47, kurtosis = -0.26). As the personal stigma composite was once again non-normally distributed, I ran all analyses involving personal service use stigma untransformed and inverse transformed (this transformation best addressed the skew; transformed skew = 0.40).<sup>44</sup>

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misperception correction intervention condition, all participants correctly answered the comprehension questions by the third attempt. For the combined intervention condition, three individuals (3%) incorrectly answered one or two comprehension questions after three attempts.

<sup>44</sup> To maintain the same scale direction as the untransformed variable, I reflected the inverse transformed variable for analyses.

**Service use interest.** Participants responded to three measures broadly assessing service use interest. The first measure assessed support for a friend's use of services. In three items, participants indicated the likelihood of (1) recommending services to a close friend, (2) helping a close friend access information about mental health services, and (3) assisting a close friend in getting to mental health services using a 7-point response scale (1 = *Very Unlikely*; 7 = *Very Likely*). I averaged the three items on this scale to compute a composite for friend support (full sample  $M = 6.07$ ,  $SD = 0.93$ ,  $\alpha = .79$ , skew = -1.32, kurtosis = 2.51), where higher scores indicate more support for a friend's use of mental health services. As the friend support composite was non-normally distributed, I ran all analyses involving friend support untransformed and reflect and inverse transformed (this transformation best addressed the skew; transformed skew = 0.25).

The second measure assessed support for a mental health service use awareness campaign. In two items (adapted from Prentice & Miller, 1993), participants indicated how many flyers they would be willing to post in support of the campaign (11-point response scale ranging from *0 flyers* to *100 or more flyers*) and how many hours they would be willing to spend promoting the campaign (7-point response scale ranging from *no time* to *6 or more hours*). As both items were highly correlated ( $r = .68$ ,  $p < .001$ ), I standardized and averaged the items to create a composite score for campaign support (full sample skew = 0.88, kurtosis = 0.33), where higher scores indicate more willingness to support a campaign advocating for mental health service use awareness.

The final measure directly assessed interest in receiving information about available mental health services. Participants indicated their interest in receiving such information using a 5-point response scale (1 = *not at all interested*; 5 = *extremely interested*), where higher scores

indicate more interest in receiving information about services (full sample  $M = 3.16$ ,  $SD = 1.24$ , skew = -0.13, kurtosis = -0.91).

**Mental health service use.** I administered a subset of the questions used in Studies 1 and 2 to assess mental health service use. Specifically, participants completed questions assessing frequency of general mental health service use in the past year and frequency of counseling or therapy use in the past year, barriers to service use in the past year, lifetime service use, and current service use (dichotomized). I used a dichotomized version of the lifetime service use variable in exploratory analyses (0 = never used services; 1 = used services). Among the full sample, 183 individuals (48.4%) reported having never used services and 195 individuals (51.6%) reported use of services.

**Mental health.** Participants completed some of the measures described in Studies 1 and 2. Specifically, participants completed items assessing personal and family member mental illness status and current use of prescription medication for mental health. I used the personal mental illness status variable in exploratory analyses. Participants also completed a measure of depressive symptoms, the PHQ-9 (Kroenke et al., 2001; described in Study 2). I created a composite score for depression by summing all items in the PHQ-9 (full sample  $M = 9.26$ ,  $SD = 6.52$ ,  $\alpha = .89$ , skew = 0.53, kurtosis = -0.60), where higher scores indicate higher levels of depressive symptoms. I also used this variable in exploratory analyses.

**Need to belong.** Participants completed the Need to Belong Scale (Leary et al., 2013; described in Study 2). I averaged all items to compute a composite score (full sample  $M = 3.06$ ,  $SD = 0.78$ ,  $\alpha = .83$ , skew = -0.08, kurtosis = -0.29), where higher scores indicate more need to belong. I used this variable in exploratory analyses.

**Classroom performance.** Participants reported their previous semester GPA (described in Study 2). I did not use this measure in the current analyses.

**Demographics.** Participants completed some of the demographic measures used in Studies 1 and 2. Notably, I updated the question measuring gender/sex to assess gender identity with 5 response options. I also included two additional questions assessing college-type and course location/format. I used items assessing gender and race/ethnicity in exploratory analyses.

## Results

For the analyses where I measured condition differences in misperceptions (i.e., pluralistic ignorance), I specifically assessed condition differences in accuracy scores, which I calculated by subtracting the control condition sample mean ( $M_{willing} = 4.67$ ,  $M_{stigma} = 1.61$ ) from perceptions of others' willingness to use services and service use stigma, respectively (full sample willingness accuracy  $M = -0.09$ ,  $SD = 1.08$ , skew = -0.41, kurtosis = 0.07; full sample stigma accuracy  $M = 0.79$ ,  $SD = 0.94$ , skew = 0.47, kurtosis = -0.26).<sup>45</sup> As the intervention components could influence perceptions of being personally different from (or similar to) others, I also conducted conceptually identical exploratory analyses assessing condition differences in self-other discrepancy scores, which I calculated by subtracting perceptions of others' attitudes from personal attitudes for both willingness- and stigma-related measures (full sample willingness self-other discrepancy  $M = 0.09$ ,  $SD = 1.20$ , skew = -0.22, kurtosis = 1.00; full sample stigma self-other discrepancy  $M = -0.83$ ,  $SD = 0.91$ , skew = -0.57, kurtosis = 0.87). See Table 22 for primary measure descriptive statistics, including self-other discrepancy scores,

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<sup>45</sup> To create accuracy scores, I performed linear transformations of the perception of others' attitude scores by subtracting the average personal attitude from the control condition, as opposed to the average personal attitude from the sample (collapsed across conditions). Importantly, model results and overarching conclusions using either transformation are identical, as they are both linear transformations of the same variable. As personal attitudes from the intervention conditions could have been influenced by the intervention material, I decided the most informative accuracy scores were ones assessing perception accuracy of "non-intervened" attitudes.

across experimental conditions (and the associated  $F$  statistic for condition differences in each primary measure). Importantly, the condition differences assessed within H1 and H2 are evaluated based on the same two one-way analysis of variance (ANOVA) tests and planned post-hoc comparisons.<sup>46</sup>

### ***Pluralistic Ignorance in the Control Condition***

Although not listed in my a priori hypotheses, it is reasonable to confirm the existence of pluralistic ignorance among individuals in the control condition so as to establish the existence of pluralistic ignorance beyond Syracuse University's campus. Among those in the control condition, individuals did not mistakenly believe others were less willing to use services ( $M = 4.46, SD = 1.27$ ) compared to the self-reported average willingness of the subsample ( $M = 4.67, SD = 1.31$ ), paired  $t(95) = 1.53, p = .130, 95\% CI [-0.06, 0.48]$ .<sup>47</sup> In other words, I did not observe pluralistic ignorance of willingness of to use mental health services among this subsample. But the mean differences were in the expected direction, such that individuals perceived other students as being less willing to use services compared to the willingness of the subsample. On the other hand, I did observe pluralistic ignorance of service use stigma in the subsample. Individuals mistakenly believed others harbored more stigma toward using services ( $M = 2.72, SD = 0.98$ ) compared to the self-reported average stigma beliefs of the subsample ( $M = 1.61, SD = 0.76$ ), paired  $t(95) = -10.97, p < .001, 95\% CI [-1.31, -0.91]$ .<sup>48</sup> See Table 22 for descriptive statistics of personal and perceptions of others' attitudes across all conditions.

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<sup>46</sup> For this block of tests (i.e., tests assessing basic condition differences in primary measures) one could consider the use of a Bonferroni correction, adjusted  $\alpha = .005$ .

<sup>47</sup> There was no difference in variance between personal willingness ( $s^2 = 1.72$ ) and estimations of others' willingness to use services ( $s^2 = 1.62$ ),  $F(95, 95) = 1.06, p = .770, 95\% CI [0.71, 1.59]$ .

<sup>48</sup> There was less variance in the service use stigma of the sample ( $s^2 = 0.58$ ) compared to estimations of others' service use stigma ( $s^2 = 0.97$ ),  $F(95, 95) = 0.60, p = .013, 95\% CI [0.40, 0.90]$ .

### ***Condition Differences in Perception Accuracy (H1)***

Using two ANOVAs and post hoc Tukey Honest Significant Difference (HSD) tests, I assessed my hypotheses that (H1<sub>a</sub>) individuals in the intervention conditions, compared to the control condition, would report more accurate perceptions of others' attitudes, (H1<sub>b</sub>) individuals who received the combined intervention would report more accurate perceptions of others compared to those in the other intervention conditions, and (H1<sub>c</sub>) individuals who received the misperception correction intervention would report more accurate perceptions of others compared to those who received the pluralistic ignorance lesson intervention. See Table 22 for accuracy scores across conditions. For clarity, in this section I also detail the extent and direction of over- and underestimation in perception accuracy in each condition. As a reminder, an accuracy score of zero indicates an accurate perception of others' attitudes. All one sample *t*-tests described below compared accuracy scores to a mu of zero.

**Willingness accuracy.** There was a significant effect of condition on willingness accuracy scores (see also Table 22). I followed up with post hoc comparisons of condition differences in willingness accuracy scores using a Tukey HSD test. In support of H1<sub>a</sub>, willingness accuracy scores in the misperception correction intervention condition differed from those in the control condition by 0.89 scale points on average, 95% CI [0.50, 1.27],  $p < .001$ . To expand, individuals in the misperception correction intervention condition overestimated others' willingness to use services by 0.68 scale points on average, one sample  $t(94) = 7.60$ ,  $p < .001$ , 95% CI [0.50, 0.86], whereas individuals in the control condition underestimated others' willingness to use services by 0.21 scale points on average, although this underestimation was not statistically significant, one sample  $t(95) = -1.62$ ,  $p = .109$ , 95% CI [-0.47, 0.05]. Also in support of H1<sub>a</sub>, willingness accuracy scores in the combined intervention condition differed from



those in the control condition by 0.64 scale points on average, 95% CI [0.25, 1.02],  $p < .001$ , where individuals in the combined intervention condition also overestimated others' willingness to use services by 0.43 scale points on average, one sample  $t(92) = 4.71$ ,  $p < .001$ , 95% CI [0.25, 0.61]. Not in support of H1<sub>a</sub>, however, willingness accuracy scores in the pluralistic ignorance lesson intervention condition did not differ from those in the control condition, as the accuracy scores differed by only 0.18 scale points on average, 95% CI [-0.21, 0.56],  $p = .633$ . Individuals in the pluralistic ignorance lesson intervention condition underestimated others' willingness to use services by 0.03 scale points on average, a non-significant underestimation, one sample  $t(93) = -0.30$ ,  $p = .761$ , 95% CI [-0.24, 0.18].

In support of H1<sub>b</sub>, post hoc comparisons indicated that willingness accuracy scores in the combined intervention condition differed from those in the pluralistic ignorance lesson intervention condition by 0.46 scale points on average, 95% CI [0.07, 0.85],  $p = .013$ . As previously noted, individuals in the combined intervention condition overestimated others' willingness and individuals in the pluralistic ignorance lesson intervention condition did not. There was, however, no difference in willingness accuracy scores between those in the combined intervention and those in the misperception correction intervention, as accuracy estimations differed by 0.25 scale points on average, 95% CI [-0.64, 0.14],  $p = .341$ , and individuals in both conditions reported overestimations of others' willingness to use services.

In support of H1<sub>c</sub>, post hoc comparisons indicated that willingness accuracy scores in the misperception correction intervention condition differed from those in the pluralistic ignorance lesson intervention condition by 0.71 scale points on average, 95% CI [0.32, 1.10],  $p < .001$ . As previously noted, individuals in the misperception correction intervention condition

overestimated others' willingness and individuals in the pluralistic ignorance lesson intervention condition did not.

**Stigma accuracy.** There was a significant effect of condition on stigma accuracy scores (see also Table 22). I followed up with post hoc comparisons of condition differences in stigma accuracy scores using a Tukey HSD test. In support of H1<sub>a</sub>, stigma accuracy scores in the misperception correction intervention condition differed from those in the control condition by -0.70 scale points on average, 95% CI [-1.04, -0.37],  $p < .001$ . To expand, individuals in the misperception correction intervention condition overestimated others' service use stigma by 0.41 scale points on average, one sample  $t(94) = 4.81$ ,  $p < .001$ , 95% CI [0.24, 0.57], whereas individuals in the control condition overestimated others' service use stigma by 1.11 scale points on average, one sample  $t(95) = 11.07$ ,  $p < .001$ , 95% CI [0.91, 1.31]. Also in support of H1<sub>a</sub>, stigma accuracy scores in the combined intervention condition differed from those in the control condition by -0.56 scale points on average, 95% CI [-0.90, -0.23],  $p < .001$ , where individuals in the combined intervention condition also overestimated others' service use stigma by 0.55 scale points on average, one sample  $t(92) = 5.74$ ,  $p < .001$ , 95% CI [0.36, 0.74], but to a lesser extent than those in the control condition. Not in support of H1<sub>a</sub>, however, stigma accuracy scores in the pluralistic ignorance lesson intervention condition did not differ from those in the control condition, as the accuracy scores differed by only -0.01 scale points on average, 95% CI [-0.34, 0.33],  $p = .999$ . Individuals in the pluralistic ignorance lesson intervention condition overestimated others' service use stigma by 1.10 scale points on average, one sample  $t(93) = 12.92$ ,  $p < .001$ , 95% CI [0.93, 1.27].

In support of H1<sub>b</sub>, stigma accuracy scores in the combined intervention condition differed from those in the pluralistic ignorance lesson intervention by -0.56 scale points on average,

95% CI [-0.89, -0.22],  $p < .001$ . There was again, however, no difference between those who received the combined intervention and those who received the misperception correction intervention on stigma accuracy scores, as stigma accuracy scores differed by 0.14 scale points on average, 95% CI [-0.20, 0.48],  $p = .703$ .

Again in support of H1<sub>c</sub>, stigma accuracy scores in the misperception correction intervention condition differed from those in the pluralistic ignorance lesson intervention by -0.70 scale points on average, 95% CI [-1.03, -0.36],  $p < .001$ .

### ***Condition Differences in Service Use Interest (H2)***

Using a series of ANOVAs and post hoc Tukey HSD tests, I assessed my hypotheses that (H2<sub>a</sub>) individuals in the intervention conditions, compared to the control condition, would display more service use interest and (H2<sub>b</sub>) individuals who received the combined intervention would display more service use interest than those who received the pluralistic ignorance lesson intervention or the misperception correction intervention. See Table 22 for the descriptive statistics of service use interest measures across conditions. There was a significant effect of condition on support for a service use awareness campaign and interest in receiving information about available services; however, there was no effect of condition on support for a friend's use of services (see also Table 22).

**Service use awareness campaign.** I followed up on the statistically significant omnibus test with post hoc comparisons of condition differences in willingness to support a service use awareness campaign using a Tukey HSD test. As a reminder, the campaign support composite is standardized, so model results refer to differences in units of standard deviation as opposed to scale points. In support of H2<sub>a</sub>, individuals in the combined intervention condition were more willing to support the campaign than those in the control condition by 0.40 standard deviations

on average, 95% CI [0.06, 0.74],  $p = .014$ . Not in support of H2<sub>a</sub>, however, campaign support in the misperception correction intervention condition did not differ from support in the control condition, as support differed by only 0.27 standard deviations on average, 95% CI [-0.07, 0.61],  $p = .174$ . Similarly, campaign support in the pluralistic ignorance lesson intervention condition did not differ from support in the control condition, as support in these conditions differed by only 0.12 standard deviations on average, 95% CI [-0.21, 0.47],  $p = .765$ .

I also did not find support for H2<sub>b</sub>, as campaign support in the combined condition did not differ from the other two intervention conditions. Those in the combined condition reported more willingness to support the service use awareness campaign compared to those in the pluralistic ignorance lesson condition by 0.27 standard deviations on average, but this difference was not statistically significant, 95% CI [-0.07, 0.62],  $p = .170$ . Those in the combined condition also reported more willingness to support the service use awareness campaign compared to those in the misperception correction condition by 0.13 standard deviations on average, but, again, this difference was not statistically significant, 95% CI [-0.21, 0.47],  $p = .748$ . As previously noted, I did not have a priori hypotheses regarding service use interest differences between the pluralistic ignorance lesson intervention condition and the misperception correction intervention condition. Nonetheless, and for consistency in reporting, there was no difference in campaign support between the misperceptions correction intervention condition and the pluralistic ignorance lesson intervention condition, as support differed by 0.14 standard deviations on average, 95% CI [-0.20, 0.48],  $p = .714$ .

**Interest in receiving information about services.** I also conducted post hoc comparisons of condition differences in interest in receiving information about available services using a Tukey HSD test. Counter to H2<sub>a</sub>, individuals in the pluralistic ignorance lesson

intervention condition were *less* interested in receiving information about services than those in the control condition by 0.46 scale points on average, 95% CI [-0.92, -0.01],  $p = .044$ .

Furthermore, interest in receiving information in the misperception correction intervention condition did not differ from interest in the control condition, as they differed in interest by only 0.16 scale points on average, 95% CI [-0.29, 0.62],  $p = .799$ . Similarly, interest in receiving information in the combined intervention condition did not differ from interest in the control condition, as they differed in interest by only 0.11 scale points on average, 95% CI [-0.34, 0.57],  $p = .917$ .

In support of H2<sub>b</sub>, individuals in the combined intervention condition reported more interest in receiving information about services available to them compared to individuals in the pluralistic ignorance lesson intervention condition by 0.58 scale points on average, 95% CI [0.12, 1.04],  $p = .007$ . There was, however, no difference in interest between the combined intervention condition and the misperception correction condition, as interest differed by -0.05 scale points on average, 95% CI [-0.50, 0.41],  $p = .994$ . Again, I did not have a priori hypotheses regarding service use interest differences between the pluralistic ignorance lesson intervention condition and the misperception correction intervention condition. In this case the conditions did differ, such that individuals in the misperception correction intervention condition reported more interest in receiving information about services compared to those in the pluralistic ignorance lesson intervention condition by 0.62 scale points on average, 95% CI [0.17, 1.08],  $p = .003$ .

### ***Exploratory Analyses***

**Condition effects on self-other discrepancies.** I also explored condition differences in willingness and stigma self-other discrepancies, as self-other discrepancies have been used as an

individual-level indicator of pluralistic ignorance in the pluralistic ignorance literature and could provide additional information regarding the effectiveness of the interventions in adjusting attitudes/perceptions. In accordance with the literature on pluralistic ignorance, smaller (in magnitude) self-other discrepancies among the intervention conditions in comparison to the control condition would be ideal. See Table 22 for self-other discrepancy scores across conditions.

As displayed in Table 22, there were no condition differences in willingness self-other discrepancy scores. There were, however, condition differences in stigma self-other discrepancy scores. Across all conditions, stigma self-other discrepancy scores were negative and significantly less than zero (all one sample  $t$ s  $< -6.68$ ,  $p$ s  $< .001$ ). Negative self-other discrepancy scores in this context indicate that individuals, on average, perceived themselves as harboring less service use stigma than others. Individuals in the control condition reported larger (in magnitude) stigma self-other discrepancies than those in the combined intervention condition by 0.45 scale points on average, 95% CI [0.12, 0.78],  $p = .003$ . Individuals in the control condition also reported larger stigma self-other discrepancies than those in the misperception correction intervention condition by 0.59 scale points on average, 95% CI [0.27, 0.92],  $p < .001$ . Individuals in the control condition and the pluralistic ignorance lesson intervention condition did not differ in their stigma self-other discrepancies, as self-other discrepancies differed by 0.08 scale points on average, 95% CI [-0.25, 0.40],  $p = .932$ .

In comparing the intervention conditions, individuals in the pluralistic ignorance lesson intervention condition reported larger (in magnitude) stigma self-other discrepancies than those in the combined intervention condition by 0.37 scale points on average, 95% CI [0.04, 0.70],

$p = .020$ . Individuals in the combined intervention condition and the misperception correction intervention condition did not differ in their stigma self-other discrepancies, as self-other discrepancies differed by  $-0.14$  scale points on average, 95% CI  $[-0.47, 0.19]$ ,  $p = .671$ .

Individuals in the pluralistic ignorance lesson intervention condition also reported larger stigma self-other discrepancies than those in the misperception correction intervention condition by  $0.52$  scale points on average, 95% CI  $[0.19, 0.84]$ ,  $p < .001$ .

**Moderators of condition effects.** I also sought to explore moderators of the condition effects on misperceptions and service use interest outcomes. Using a series of two-way ANOVAs and multiple linear regressions I assessed mental illness status, mental health, lifetime service use, gender (female vs. male), race/ethnicity (White vs. Asian), and need to belong as moderators of condition differences in accuracy scores and service use interest outcome variables. I did not observe statistically significant moderation in any model for mental illness status (comparing those who identified as having a mental illness to those who identified as not having a mental illness; interaction  $ps > .137$ ), mental health (specifically depression as measured by the PHQ-9; interaction  $ps > .061$ ), lifetime service use (comparing those who reported lifetime use of services to those who reported no lifetime use of service; interaction  $ps > .090$ ), gender (interaction  $ps > .095$ ), nor need to belong (interaction  $ps > .146$ ).

Furthermore, race did not moderate the effects of experimental condition on service use stigma accuracy scores (interaction  $p = .077$ ), willingness to support a mental health service use awareness campaign (interaction  $p = .311$ ), nor interest in receiving information about mental health services (interaction  $p = .419$ ).

On the other hand, race (White vs. Asian) did interact with experimental condition to predict willingness accuracy scores,  $F(3, 275) = 2.66$ ,  $p = .048$ , and support of a friend's use of

services,  $F(3, 275) = 4.03, p = .008$ .<sup>49</sup> Follow-up analyses assessing the simple slope of race in each condition indicated that White and Asian participants did not differ in their estimations of others' willingness in any of the three intervention conditions ( $ps > .232$ ).<sup>50</sup> Meanwhile in the control condition, White participants ( $M = -0.56, SD = 1.14$ ) reported larger underestimations of others' willingness to use services compared to Asian participants ( $M = 0.05, SD = 1.21$ ),  $b = -0.61, SE_b = 0.25, t(275) = -2.42, p = .016, 95\% \text{ CI } [-1.10, -0.11]$ . Regarding support for a friend's use of services, follow-up analyses assessing the simple slope of race in each condition indicated that White and Asian participants did not differ in their willingness to support a friend's use of services in the control, misperception correction intervention, nor the combined intervention conditions ( $ps > .076$ ).<sup>51</sup> Meanwhile in the pluralistic ignorance lesson intervention condition, White participants ( $M = 6.23, SD = 0.75$ ) reported more willingness to support a friend compared to Asian participants ( $M = 5.54, SD = 1.00$ ),  $b = 0.69, SE_b = 0.23, t(275) = 3.04, p = .003, 95\% \text{ CI } [0.24, 1.13]$ . In sum, racial differences were observed in two conditions and on two different outcome measures, however the observed patterns were not consistent. Within the

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<sup>49</sup> Notably, the statistically significant interaction using the untransformed version of the friend support outcome was not statistically significant when using the transformed version,  $F(3, 275) = 2.60, p = .053$ . However, the statistically significant simple slope of race within the pluralistic ignorance lesson intervention condition remained significant when using the transformed version of the friend support outcome,  $b = 0.17, SE_b = 0.06, t(275) = 2.70, p = .007, 95\% \text{ CI } [0.05, 0.30]$ .

<sup>50</sup> Within the pluralistic ignorance lesson intervention condition, White participants ( $M = 0.02, SD = 0.97$ ) did not differ from Asian participants ( $M = -0.17, SD = 1.11$ ) in the accuracy of their estimations of others' willingness to use services,  $b = 0.19, SE_b = 0.24, t(275) = 0.79, p = .431, 95\% \text{ CI } [-0.28, 0.66]$ . Within the misperception correction intervention condition, White participants ( $M = 0.60, SD = .87$ ) did not differ from Asian participants ( $M = 0.76, SD = 0.84$ ) in the accuracy of their estimations of others' willingness to use services,  $b = -0.16, SE_b = 0.24, t(275) = -0.68, p = .498, 95\% \text{ CI } [-0.64, 0.31]$ . Within the combined intervention condition, White participants ( $M = 0.46, SD = 0.80$ ) did not differ from Asian participants ( $M = 0.12, SD = 1.17$ ) in the accuracy of their estimations of others' willingness to use services,  $b = 0.34, SE_b = 0.29, t(275) = 1.20, p = .232, 95\% \text{ CI } [-0.22, 0.91]$ .

<sup>51</sup> Within the control condition, White participants ( $M = 5.63, SD = 1.28$ ) did not differ from Asian participants ( $M = 6.05, SD = 0.90$ ) in their willingness to support a friend's use of services,  $b = -0.42, SE_b = 0.24, t(275) = -1.78, p = .076, 95\% \text{ CI } [-0.88, 0.04]$ . Within the misperception correction intervention condition, White participants ( $M = 6.24, SD = 0.83$ ) did not differ from Asian participants ( $M = 6.20, SD = 0.67$ ) in their willingness to support a friend's use of services,  $b = 0.04, SE_b = 0.23, t(275) = 0.18, p = .860, 95\% \text{ CI } [-0.41, 0.49]$ . Within the combined intervention condition, White participants ( $M = 6.14, SD = 0.96$ ) did not differ from Asian participants ( $M = 6.22, SD = 0.79$ ) in their willingness to support a friend's use of services,  $b = -0.08, SE_b = 0.27, t(275) = -0.30, p = .761, 95\% \text{ CI } [-0.61, 0.45]$ .



control condition, White participants reported stronger *underestimations* of others' willingness to use services compared to Asian participants. Within the pluralistic ignorance lesson condition, White participants were *more* willing to support a friend's use of services compared to Asian participants. Below I discuss these findings further.

## **Discussion**

This research was the first to assess the effectiveness of a brief pluralistic ignorance-based intervention addressing the underutilization of mental health services on college campuses. This research is a first step in further intervention development and provides direction for future research addressing service underutilization. Furthermore, this research adds to the limited literature on pluralistic ignorance-based interventions by comparing the only two previously-used intervention approaches in the literature, a pluralistic ignorance lesson and a misperception correction (Geiger & Swim, 2016; Munsch et al., 2014; Schroeder & Prentice, 1998; Van Grootel et al., 2018).

Before I discuss the effectiveness of the interventions, however, I believe it is important to highlight the basic pluralistic ignorance findings from this study. Among an online sample of college students in the United States, individuals again mistakenly perceived others as harboring more service use stigma compared to the self-reported average stigma beliefs of the sample, thus demonstrating pluralistic ignorance of service use stigma. Although not statistically significant, individuals did perceive others as being less willing to use services compared to the self-reported average willingness of the sample. It is possible that pluralistic ignorance of willingness to use services is specific to Syracuse University's campus, but it is also possible that a more precise "other" designation is needed to effectively measure pluralistic ignorance of willingness to use services (e.g., "other students on your campus," "other students in your state"). Altogether, these

findings indicate that misperceptions of others' attitudes toward mental health services are generalizable and prevalent beyond Syracuse University's campus, highlighting the global importance of the investigation of these misperceptions.

As previously mentioned, the primary aim of this research was to assess the effectiveness of the interventions in reducing misperceptions (i.e., pluralistic ignorance) and increasing positive mental health service use-related outcomes (see Table 23 for a summary of intervention effectiveness results). As such, I will first discuss how the interventions performed in comparison to the control condition. I found partial support for my hypothesis comparing perception accuracy in the intervention conditions to perception accuracy in the control condition (H1<sub>a</sub>). The misperception correction intervention and the combined intervention were both effective in increasing perceptions of others' willingness to use services and decreasing perceptions of others' service use stigma compared to the control condition. The pluralistic ignorance lesson intervention was not successful in correcting misperceptions compared to the control condition. I also found partial support for my hypothesis comparing service use interest outcomes in the intervention conditions to outcomes in the control condition (H2<sub>a</sub>). Individuals who received the combined intervention were more willing to volunteer their time and energy for a campaign to support mental health service use awareness compared to those in the control group. The pluralistic ignorance lesson intervention and the misperception correction interventions were not successful in increasing campaign support compared to the control group. All three intervention conditions were not successful in increasing support for a friend's use of services compared to the control, nor were they successful in increasing interest in receiving information about available services compared to the control. Altogether, there is strong evidence for the effectiveness of the misperception correction intervention and the combined

intervention in correcting misperceptions of others' attitudes toward services, and there is evidence in support of the combined intervention in increasing willingness to support a mental health service use awareness campaign.

I also sought to compare the intervention conditions on their ability to reduce misperceptions and increase positive mental health service use-related outcomes relative to one another. I found partial support for my hypothesis comparing perception accuracy in the combined intervention condition to perception accuracy in the other two intervention conditions (H1<sub>b</sub>) and I found full support for my hypothesis comparing perception accuracy in the misperception correction intervention condition to perception accuracy in the pluralistic ignorance lesson intervention condition (H1<sub>c</sub>). Both the misperception correction intervention and the combined intervention were, as expected, successful in increasing perceptions of others' willingness to use services and decreasing perceptions of others' service use stigma compared the levels observed in the pluralistic ignorance lesson intervention condition. However, the misperception correction intervention and combined intervention did not differ in perception accuracy. I also found partial support for my hypothesis comparing service use interest outcomes in the combined intervention condition to outcomes in the other two intervention conditions (H2<sub>b</sub>). Individuals in the combined intervention condition were more interested in receiving information about services compared to those in the pluralistic ignorance lesson intervention condition. However, I did not observe differences between the combined intervention condition and misperception correction intervention condition on the same metric. I also did not observe differences between the intervention conditions on friend support nor campaign support. Although exploratory, I did find the misperception correction intervention condition to

outperform the pluralistic ignorance lesson intervention condition in relation to interest in receiving information about services.

In brief, the misperception correction intervention and the combined intervention were almost identical in their ability to correct misperceptions and increase interest in receiving information about available services (the latter specifically in comparison to the pluralistic ignorance lesson intervention). Furthermore, the combined intervention increased willingness to support a service use awareness campaign compared to the control group, whereas the misperception correction intervention did not. One could speculate as to why the campaign support outcome measure appeared to be most sensitive, relative to the friend support and interest measures. It is possible that willingness to engage in a public action that reflects one's true beliefs is more closely addressed by the intervention materials than willingness to help a friend and interest in receiving information about services. Willingness to help a friend might be irrelevant (or at least less relevant) to the pluralistic ignorance processes at play, and there could have been a ceiling effect on the measure, as the participants indicated a high likelihood of assisting a friend in their pursuit of services on average (thus restricting the range of variance to be explained). The interventions were also unlikely to change individual's actual need for mental health services, which could explain the unanticipated findings regarding interest in receiving information about services. These interpretations are speculative, however, and additional research is needed.

Moreover, it is unclear why the pluralistic ignorance lesson intervention did not effectively reduce pluralistic ignorance and/or increase service use interest. The subsample did not differ drastically from other subsamples on age, gender, race, or service use. It is possible that individuals are not able to apply the pluralistic ignorance lesson to a new context, namely

attitudes toward mental health services, without an explicit misperception correction. It is also possible that the pluralistic ignorance lesson, on its own, was not clear or compelling enough to be effective. As a reminder, Schroeder and Prentice's (1998) pluralistic ignorance-based intervention did include both a lesson on pluralistic ignorance *and* a misperception correction, and the current study was the first to assess the effects of a generalized pluralistic ignorance lesson in addressing a particular context of pluralistic ignorance alone. These findings indicate that it might be necessary to accompany any given pluralistic ignorance lesson with a concrete misperception correction; however, more research is needed to finalize this recommendation.

Lastly, I also conducted a series of exploratory analyses that are worth mentioning. First I explored condition differences in self-other discrepancy scores. Although I did not observe condition differences in willingness self-other discrepancy scores, I did observe differences in stigma self-other discrepancy scores. Compared to the control condition, the misperception correction intervention and the combined intervention were effective in reducing the magnitude of the stigma self-other discrepancies—that is, reductions in the extent to which individuals perceive others as harboring more service use stigma than oneself. The observation of smaller (in magnitude) self-other discrepancy scores in these conditions is promising, as minimizing the extent to which one perceives themselves as different than others could reduce the desire to conform to perceived norms that do *not* reflect one's personal desires and convictions (which can contribute to the development of pluralistic ignorance in the population). I also explored several moderators of condition differences in perception accuracy and service use interest outcomes. The moderators I explored returned overwhelmingly null results, with the exception of race (White vs. Asian). In the control condition, White participants reported stronger underestimations of others' willingness to use services compared to Asian participants. This

finding replicates the racial difference observed in Study 2. Furthermore, the racial difference did not persist in any of the three intervention conditions. Less intuitive then is the finding that White participants were more willing to support a friend's use of services compared to Asian participants in the pluralistic ignorance lesson intervention condition (but not in the other three conditions). It is especially interesting that this occurred in the pluralistic ignorance lesson intervention condition and not in the control condition. It is possible that the Asian (vs. White) participants in the pluralistic ignorance lesson intervention condition had adverse reactions to learning about pluralistic ignorance, especially if the lesson produced fears that one's actions would especially stand out against others (see literature on the minority spotlight effect; Crosby et al., 2014).

In all, the findings from this study certainly inform future research on the enhancement of pluralistic ignorance-related interventions. In particular, researchers might consider only correcting misperceptions (and not teaching about pluralistic ignorance) or always accompanying pluralistic ignorance lessons with an explicit misperception correction. I lean toward the latter option—that is, it might be better to err in the direction of providing too much rather than too little information. There is still much to be learned about how teaching about pluralistic ignorance can influence cognitions related to perceptions of others' attitudes and behaviors. Furthermore, this was the first formal assessment of the generalized pluralistic ignorance lesson intervention and modifications could enhance the intervention (e.g., enhanced visual representations of misperceptions, video demonstrations). Also, it is still unknown how effective a pluralistic ignorance lesson can be when incorporated with other pluralistic ignorance-related intervention components, such as need to belong reduction procedures. It is important that future research continue to assess the effectiveness of interventions in correcting misperceptions *and*

encouraging context-related positive outcomes (e.g., campaign support). This research provided promising preliminary evidence for the value of assessing both outcome categories, as both are important in the development a full understanding of pluralistic ignorance and its individual-level implications. Finally, this study emphasizes the importance of continued research on interventions that specifically address pluralistic ignorance of attitudes toward mental health services, as well as interventions that address other pluralistic ignorance contexts that have significant public health concerns (e.g., sexual behavior, bullying).

### *Limitations*

Although this research provides a necessary foundation for future research assessing pluralistic ignorance interventions, there are still several limitations that should be acknowledged and addressed in the future. First, it is potentially problematic that pluralistic ignorance of willingness to use mental health services was not replicated within the control condition of this online study. As previously noted, the lack of replication could indicate a potential issue with the wording of the “other” scale items—particularly in relation to how general the “other” reference group was (i.e., “other students”). It is possible that pluralistic ignorance would have been observed if the questions used to assess pluralistic ignorance were made relevant to a particular campus/social group. This potential methodological flaw could have implications for making sound conclusions about the intervention effectiveness, especially in relation to condition differences in perception accuracy. The question of the optimal generality of the “other” category should be strategically assessed in future research (for a discussion of this point, see Sargent & Newman, 2021). Furthermore, it bears repeated mentioning that there still remains a possibility that discrepancies between personal attitudes and perceptions of others’ attitudes could reflect misperceptions of others’ attitudes, or they could reflect inaccurate reporting of personal

attitudes (perhaps due to social desirability concerns, in this instance). This possibility should be considered in conjunction with the previous speculations.

Second, it is possible that the interventions, specifically the misperception correction intervention, need to be targeted to particular campuses and social groups. To expand, campuses have different norms concerning attitudes toward mental health services. If these norms are especially blatant and differ from the Syracuse University norms I presented to participants, the stark difference could have been apparent and influenced participant responses. Luckily, the intervention that I designed can be easily adapted to present accurate norms within any social group. Future research should emphasize assessment of the intervention effectiveness on different campuses, with different established norms, and different intervention materials that reflect those norms.

Moreover, the questions in this research implicitly assume that mental health services are available to students on their campuses and/or that student social interactions are primarily with other students attending their school. However, this might not be the case for all college settings and course structures. Of the students who completed the study, 78.8% ( $n = 298$ ) identified as attending a University (i.e., University students; where services are likely available to students), as opposed to a community or junior college, Liberal Arts College, etc., and 90.7% ( $n = 343$ ) identified as attending classes either fully or partially on campus (i.e., in-person students; where students would have the opportunity to interact with other students). Among both subsamples, the trends in the primary results remained the same.<sup>52</sup> Even so, future research should take care

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<sup>52</sup> There was no effect of condition on support for a friend's use of services among the University subsample,  $F(3, 294) = 0.94, p = .424$ , nor was there an effect of condition among the in-person subsample,  $F(3, 339) = 1.88, p = .132$ . There was an effect of condition on willingness to volunteer for a service use awareness campaign for both the University subsample,  $F(3, 294) = 2.71, p = .046$ , and the in-person subsample,  $F(3, 339) = 2.58, p = .054$ . Follow-up Tukey HSD tests revealed marginal differences between the combined intervention condition and the



to limit participation to students who have access to services on campus and interact with other students on a frequent basis. If not that, researchers should, at the very least, include measures of these variables to be addressed in analyses.

Of note, the outcome measures in this study were all anticipated (behavioroid) measures, as opposed to behavior measures. These interventions are expected to influence both attitudes and behaviors; however, it was only feasible to measure attitudes in this research. Reported willingness to support a friend in their use of services is different than actually helping a friend (or even a stranger) in their pursuit of services. Reported willingness to volunteer for a service use awareness campaign is different than actually spending time volunteering for the campaign. Reported interest in receiving information about available services is different than signing up to be on a listserv to receive service-related information or taking flyers/pamphlets about services available on campus (especially in public). It would be interesting to investigate how the interventions would impact actual behaviors, including actual use of services, and to measure these outcomes across time. Doing so would provide a more robust assessment of the intervention effectiveness in promoting positive service use-related attitudinal and behavioral outcomes.

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control condition, such that individuals reported more willingness in the combined intervention by 0.38 standard deviations on average among the University subsample, 95% CI [-0.00, 0.77],  $p = .051$ , and 0.35 standard deviations among the in-person subsample, 95% CI [-0.01, 0.71],  $p = .063$ . There were also condition differences in interest in receiving information about available services for both the University subsample,  $F(3, 294) = 2.92$ ,  $p = .034$ , and the in-person subsample,  $F(3, 339) = 4.61$ ,  $p = .004$ . Among the University subsample, Tukey HSD tests revealed that those in the pluralistic ignorance lesson intervention condition were marginally *less* interested in receiving information than those in the misperception correction intervention condition and the combined intervention condition by 0.47 scale points on average, 95% CI [-0.98, 0.03],  $p = .075$ , and 0.53 scale points on average, 95% CI [-1.06, 0.00],  $p = .052$ , respectively. Similarly, among the in-person subsample, Tukey HSD tests revealed that those in the pluralistic ignorance lesson intervention condition were *less* interested in receiving information than those in the misperception correction intervention condition and the combined intervention condition by 0.60 scale points on average, 95% CI [-1.08, -0.12],  $p = .007$ , and 0.59 scale points on average, 95% CI [-1.07, -0.11],  $p = .009$ , respectively.

Finally, I am unable to draw conclusions regarding the long-term effectiveness of the interventions in reducing misperceptions (i.e., pluralistic ignorance) and increasing positive mental health service use-related outcomes. Researchers should incorporate longitudinal assessments into their programs of research as they continue to refine and assess pluralistic ignorance-based interventions (in the current context, and across other contexts)

### **General Discussion**

This research identified a modifiable factor that could impact the utilization of mental health services among college students in the United States—that is, pluralistic ignorance of attitudes toward mental health services. This research also filled a gap in the pluralistic ignorance literature by being the first to assess pluralistic ignorance of attitudes toward mental health services among college students using cross-sectional, longitudinal, and experimental methods. In Study 1, I established the existence of pluralistic ignorance in the population. In Study 2, I replicated the pluralistic ignorance findings, and, using longitudinal methods, predicted changes in pluralistic ignorance-related implications as a function of individual-level indicators of pluralistic ignorance (i.e., personal attitudes, perceptions of others' attitudes, and their interaction). Also in Study 2, I began the assessment of pluralistic ignorance-related constructs that could moderate the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications, as these constructs could serve as additional barriers to positive health outcomes and potential points of intervention. In Study 3, I used experimental methods to assess the effectiveness of pluralistic ignorance intervention components in reducing misperceptions and increasing service use interest. Of note, I found evidence for the effectiveness of an intervention that incorporates both a norm misperception correction *and* a pluralistic ignorance lesson in increasing perception accuracy and service use

interest. In this chapter, I consolidate and summarize the primary findings across studies, highlight the implications of this research, and discuss study limitations and future directions for this program of research.

## **Summary of Findings Across Studies**

### ***Pluralistic Ignorance***

In this research, I assessed pluralistic ignorance of willingness to use mental health services and pluralistic ignorance of mental health service use stigma among college students. In Study 1, I observed pluralistic ignorance in both contexts. College students misperceived other students as being less willing to use services compared to the average self-reported willingness of the sample. College students also misperceived other students as harboring more service use stigma compared to the average self-reported stigma beliefs of the sample. These findings are in line with previous work assessing pluralistic ignorance of willingness to use services among non-student samples (Karaffa & Koch, 2016) and work assessing discrepancies between personal and perceptions of others' stigma (Eisenberg & Lipson, 2019; Eisenberg et al., 2009; Pompeo-Fargnoli, 2020). Furthermore, I replicated these pluralistic ignorance findings in Study 2 with a new sample at the same University, at both T1 and T2. In Study 3, I assessed pluralistic ignorance of attitudes toward mental health services among an online sample of college students in the United States. Among those in the control condition, I replicated findings regarding pluralistic ignorance of service use stigma. However, I did not replicate findings regarding pluralistic ignorance of willingness to use services. Notably though, the pattern was in the expected direction. As previously mentioned, it is possible that the "other" reference group was too broad to pick up on the campus-specific willingness misperceptions observed in the first two studies. It is also possible that pluralistic ignorance of service use stigma is more widespread and

consistent across campuses, whereas pluralistic ignorance of willingness to use services might be more variable across campuses. These findings emphasize the need to further assess pluralistic ignorance of willingness to use services and service use stigma among multiple campuses, as it is likely that misperceptions, campus-level attitudes, and campus-level perceived norms vary. In all, I am confident concluding that pluralistic ignorance of attitudes toward mental health services exists among college students in the United States.

### *Predictors of Service Use*

In this research I aimed to assess individual-level indicators of pluralistic ignorance (i.e., personal attitudes, perceptions of others' attitudes, and their interaction) as predictors of mental health service use. In Study 1, higher odds of using services were associated with higher levels of personal willingness to use services (adjusting for perceptions of others' willingness). Higher odds of using services were also associated with lower levels of personal service use stigma (adjusting for perceptions of others' stigma). These relationships are sensible, and the latter is supported by previous research (e.g., Clement et al., 2015). Interestingly, however, higher odds of using services were associated with *higher* perceived levels of others' service use stigma (adjusting for personal stigma). As previously noted, this finding, although seemingly counterintuitive, is supported by trends in previous research (Cage et al., 2020) and could reflect a hyper-awareness of the potential (or experienced) stigma associated with service use, mental illness, and concealable identities, including mental illness (for related discussions, see Goffman, 1963, Quinn & Earnshaw, 2011, and Wu et al., 2017). This is a speculative account, however, given that the study was cross-sectional and directionality cannot be established. In Study 2, I sought to further explain the relationships between individual-level indicators of pluralistic ignorance and service use by assessing *changes* in service use across time.

Unfortunately, these relationships were not clarified, as changes in service use were not predicted by individual-level indicators of pluralistic ignorance in Study 2. As a reminder, Study 2 data collection was interrupted by the COVID-19 pandemic. College students did not have access to on-campus mental health services during T2 data collection, and many had left campus altogether. Virtual services were available to students, but such services were in an early stage of development. I can imagine that many mental health service consumers had difficulty maintaining their service use and/or temporarily paused their service use during the transition period from in-person to online education. I primarily attribute the null findings in Study 2 to these unexpected study limitations.

In all, using cross-sectional results from Study 1, I replicated previous research highlighting the importance of personal attitudes in predicting service use (e.g., Eisenberg et al., 2009). I also provide some evidence for the potentially intriguing relationship between perceptions of others' service use stigma and service use. I maintain that there are relationships between individual-level indicators of pluralistic ignorance and service use that are worthy of further investigation, and I believe that a well-conducted longitudinal study is the optimal next step in piecing apart these relationships. More research is needed, and, when college campuses return to a state of normality and stability, a replication of Study 2 would be informative.

### ***Assessment of Extended Implications***

Across studies, I sought to assess extended pluralistic ignorance-related implications—that is, implications beyond service use (e.g., implications for mental health, physical health, substance use, academic success). I observed several interesting relationships and will review a few of note in this section. In Study 1, I observed an interaction between personal willingness and perceptions of others' willingness to use services in predicting depression. For individuals

who reported higher levels of personal willingness to use services, higher levels of depression were associated with lower perceptions of others' willingness to use services. For individuals who reported lower levels of personal willingness to use services, depression was not associated with perceptions of others' willingness to use services. I also observed a similar interaction between personal service use stigma and perceptions of others' service use stigma in predicting sleep interference on daily functioning. For individuals who perceived others as harboring less service use stigma, personal service use stigma was not associated with sleep interference on daily functioning. For individuals who perceived others as harboring more service use stigma, more sleep interferences on daily functioning was associated with lower levels of personal stigma. In both cases, I observed associations with negative implications to the extent that personal attitudes reflected the pattern of pluralistic ignorance observed at the group level (high personal willingness, low perceptions of others' willingness; low personal stigma, high perceptions of others' stigma).

In Study 2, I sought to replicate this overarching pattern in assessments of *changes* in the implications across time. I did replicate this pattern in one model predicting decreases in alcohol use from T1 to T2. For individuals who perceived others as harboring less service use stigma, low personal service use stigma was associated with steeper declines in alcohol use. For individuals who perceived others as harboring more service use stigma, low service use stigma was associated with weaker declines in alcohol use. Again, these findings indicate that the potential benefits of harboring positive attitudes toward services could be dampened by inaccurate perceptions of others as harboring negative attitudes toward services. Importantly, however, this was the only statistically significant interaction observed in Study 2 (which I again attribute to the Study's previously acknowledged methodological issues). Collectively across

Studies 1 and 2, my overarching hypothesis concerning the extended implications of pluralistic ignorance in this context received some support, but the support was weak and more research is needed to better understand the proposed relationships.

### ***Moderators and Additional Barriers to Positive Health Outcomes***

In Study 2 I aimed to assess need to belong and public self-consciousness as moderators of the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications. Of the 46 models that included the full longitudinal sample, only two models resulted in a statistically significant three-way interaction between personal attitudes, perceptions of others' attitudes, and either need to belong or public self-consciousness, depending on the model. Specifically, the willingness-related individual-level indicators of pluralistic ignorance interacted with need to belong to predict changes in alcohol use, and the stigma-related individual-level indicators of pluralistic ignorance interacted with public self-consciousness to predict changes in perceptions of academic success. My hypotheses were supported in both cases, with results indicating that need to belong and public self-consciousness serve as additional barriers to positive health outcomes. To expand, people who harbored positive attitudes toward services (i.e., high personal willingness to use services, low service use stigma) and perceived others as harboring positive attitudes toward services reported better outcomes (i.e., steeper declines in alcohol use and weaker declines in perceived academic success), but only when they also reported low levels of need to belong and public self-consciousness. Personal attitudes were not associated with the outcomes when individuals perceived others as harboring negative attitudes toward services, regardless of levels of need to belong and public self-consciousness. Importantly though, the study was highly underpowered to

assess these three-way interactions, and I am certain that the field would benefit from a well-powered replication of this longitudinal study where the limitations have been addressed.

### ***Group Differences in Misperceptions***

One important component of this research was the exploration of group differences in misperceptions, as this information can be used to pinpoint who might be in most need of targeted interventions. I explored such differences specifically in Studies 1 and 2. In Study 1, I found that students who identified as having a mental illness harbored stronger misperceptions than those who did not identify as having a mental illness. This finding is interesting and informative, as it provides tangential support for my speculative explanation concerning the observed positive relationship between service use and perceptions of others' service use stigma within the same sample. This pattern was not replicated in Study 2, however. Nonetheless, I did observe other interesting group differences in Study 2. For example, undergraduate (vs. graduate) and White (vs. Asian) students reported larger underestimations of others' willingness to use mental health services. Furthermore, I replicated the latter finding within the control condition in Study 3. I acknowledge, however, that these findings are fairly inconsistent across studies, and I feel it would be inappropriate to begin drawing conclusions about which specific groups might benefit most from targeted interventions. I am comfortable concluding, however, that there certainly is evidence of variation in the extent to which subgroups within a population misperceive others' attitudes. In turn, there is reason to continue this assessment moving forward and carefully consider such differences when developing and implementing interventions.

### ***Pluralistic Ignorance Interventions***

In Study 3, I assessed the primary components of a pluralistic ignorance intervention in correcting misperceptions and increasing service use interest, and I found promising results for



two interventions (i.e., the misperception correction intervention and the combined intervention, which included both a misperception correction and a pluralistic ignorance lesson). Indeed, compared to the control condition, individuals in the misperception correction and combined interventions reported increases in their estimates of others' willingness to use services and decreases in their estimates of others' service use stigma. Also compared to the control condition, individuals who received the combined intervention displayed more willingness to support a campaign aimed at increasing awareness of mental health services. Ultimately, the study was a success in determining that both a norm misperception correction and a combined intervention can result in positive outcomes with regard to attitudes toward mental health services, and it is especially exciting that the combined intervention slightly (but not significantly) outperformed the misperception correction intervention. These findings suggest that a reasonable next step in this line of research would be to work on enhancing the combined intervention. It is clear that the pluralistic ignorance lesson alone is not sufficient to increase perception accuracy and/or positive service use-related outcomes. However, it is possible that a more effective pluralistic ignorance lesson, when combined with a misperception correction, would lead individuals not only to perceive others more accurately, but also become aware of their systematic errors in perceiving others' attitudes and adjust their own attitudes and behaviors accordingly. Of course, more research is needed to better understand the processes underlying attitude and behavior change with respect to these intervention components.

## **Implications**

### ***Practical Implications***

Mental health services on college campuses are underutilized. Although there is an abundance of research assessing individual-level barriers to service use, there is an absence of

research considering group-level barriers, including pluralistic ignorance. This research program expands current knowledge on mental health service use by highlighting pluralistic ignorance as a potentially influential barrier. Prior to this research, only one study had specifically assessed pluralistic ignorance of willingness to use mental health services (Karaffa & Koch, 2016), and this was among a police officer sample. This research builds on that assessment through the evaluation of a different at-risk population, college students. Numerous researchers had previously assessed personal and perceptions of others' service use stigma among college students (e.g., researchers associated with the Healthy Minds Network; Eisenberg & Lipson, 2019; Eisenberg et al., 2009), however, to my knowledge, no paper had tied these attitudes to pluralistic ignorance. Furthermore, this research explicitly consolidates multiple aspects of the literature on service underutilization. More specifically, this research focuses on both willingness to use services and service use stigma as potentially important predictors of service utilization and this research highlights the importance of considering group-level *and* individual-level processes in assessing potential barriers to service utilization.

Furthermore, most research on this topic does not highlight the long-term implications associated with the individual-level indicators of pluralistic ignorance assessed, nor has any study assessed a pluralistic ignorance intervention in this context. Thus, this research adds to the literature through the assessment of implications longitudinally and by being the first to experimentally assess interventions aimed at reducing misperceptions of attitudes toward mental health services and promoting positive health outcomes. This research collectively paves the way for continued research on interventions designed to teach individuals about pluralistic ignorance, correct norm misperceptions, and (in future iterations) address pluralistic ignorance-related constructs that could facilitate misperception development and/or intensify conformity with

misperceived norms (e.g., need to belong, public self-consciousness). Interventions of this nature, in combination with previously administered interventions (e.g., individual-level stigma-focused interventions), will address multiple levels of barriers to mental health service use. I am certain that this research will effectively inform the expansion of continued research on mental health service underutilization, which in turn will continue to have applied implications impacting college students in the United States.

### ***Expansion of Research on Pluralistic Ignorance***

Research on pluralistic ignorance is inconsistent in many ways—from operational definitions of pluralistic ignorance and individual-level indicators of pluralistic ignorance, to the methods used to assess pluralistic ignorance, to the types of research questions relating to pluralistic ignorance assessed, the inconsistency is widespread (Sargent & Newman, 2021). Part of this inconsistency is due to the fact that pluralistic ignorance has been assessed superficially across topics, with comparatively less thorough investigation of the phenomenon in itself. The academic innovation of the current research program is two-fold in that it highlights the role of pluralistic ignorance in a new context (i.e., mental health service use on college campuses), while also emphasizing the value of comprehensive assessments of pluralistic ignorance.

As noted in the previous discussion, this research highlights the assessment of pluralistic ignorance in a context that has been dominated by research assessing individual-level processes. It is likely that there are many contexts in which researchers have focused primarily on studying individual-level misperceptions. This research exemplifies the value of taking a broader perspective on assessments, specifically by assessing more contexts from a pluralistic ignorance framework. For example, pluralistic ignorance could characterize attitudes toward other health-related behaviors, such as attitudes toward use of certain medications or attitudes toward social

distancing measures during the COVID-19 pandemic. An extension of the phenomenon to other health-related domains could be useful.

Moreover, this research emphasizes the need to comprehensively assess pluralistic ignorance. It is important to assess pluralistic ignorance in new contexts, but it is equally important to conduct in-depth assessments of pluralistic ignorance within contexts. This research sets a precedent for researchers assessing pluralistic ignorance by highlighting the types of research questions that can be asked to further the field's understanding of pluralistic ignorance. My research highlighted various questions that are vital to the theoretical expansion of pluralistic ignorance research. For example, I directly assessed pluralistic ignorance-related implications, which are infrequently formally assessed in the literature. I also furthered this investigation by assessing extended implications, which is even less common in the literature. Beyond this, I placed emphasis on assessing moderators of the relationships between individual-level indicators of pluralistic ignorance and pluralistic ignorance-related implications, a task that is again relatively uncommon in research on pluralistic ignorance. I specifically assessed two moderators, need to belong and public self-consciousness, that relate to the social comparison processes underlying pluralistic ignorance. Exploring moderators in this fashion is informative and should be encouraged in future assessments of pluralistic ignorance.

I also highlighted the importance of assessing group differences in misperceptions. Although this is a bit more common in the pluralistic ignorance literature, it is still important to emphasize these research questions. In fact, I would argue that all investigations of pluralistic ignorance should consider which groups of individuals might be particularly prone to misperceiving the group norm. Much of the research assessing group differences has focused on gender differences (e.g., Lambert et al., 2003; Munsch et al., 2018), but it is also important to

examine individual differences that might be especially important to the context assessed, such as mental illness status in the current context. Although I took an exploratory approach to assessments of group differences in this research, I encourage researchers to think carefully about such assessments, and perhaps even construct a priori hypotheses regarding which groups they think will be most at risk for harboring inaccurate perceptions of the majority.

In this research I also began the assessment of targeted pluralistic ignorance-based interventions. In particular, this research expanded on the work of others, specifically work that focused on misperception correction procedures (e.g., Geiger & Swim, 2016) and work that incorporated some form of a pluralistic ignorance lesson (Schroeder & Prentice, 1998). The interventions I created were clear and explicit, designed to be implemented online (increasing accessibility and ease of use), and designed to be easily adapted to address pluralistic ignorance in other contexts—especially contexts that have health-related implications. This research informs future research assessing pluralistic ignorance-based interventions, and my promising results call for immediate follow-up research and intervention enhancement.

Finally, this research highlights the value of using diverse methods in pluralistic ignorance research. In this research I used cross-sectional, longitudinal, and experimental methods, each of which served to effectively address specific questions pertaining to pluralistic ignorance (i.e., prevalence, implications, and interventions, respectively). For example, to simply establish the presence of pluralistic ignorance, a cross-sectional design was sufficient. To assess the extended and long-term implications of individual-level indicators of pluralistic ignorance, a longitudinal study was more appropriate. By highlighting and leaning on different research methods, I was able to strengthen conclusions pertaining to pluralistic ignorance in the literature. Of note, using a variety of methods within one research program is a rare occurrence in the

pluralistic ignorance literature (for an example of a study that does do this, see Buzinski et al., 2018). As previously mentioned, researchers tend to not study the phenomenon in depth (with the literature on pluralistic ignorance of alcohol use being an exception). By showing the different ways in which pluralistic ignorance can be incorporated into extended assessments of specific topics, researchers might be more apt to incorporate some of these assessments into their own lines of research moving forward.

In all, this research provides a framework for the continued refinement of the pluralistic ignorance phenomenon, details methodological decisions and, in turn, showcases best practices pertaining to pluralistic ignorance research, and thoroughly examines pluralistic ignorance intervention components. Collectively, this research facilitates continued investigation of the phenomenon, encourages empirical expansion of the phenomenon to different contexts, especially contexts posing public health concerns, and emphasizes a need to develop methodologically rigorous approaches to studying pluralistic ignorance.

### **Limitations and Future Directions**

One strength of this research is that each study, in some way, builds on the limitations of the previous study. For example, Study 1 was cross-sectional, and in turn conclusions concerning the implications of pluralistic ignorance were limited. Study 2 addressed this limitation by implementing a longitudinal design. But, although Study 2 was informative, it did not begin to assess ways to address pluralistic ignorance of attitudes toward mental health services within the population. Study 3 began this assessment using an experimental design. Nonetheless, there are still overarching limitations that should be recognized. For the most part I described such limitations in detail in the chapters associated with each study. Here I discuss a few that are

worthy of repeated mention, and I also expand on some other limitations not previously mentioned.

First and foremost, I have extensively described the limitations associated with drawing conclusions from Study 2. My sample size was small, and I was underpowered to observe the effects I sought out to assess. The study was also interrupted by the COVID-19 pandemic, which altered the integrity of the T2 data. Second, although I consider the experimental design of Study 3 to be a strength, it also forced me to conduct the study online (both to achieve the desired sample size and to avoid participant overlap with Studies 1 and 2). To accommodate the online administration of this research, I modified the “other” descriptor to be more general (i.e., “other students”, “most students”). It is possible that this reference was too broad to measure accurate (and meaningful) estimations of others’ attitudes. Future research should conduct the experimental study on multiple college campuses, with the reference group specific to students on that particular campus. This will allow for the assessment of how perceptions differ across campuses, as well as assessment of the intervention effectiveness across campuses.

Not all instances of pluralistic ignorance involve people claiming that they are less likely to engage in an unattractive behavior or to have an unpleasant attitude relative to other people (see Sargent & Newman, 2021). However, the current context does involve such favorable self-perceptions. As such, it is possible that the evidence for pluralistic ignorance is driven by inaccurate self-reporting of personal attitudes (especially in response to social desirability concerns), as opposed to inaccuracy in perceptions of others’ attitudes. This limitation has been discussed by others (e.g., Kypri & MacLennan, 2011; Sandstrom & Bartini, 2010) and remains a limitation in the current research program. Future research should take care to reduce the influence of social desirability in reporting where possible; researchers could counterbalance the

presentation order of personal attitude scales and perceptions of others' attitude scales, use a between-subject design where participants only report their personal attitudes or their perceptions of others' attitudes, lean on other ways to assess pluralistic ignorance (e.g., proportional questioning) that might reduce the extent to which individuals directly compare themselves to others, or include social desirability as a covariate in analyses. Furthermore, in this research I used one measure of pluralistic ignorance of willingness to use mental health services and one measure of pluralistic ignorance of service use stigma. Although I slightly modified the stigma measure for Studies 2 and 3, it still bears mentioning that other measures could be developed and used to assess different dimensions of each construct. The willingness to use services measure showed promising reliability, but it is possible that there are other reasons that college students would use services that were not captured in the measure. The service use stigma measure showed less than satisfactory reliability, and although it had been used in previous research, it might be best to construct and use a different, expanded measure moving forward.

More research is needed to fully understand the role of pluralistic ignorance in the underutilization of mental health services, both among college students and among a more general population of individuals. Although I assessed extended implications of pluralistic ignorance among college students beyond mental health service use in Study 2, a replication of the study without a pandemic beginning in the middle of data collection is necessary. Moreover, these findings do not easily generalize to non-college student populations broadly, or potentially even college student populations where mental health services are not readily available/accessible. It is possible that these findings—that is, the findings pertaining to misperceptions of others' attitudes toward mental health services and related implications—are



not relevant in populations where a shared identity is not developed, in groups where services are not available, or among groups characterized by different SES (as a reminder, the first two studies assessed college students who were attending an expensive private institution in Upstate New York).<sup>53</sup> More research is needed to determine the extent to which these results generalize to other populations.

Finally, the pluralistic ignorance intervention assessed in Study 3 needs refining and replication in other samples and in relation to other pluralistic ignorance contexts (especially other health-related contexts that are similarly influenced by social comparison processes). In all, although there were limitations associated with each study, I believe the overarching conclusions and findings nonetheless make valuable contributions to the literatures on pluralistic ignorance and mental health service utilization.

### Conclusion

Allport and his students, Katz and Schanck, conceptualized pluralistic ignorance at Syracuse University in the 1920s (Allport, 1924; Katz & Allport, 1931; Schanck, 1934). In their assessment of pluralistic ignorance of accepting racial minorities into fraternities, Katz and Allport (1931) found fraternity members to misperceive other members as being less accepting of racial minorities than the average self-reported attitudes of the group. This misperception, in

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<sup>53</sup> Although objective and subjective SES were normally distributed in Study 1, Study 2 (T1 sample) and Study 3 (control condition sample; for each measure, skew < 1.00), there could still be errors in drawing reliable conclusions about the role of SES among these college student populations. For example, in Study 1, almost 60% of the sample ( $n = 116$ ) reported a childhood family annual income of over \$75,001, with almost a quarter of the sample ( $n = 47$ ) reporting a childhood family annual income of over \$150,001. It is unlikely that this sort of SES distribution would appear across all Universities in the United States. Nonetheless, I did explore differences in mental health service use attitudes on the basis of objective childhood and current family SES among participants in the Study 2 T1 sample (the largest sample, to allow for the greatest power to detect differences). Objective childhood and current family SES were not associated with personal willingness to use services ( $r_s < .04$ ,  $p_s > .495$ ), perceptions of others' willingness to use services ( $r_s < .11$ ,  $p_s > .078$ ), nor perceptions of others' service use stigma ( $r_s < .11$ ,  $p_s > .089$ ). However, SES was associated with personal service use stigma, such that higher levels of personal service use stigma were associated with lower childhood family SES ( $r = -.20$ ,  $p = .002$ ) and lower current family SES ( $r = -.15$ ,  $p = .016$ ). As such, researchers should take care to continue measuring demographic information that could shed light on differing attitudes toward mental health services, including SES, access to health insurance, etc.

turn, could have contributed to a prolonged period of racial segregation on Syracuse University's campus. Uncovering such misperceptions was undoubtedly monumental and influential for both the field and the community. I am excited to have brought pluralistic ignorance research back to Syracuse University's campus. A century later, misperceptions of others' cognitions and behaviors still exist, have significant implications, and can be targeted in interventions.

College students misperceive other students as having more negative attitudes toward mental health services than the average self-reported attitudes of the sample. This is a red flag warning that the college student population is riddled with a systematic misperception of others' attitudes. This misperception, when brought to the individual-level, can have negative implications for service use and extended consequences, including implications for health, substance use, and academic performance. But this misperception can also be corrected and resulting implications can be mitigated. Observing pluralistic ignorance in a population, as problematic as it may seem, is also quite exciting. It means that measures can be taken to eliminate the misperception. It means that the observed negative implications can be addressed at a mass level. It emphasizes the need to continue to expand on the assessment of a century-old phenomenon, that clearly has important implications for society at large.

**Table 1**

*Means, Standard Deviations, and Zero-Order Correlations Among Variables Used in Confirmatory and Exploratory Implication Assessment Analyses in Study 1*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Personal Willing	6.90	2.14								
2. Other Willing	6.55	1.75	.41*** [.29, .52]							
3. Personal Stigma	1.67	0.83	-.23** [-.35, -.09]	-.06 [-.20, .08]						
4. Other Stigma	2.61	0.88	-.11 [-.25, .03]	-.22** [-.35, -.08]	.21** [.07, .34]					
5. Service Use <sup>d</sup>	0.24	0.43	.27*** [.14, .40]	.03 [-.11, .17]	-.12 [-.26, .01]	.11 [-.03, .24]				
6. Depression	7.12	5.49	-.03 [-.17, .11]	-.15* [-.29, -.02]	.03 [-.11, .17]	.17* [.03, .30]	.09 [-.05, .23]			
7. Sleep Interference	2.65	1.12	.00 [-.14, .14]	-.06 [-.20, .08]	-.11 [-.25, .03]	.10 [-.04, .24]	.10 [-.04, .24]	.57*** [.46, .65]		
8. Smoker <sup>d</sup>	0.09	0.28	-.00 [-.14, .14]	.07 [-.07, .21]	-.03 [-.17, .11]	.01 [-.13, .15]	.08 [-.06, .22]	.12 [-.02, .25]	.03 [-.11, .17]	
9. Alcohol Use	2.56	1.12	.06 [-.08, .20]	-.05 [-.18, .10]	-.15* [-.28, -.01]	.08 [-.22, .06]	.02 [-.12, .16]	-.02 [-.16, .12]	.14 [-.00, .27]	.25*** [.11, .38]

*Note.*  $N = 198$ . 95% confidence intervals provided in brackets.

<sup>d</sup> Indicates dichotomized measure, with point-biserial correlation coefficients reported.

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

**Table 2***Logistic Regression Analyses Predicting Use of Mental Health Services (Dichotomized) in Study 1*

Predictor(s)	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	odds-ratio	<i>R</i> <sup>2</sup> <sub>Nagelkerke</sub>
<u>Willingness</u>						
Personal Willing	0.44 [0.23, 0.68]	0.11	3.88	< .001	1.56 [1.26, 1.97]	.14
Other Willing	-0.17 [-0.41, 0.05]	0.12	-1.49	.137	0.84 [0.66, 1.05]	.14
Personal Willing x Other Willing	0.05 [-0.04, 0.13]	0.04	1.14	.256	1.05 [0.96, 1.14]	.15
<u>Stigma</u>						
Personal Stigma	-0.59 [-1.17, -0.09]	0.28	-2.16	.031	0.55 [0.31, 0.91]	.06
Other Stigma	0.42 [0.02, 0.83]	0.21	2.04	.042	1.52 [1.02, 2.29]	.06
Personal Stigma x Other Stigma	-0.32 [-0.78, 0.19]	0.24	-1.34	.182	0.73 [0.46, 1.21]	.07

*Note.* *N* = 198. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 3***Linear Regression Analyses Predicting Willingness to Use Services in Study 1*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
Personal Stigma	-0.54 [-0.90, -0.18]	0.18	-2.97	.003	.05
Other Stigma	-0.16 [-0.50, 0.18]	0.17	-0.93	.351	.05
Personal Stigma x Other Stigma	-0.05 [-0.38, 0.28]	0.17	-0.31	.758	.04

*Note.* *N* = 198. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 4***Linear Regression Analyses Predicting Mental and Physical Health (Depression and Sleep Interference, Respectively) in Study 1*

Predictor(s)	Depression					Sleep Interference				
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup> <sub>adj</sub>	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup> <sub>adj</sub>
<u>Willingness</u>										
Personal Willing	0.10 [-0.29, 0.50]	0.20	0.52	.602	.02	0.02 [-0.06, 0.10]	0.04	0.42	.676	-.01
Other Willing	-0.54 [-1.02, -0.06]	0.24	-2.20	.029	.02	-0.05 [-0.15, 0.05]	0.05	-0.97	.333	-.01
Personal Willing x Other Willing	-0.20 [-0.36, -0.03]	0.09	-2.29	.023	.04	-0.01 [-0.05, 0.02]	0.02	-0.67	.503	-.01
<u>Stigma</u>										
Personal Stigma	-0.05 [-0.99, 0.89]	0.48	-0.10	.917	.02	-0.19 [-0.38, 0.00]	0.10	-1.94	.054	.02
Other Stigma	1.07 [0.18, 1.97]	0.45	2.38	.018	.02	0.17 [-0.01, 0.35]	0.09	1.85	.065	.02
Personal Stigma x Other Stigma	-0.56 [-1.41, 0.30]	0.43	-1.29	.199	.02	-0.24 [-0.42, -0.07]	0.09	-2.82	.005	.05

*Note.* *N* = 198. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 5***Logistic Regression Analyses Predicting Tobacco Use (Dichotomized) in Study 1*

Predictor(s)	<i>b</i>	<i>SE</i>	<i>z</i>	<i>p</i>	odds-ratio	$R^2_{Nagelkerke}$
<u>Willingness</u>						
Personal Willing	-0.06 [-0.30, 0.20]	0.13	-0.45	.656	0.95 [0.74, 1.23]	.01
Other Willing	0.16 [-0.14, 0.47]	0.16	1.06	.291	1.18 [0.87, 1.60]	.01
Personal Willing x Other Willing	-0.01 [-0.13, 0.09]	0.06	-0.15	.878	0.99 [0.88, 1.10]	.01
<u>Stigma</u>						
Personal Stigma	-0.16 [-0.95, 0.43]	0.35	-0.45	.655	0.86 [0.39, 1.54]	.00
Other Stigma	0.06 [-0.54, 0.65]	0.30	0.20	.841	1.06 [0.58, 1.91]	.00
Personal Stigma x Other Stigma	-0.51 [-1.16, 0.08]	0.30	-1.69	.092	0.60 [0.31, 1.08]	.04

*Note.*  $N = 198$ . Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 6***Linear Regression Analyses Predicting Alcohol Use in Study 1*

Predictor(s)	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>R</i> <sup>2</sup> <sub>adj</sub>
<u>Willingness</u>					
Personal Willing	0.05 [-0.03, 0.13]	0.04	1.23	.129	-.00
Other Willing	-0.05 [-0.15, 0.04]	0.05	-1.08	.280	-.00
Personal Willing x Other Willing	-0.01 [-0.05, 0.02]	0.02	-0.78	.437	-.00
<u>Stigma</u>					
Personal Stigma	-0.18 [-0.38, 0.01]	0.10	-1.90	.059	.01
Other Stigma	-0.06 [-0.24, 0.12]	0.09	-0.68	.498	.01
Personal Stigma x Other Stigma	-0.11 [-0.28, 0.07]	0.09	-1.20	.230	.02

*Note.* *N* = 198. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.



**Table 7***Study 2 Hypotheses*

#	Hypothesis
1	Students will incorrectly anticipate others to be less willing to use services at T1 and T2, and T1 individual-level attitude scores (i.e., personal and perceptions of others scores) will positively correlate with respective T2 measurements
2	Students will incorrectly anticipate others to harbor more service use stigma at T1 and T2, and T1 individual-level attitude scores will positively correlate with respective T2 measurements
3*	Individual-level attitude scores will predict implications, such that service use will be greater, mental health, physical health, and academic performance will be better, and substance use will be lower among participants who have:
	<u>Willingness</u>
3 <sub>a</sub>	Higher levels of personal willingness
3 <sub>b</sub>	Higher perceived levels of others' willingness
3 <sub>c</sub>	Higher levels of personal willingness combined with higher perceived levels of others' willingness, but less so when combined with lower perceived levels of others' willingness (i.e., an interaction effect)
	<u>Stigma</u>
3 <sub>d</sub>	Lower levels of personal stigma
3 <sub>e</sub>	Lower perceived levels of others' stigma
3 <sub>f</sub>	Lower levels of personal stigma combined with lower perceived levels of others' stigma, but less so when combined with higher perceived levels of others' stigma (i.e., an interaction effect)
4*	Individual-level stigma scores will predict personal willingness to use services (as opposed to actual use of services), such that willingness to use services will be greater among participants who have:
4 <sub>a</sub>	Lower levels of personal stigma
4 <sub>b</sub>	Lower perceived levels of others' stigma
4 <sub>c</sub>	Lower levels of personal stigma combined with lower perceived levels of others' stigma, but less so when combined with higher perceived levels of others' stigma (i.e., an interaction effect)
5*	Need to belong and public self-consciousness will interact with T1 individual-level attitude scores to amplify implications described in H3-4.

*Note.* Individual-level attitude scores refer to personal scores, perceptions of others scores, and their interaction (and are referred to as “individual-level indicators of pluralistic ignorance” throughout the manuscript). Hypotheses indicated with an asterisk (\*) assessed where T1 individual-level attitude scores predict T2 pluralistic ignorance-related implications, adjusting for T1 implications.

**Table 8***T1 Means, Standard Deviations, and Correlations for Primary Full-Sample Measures in Study 2*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Personal Willing	4.85	1.33																
2. Other Willing	4.59	1.06	.39***															
3. Personal Stigma	1.56	0.68	-.41***	.01														
4. Other Stigma	2.56	0.78	-.00	-.24***	.17**													
5. Service Use <sup>d</sup>	0.42	0.50	.31***	-.02	-.19**	.06												
6. Depression <sup>a</sup>	7.37	6.17	-.01	-.13*	-.06	.13*	.30***											
7. Gastrointestinal	10.36	5.37	.07	.00	-.02	.16**	.14*	.48***										
8. Headaches	8.67	4.69	-.01	-.07	-.06	.12*	.21***	.51***	.47***									
9. Sleep Disturbance	13.82	5.23	.01	-.16**	-.14*	.15*	.26***	.60***	.37***	.53***								
10. Respiratory	7.01	3.72	.02	-.10	-.02	.15*	<b>.13*</b>	.39***	.47***	.52***	.37***							
11. Tobacco <sup>d</sup>	0.26	0.44	.01	.07	.02	-.10	.09	.14*	.08	.09	.12	.17**						
12. Cannabis <sup>d</sup>	0.40	0.49	.11	.01	-.25***	-.13*	.14*	.19**	.15*	.14*	.15*	.21***	.30***					
13. Alcohol <sup>a</sup>	4.86	4.87	-.09	.03	.08	-.06	-.05	.20**	.22***	<b>.18**</b>	.15*	.29***	.38***	.19**				
14. Public SC	1.84	0.72	.02	-.08	-.16*	.05	.13*	.24***	.20**	.27***	.24***	.19**	.03	.06	.11			
15. Need to Belong	3.15	0.74	.12*	-.03	-.15*	.07	.16**	.27***	.22**	.26***	.22***	.22***	.11	.08	.16*	.65***		
16. Acad. Success	3.81	1.04	.10	.01	-.07	-.01	.04	-.26***	-.08	-.03	-.11	-.12	-.04	.04	-.05	.00	-.02	
17. Acad. Impair	2.00	0.98	.06	.00	.11	.11	.30***	.60**	.34***	.31***	.46***	.20***	.14*	.16**	.08	.17**	.17**	-.35***

*Note.*  $N = 257-260$ . Gastrointestinal = gastrointestinal problems. Respiratory = respiratory problems. SC = self-consciousness. Acad. = Academic. Impair = impairment. The two correlation coefficients in **bold and underlined** represent statistically significant relationships that were not significant using transformed versions of one or both variables. I omitted 95% confidence intervals due to spacing constraints.

<sup>a</sup> Indicates summed composite variables with means and standard deviations that exclude individuals with one or more missing values on scale items; correlations replace missing values with within-person scale means (I did not include individuals with missing values on 80% or more of the scale items in analyses).

<sup>d</sup> Indicates dichotomized measure, with point-biserial correlation coefficients reported.

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

**Table 9***T2 Means, Standard Deviations, and Correlations for Primary Full-Sample Measures in Study 2*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Personal Willing	5.11	1.15																
2. Other Willing	4.74	0.97	.42***															
3. Personal Stigma	1.52	0.67	-.41***	.04														
4. Other Stigma	2.54	0.79	-.22**	-.23**	.28***													
5. Service Use <sup>d</sup>	0.50	0.50	.31***	.11	-.26**	-.02												
6. Depression	8.30	6.20	-.15	-.16	.04	.18*	.21*											
7. Gastrointestinal	11.22	5.80	.05	-.02	.06	.17*	.12	.46***										
8. Headaches	9.11	4.76	-.13	-.17*	.00	.20*	.02	.52***	.50***									
9. Sleep Disturbance	14.28	4.86	-.16	-.18*	-.05	.23**	.04	.47***	.47***	.58***								
10. Respiratory	6.64	3.43	-.09	<b><u>-.16*</u></b>	.10	.20*	.03	.38***	.52***	.43***	.43***							
11. Tobacco <sup>d</sup>	0.21	0.41	-.07	.06	.09	-.04	.15	.12	.12	.06	.06	.23**						
12. Cannabis <sup>d</sup>	0.41	0.49	.08	.09	-.22**	-.19*	.11	.09	<b><u>.17*</u></b>	.19*	.12	.14	.24**					
13. Alcohol	4.65	4.90	.01	.08	<b><u>.17*</u></b>	-.02	.07	<b><u>.18*</u></b>	.14	.04	.04	<b><u>.22**</u></b>	.40***	.22**				
15. Public SC	1.89	0.69	.03	-.03	-.20*	-.05	.15	.17*	.17*	.23**	.17*	.14	-.05	.11	.02			
16. Need to Belong	3.29	0.71	.08	-.05	-.10	.04	.10	.28***	.12	.13	.12	.11	-.02	.17*	.15	.60***		
17. Acad. Success	3.83	0.93	.22**	.19*	-.24**	-.19*	.03	-.27**	-.06	-.17*	-.16	-.07	.00	.05	-.12	.03	.06	
18. Acad. Impair	2.30	1.10	-.07	-.05	-.01	.13	.23**	.45***	.19*	.28***	.33***	.21*	.12	.13	.04	.15	.14	-.23**

*Note.*  $N = 142-145$ . Gastrointestinal = gastrointestinal problems. Respiratory = respiratory problems. SC = self-consciousness. Acad. = Academic. Impair = impairment. I did not include individuals with missing values on 80% or more of the scale items in analyses. The five correlation coefficients in **bold and underlined** represent statistically significant relationships that were not significant using transformed versions of one or both variables. I omitted 95% confidence intervals due to spacing constraints.

<sup>d</sup> Indicates dichotomized measure, with point-biserial correlation coefficients reported.

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

**Table 10***Logistic Regression Analyses Predicting Use of Mental Health Services (Dichotomized) in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>z</i>	<i>p</i>	odds-ratio	95% CI	<i>R</i> <sup>2</sup> <sub>Nagelkerke</sub>
<u>Willingness</u>							
Personal Willing	0.31	0.24	1.27	.206	1.36	[0.86, 2.26]	0.65
Other Willing	0.03	0.28	0.12	.903	1.03	[0.59, 1.76]	0.65
Personal Willing x Other Willing	-0.05	0.14	-0.38	.702	0.95	[0.71, 1.29]	0.65
<u>Stigma</u>							
Personal Stigma	0.30	0.41	0.73	.466	1.35	[0.58, 2.94]	0.65
Other Stigma	0.45	0.35	1.30	.194	1.57	[0.81, 3.16]	0.65
Personal Stigma x Other Stigma	-0.00	0.53	-0.00	.997	1.00	[0.36, 3.11]	0.65

*Note.* *N* = 145. CI = confidence interval. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 use of mental health services, adjusting for T1 use of mental health services. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models.

**Table 11**

*Linear Regression Analyses Predicting Use of Mental Health Services (Continuous) Among Those Who Used Services at T1 in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>					
Personal Willing	0.17 [-0.06, 0.39]	0.11	1.47	.148	0.62
Other Willing	0.10 [-0.16, 0.35]	0.13	0.76	.451	0.62
Personal Willing x Other Willing	-0.08 [-0.21, 0.05]	0.07	-1.25	.217	0.63
<u>Stigma</u>					
Personal Stigma	-0.09 [-0.65, 0.46]	0.28	-0.34	.736	0.60
Other Stigma	0.15 [-0.12, 0.41]	0.13	1.09	.279	0.60
Personal Stigma x Other Stigma	-0.48 [-1.37, 0.41]	0.44	-1.07	.287	0.61

*Note.* *N* = 67. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 use of mental health services, adjusting for T1 use of mental health services. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 12***Linear Regression Analyses Predicting Mental Health (Depression) in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>					
Personal Willing	-0.40 [-1.12, 0.32]	0.36	-1.10	.273	0.34
Other Willing	0.64 [-0.24, 1.51]	0.44	1.44	.152	0.34
Personal Willing x Other Willing	0.04 [-0.48, 0.55]	0.26	0.14	.892	0.34
<u>Stigma</u>					
Personal Stigma	0.66 [-0.76, 2.08]	0.72	0.92	.357	0.34
Other Stigma	-0.32 [-1.39, 0.75]	0.54	-0.59	.556	0.34
Personal Stigma x Other Stigma	0.30 [-1.64, 2.25]	0.99	0.31	.757	0.33

*Note.* *N* = 145. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict T2 depression, adjusting for T1 depression. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 13***Linear Regression Analyses Predicting Physical Health in Study 2*

Predictor(s)	Gastrointestinal Problems					Headaches				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>										
Personal Willing	-0.44 [-1.00, 0.12]	0.28	-1.55	.123	0.55	-0.65 [-1.17, -0.12]	0.27	-2.45	.016	0.41
Other Willing	0.44 [-0.24, 1.12]	0.34	1.29	.200	0.55	0.46 [-0.17, 1.09]	0.32	1.44	.153	0.41
Personal Willing x Other Willing	-0.28 [-0.68, 0.12]	0.20	-1.40	.164	0.55	-0.15 [-0.52, 0.23]	0.19	-0.78	.438	0.41
<u>Stigma</u>										
Personal Stigma	0.58 [-0.52, 1.69]	0.56	1.04	.299	0.54	0.15 [-0.90, 1.20]	0.53	0.29	.773	.39
Other Stigma	-0.26 [-1.10, 0.58]	0.42	-0.61	.541	0.54	-0.25 [-1.04, 0.54]	0.40	-0.63	.531	.39
Personal Stigma x Other Stigma	-0.21 [-1.73, 1.31]	0.77	-0.28	.784	0.54	0.47 [-0.98, 1.91]	0.73	0.64	.525	.38

Predictor(s)	Sleep Disturbance					Respiratory Illness				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>										
Personal Willing	-0.13 [-0.66, 0.39]	0.27	-0.50	.617	0.43	-0.38 [-0.76, -0.00]	0.19	-1.99	.048	0.41
Other Willing	-0.23 [-0.87, 0.42]	0.32	-0.70	.486	0.43	0.14 [-0.32, 0.61]	0.24	0.61	.542	0.41
Personal Willing x Other Willing	-0.07 [-0.45, 0.30]	0.19	-0.39	.697	0.42	0.12 [-0.16, 0.39]	0.14	0.83	.410	0.41
<u>Stigma</u>										
Personal Stigma	0.15 [-0.89, 1.19]	0.53	0.29	.776	0.42	0.47 [-0.28, 1.21]	0.38	1.24	.218	0.40
Other Stigma	-0.32 [-1.10, 0.46]	0.39	-0.82	.413	0.42	-0.34 [-0.91, 0.23]	0.29	-1.17	.244	0.40
Personal Stigma x Other Stigma	-0.85 [-2.28, 0.58]	0.72	-1.17	.244	0.43	0.33 [-0.69, 1.36]	0.52	0.64	.524	0.40

*Note.*  $N = 144$ . In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict T2 physical health, adjusting for T1 physical health. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.



**Table 14***Logistic Regression Analyses Predicting Tobacco Use Risk (Dichotomized) in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>z</i>	<i>p</i>	odds-ratio	95% CI	<i>R</i> <sup>2</sup> <sub>Nagelkerke</sub>
<u>Willingness</u>							
Personal Willing	-0.08	0.25	-0.30	.763	0.93	[0.56, 1.51]	0.55
Other Willing	-0.32	0.31	-1.06	.292	0.72	[0.39, 1.32]	0.55
Personal Willing x Other Willing	-0.04	0.15	-0.24	.812	0.96	[0.68, 1.27]	0.55
<u>Stigma</u>							
Personal Stigma	0.61	0.46	1.34	.181	1.84	[0.75, 4.54]	0.56
Other Stigma	0.31	0.36	0.87	.387	1.37	[0.68, 2.86]	0.56
Personal Stigma x Other Stigma	-0.02	0.59	-0.03	.979	0.98	[0.31, 3.09]	0.56

*Note.* *N* = 145. CI = confidence interval. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 tobacco use risk, adjusting for T1 tobacco use risk. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models.

**Table 15**

*Linear Regression Analyses Predicting Tobacco Use (Continuous) Among Tobacco Users in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>					
Personal Willing	-0.43 [-2.88, 2.02]	1.20	-0.36	.721	0.35
Other Willing	0.22 [-2.82, 3.25]	1.48	0.15	.884	0.35
Personal Willing x Other Willing	0.66 [-1.55, 2.86]	1.08	0.61	.547	0.33
<u>Stigma</u>					
Personal Stigma	2.21 [-1.94, 6.37]	2.03	1.09	.284	0.37
Other Stigma	-0.56 [-3.41, 2.30]	1.39	-0.40	.692	0.37
Personal Stigma x Other Stigma	-0.34 [-5.33, 4.66]	2.43	-0.14	.890	0.35

*Note.* *N* = 32. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 tobacco use, adjusting for T1 tobacco use. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 16***Logistic Regression Analyses Predicting Cannabis Use Risk (Dichotomized) in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>z</i>	<i>p</i>	odds-ratio	95% CI	<i>R</i> <sup>2</sup> <sub>Nagelkerke</sub>
<u>Willingness</u>							
Personal Willing	-0.23	0.20	-1.13	.259	0.80	[0.53, 1.18]	0.53
Other Willing	0.24	0.24	1.02	.310	1.27	[0.80, 2.03]	0.53
Personal Willing x Other Willing	0.10	0.13	0.74	.459	1.10	[0.84, 1.44]	0.53
<u>Stigma</u>							
Personal Stigma	0.01	0.40	0.03	.974	1.01	[0.43, 2.13]	0.52
Other Stigma	0.20	0.30	0.67	.506	1.22	[0.68, 2.20]	0.52
Personal Stigma x Other Stigma	-0.33	0.53	-0.63	.526	0.72	[0.25, 2.09]	0.52

*Note.* *N* = 145. CI = confidence interval. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 cannabis use risk, adjusting for T1 cannabis use risk. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models.

**Table 17**

*Linear Regression Analyses Predicting Cannabis Use (Continuous) Among Cannabis Users in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>					
Personal Willing	-0.05 [-1.31, 1.22]	0.63	-0.07	.941	0.58
Other Willing	0.49 [-1.03, 2.02]	0.76	0.65	.519	0.58
Personal Willing x Other Willing	0.16 [-1.23, 1.55]	0.69	0.23	.816	0.57
<u>Stigma</u>					
Personal Stigma	-2.92 [-6.45, 0.61]	1.76	-1.66	.103	0.61
Other Stigma	-0.47 [-1.87, 0.92]	0.69	-0.68	.497	0.61
Personal Stigma x Other Stigma	-1.58 [-5.90, 2.74]	2.15	-0.73	.467	0.60

*Note.* *N* = 55. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict of T2 cannabis use, adjusting for T1 cannabis use. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 18***Linear Regression Analyses Predicting Alcohol Use in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>					
Personal Willing	-0.18 [-0.74, 0.38]	0.28	-0.63	.527	0.38
Other Willing	0.62 [-0.05, 1.29]	0.34	1.83	.070	0.38
Personal Willing x Other Willing	-0.04 [-0.43, 0.36]	0.20	-0.19	.853	0.37
<u>Stigma</u>					
Personal Stigma	-0.28 [-1.38, 0.82]	0.56	-0.50	.618	0.37
Other Stigma	-0.46 [-1.29, 0.36]	0.42	-1.12	.267	0.37
Personal Stigma x Other Stigma	-2.14 [-3.60, -0.68]	0.74	-2.89	.004	0.40

*Note.* *N* = 144. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict T2 alcohol use, adjusting for T1 alcohol use. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 19***Linear Regression Analyses Predicting Academic Success and Impairment in Study 2*

Predictor(s)	Academic Success					Academic Impairment				
	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
<u>Willingness</u>										
Personal Willing	0.08 [-0.02, 0.18]	0.05	1.64	.104	0.47	-0.10 [-0.24, 0.04]	0.07	-1.37	.173	0.20
Other Willing	0.05 [-0.07, 0.17]	0.06	0.83	.408	0.47	0.05 [-0.12, 0.22]	0.09	0.60	.548	0.20
Personal Willing x Other Willing	0.04 [-0.03, 0.11]	0.04	1.06	.291	0.47	-0.04 [-0.14, 0.06]	0.05	-0.83	.406	0.20
<u>Stigma</u>										
Personal Stigma	-0.22 [-0.41, -0.03]	0.10	-2.32	.022	0.48	0.22 [-0.06, 0.50]	0.14	1.58	.117	0.21
Other Stigma	-0.08 [-0.22, 0.06]	0.07	-1.16	.249	0.48	0.06 [-0.14, 0.27]	0.10	0.62	.537	0.21
Personal Stigma x Other Stigma	0.11 [-0.15, 0.37]	0.13	0.87	.388	0.48	-0.04 [-0.42, 0.34]	0.19	-0.21	.831	0.21

*Note.* *N* = 144. In all analyses, I used T1 individual-level indicators of pluralistic ignorance to predict T2 academic success and impairment, adjusting for T1 academic success and impairment. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 20***Linear Regression Analyses Predicting Willingness to Use Services in Study 2*

Predictor(s)	<i>b</i>	<i>SE<sub>b</sub></i>	<i>t</i>	<i>p</i>	<i>R<sup>2</sup><sub>adj</sub></i>
Personal Stigma	-0.36 [-0.61, -0.11]	0.12	-2.89	.004	0.48
Other Stigma	-0.00 [-0.18, 0.17]	0.09	-0.03	.979	0.48
Personal Stigma x Other Stigma	-0.12 [-0.44, 0.20]	0.16	-0.72	.472	0.48

*Note.* *N* = 145. In all analyses, T1 individual-level indicators of pluralistic ignorance were used to predict T2 willingness to use services, adjusting for T1 willingness. Predictor main effects adjust for one another and do not include the interaction term. The main effect and interaction terms reported are from separate models. 95% confidence intervals provided in brackets.

**Table 21***Participant Demographics Across Experimental Condition in Study 3*

Demographic	Control ( <i>n</i> = 96)	Lesson ( <i>n</i> = 94)	Correction ( <i>n</i> = 95)	Combined ( <i>n</i> = 93)
Age Range (in years)	18-41	18-50	18-46	18-56
Gender ( <i>n</i> )				
Man	48	46	37	48
Woman	43	46	56	43
Non-binary/gender fluid	3	1	1	2
Preferred different term	1	1	0	0
Preferred not to answer	1	0	1	0
Race ( <i>n</i> )				
American Indian or Alaska Native	0	0	1	0
Asian	26	27	25	15
Black or African American	14	6	4	9
Hispanic or Latinx	12	12	8	6
Native Hawaiian or Other Pacific Islander	0	0	1	0
White or European American	38	45	50	57
Other	1	0	1	3
Multi-racial/mixed	5	4	5	3
Birthplace				
United States	79	84	85	88
Other	17	10	10	5
Current Service Use ( <i>n</i> )				
Currently using services	15	18	16	20
Not currently using services	81	76	79	73
Lifetime Service Use ( <i>n</i> )				
Used services	43	46	53	53
Never used services	53	48	42	40

*Note.* The median age for participants in each condition was 21 years old. As mental health service use could be of interest to readers, I have included distributions for current service use and lifetime service use.



**Table 22***Means, Standard Deviations, and One-Way Analysis of Variance Statistics for Primary Variables in Study 3*

Variables	Control ( <i>n</i> = 96)	Lesson ( <i>n</i> = 94)	Correction ( <i>n</i> = 95)	Combined ( <i>n</i> = 93)	<i>F</i> (3, 374)
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	
Personal Willing	4.67 (1.31)	4.75 (1.20)	5.34 (1.08)	5.16 (1.18)	6.84***
Other Willing	4.46 (1.27)	4.64 (1.04)	5.35 (0.87)	5.10 (0.88)	15.04***
Willing Accuracy	-0.21 (1.27)	-0.03 (1.04)	0.68 (0.87) <sup>a</sup>	0.43 (0.88) <sup>a</sup>	15.04***
Willing S/O	0.21 (1.35)	0.11 (1.15)	-0.01 (1.03)	0.06 (1.26)	0.57
Personal Stigma	1.61 (0.76)	1.68 (0.75)	1.50 (0.71)	1.49 (0.72)	1.43
Other Stigma	2.72 (0.98)	2.71 (0.83)	2.02 (0.82)	2.16 (0.92)	16.23***
Stigma Accuracy	1.11 (0.98) <sup>a</sup>	1.10 (0.83) <sup>a</sup>	0.41 (0.82) <sup>a</sup>	0.55 (0.92) <sup>a</sup>	16.23***
Stigma S/O	-1.11 (0.99)	-1.03 (0.93)	-0.52 (0.76)	-0.66 (0.81)	10.14***
Friend Support	5.93 (1.05)	5.99 (0.96)	6.23 (0.73)	6.15 (0.93)	2.12
Campaign Support	-0.20 (0.77)	-0.07 (0.88)	0.07 (0.97)	0.20 (1.01)	3.45*
Information Interest	3.21 (1.27)	2.74 (1.13)	3.37 (1.26)	3.32 (1.20)	5.20**

*Note.* *N* = 378. S/O = self-other discrepancy score. Campaign support is an averaged composite of two standardized measures. Self-other discrepancy analyses were post hoc.

<sup>a</sup> Indicates accuracy scores that are significantly difference from zero (an accurate perception) at  $p < .001$ .

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

**Table 23***Summary of Intervention Effectiveness Results in Study 3*

Outcome	Compared to Control			Compared to Lesson		Compared to Correction
	<i>Lesson</i>	<i>Correction</i>	<i>Combined</i>	<i>Correction</i>	<i>Combined</i>	<i>Combined</i>
Higher Perceived Levels of Others' Willingness		X	X	X	X	
Less Willingness S/O Discrepancy						
Lower Perceived Levels of Others' Stigma		X	X	X	X	
Less Stigma S/O Discrepancy		X	X	X	X	
Increased Support of Friend's Service Use						
Increased Support of Awareness Campaign			X			
Increased Interest in Service Information	X*			X	X	

*Note.*  $N = 378$ . X = significant difference at  $p < .05$ . \* = difference in opposite direction of hypothesis. S/O = self-other discrepancy. Self-other discrepancy analyses and comparisons of the pluralistic ignorance lesson intervention and the misperception correction intervention on service use interest outcomes were post hoc.

**Appendix A: Study 1 Measures**

### **Willingness to Use Mental Health Services (adapted from Karaffa & Koch, 2016)**

Instructions: Please respond to the following questions about your willingness to use mental health services (e.g., counseling). / Please respond to the following questions about your perception of other Syracuse students' willingness to use mental health services (e.g., counseling).

Items: I would want to use mental health services if . . . / Other Syracuse students would want to use mental health services if . . .

1. I were experiencing problems in my family relationships. / They were experiencing problems in their family relationships.
2. I were experiencing problems in my romantic relationship(s). / They were experiencing problems in their romantic relationship(s).
3. I were experiencing problems with my friendship(s). / they were experiencing problems with their friendship(s).
4. I were experiencing depression. / They were experiencing depression.
5. I were experiencing problems with substance abuse (e.g., drug and/or alcohol). / They were experiencing problems with substance abuse (e.g., drug and/or alcohol).
6. I were experiencing physical symptoms due to stress. / They were experiencing physical symptoms due to stress.
7. I were experiencing post traumatic stress disorder (PTSD). / They were experiencing post traumatic stress disorder (PTSD).
8. I were struggling academically. / They were struggling academically.
9. I were experiencing problems with my finances. / They were experiencing problems with their finances.
10. I were experiencing anxiety. / They were experiencing anxiety.

Scale (for all items): 1 = *Very Unwilling*; 2 = (2); 3 = (3); 4 = (4); 5 = (5); 6 = *Neutral*; 7 = (7); 8 = (8); 9 = (9); 10 = (10); 11 = *Very Willing*

### **Mental Health Service Use Stigma (Healthy Minds Network, 2019)**

Instructions: How much do you agree with the following statements?

Items (reverse-score items are identified with an asterisk):

1. I would willingly accept someone who has received mental health treatment as a close friend. / Most Syracuse students would willingly accept someone who has received mental health treatment as a close friend.
  2. \* I feel that receiving mental health treatment is a sign of personal failure. / Most Syracuse students feel that receiving mental health treatment is a sign of personal failure.
  3. \* I would think less of a person who has received mental health treatment. / Most Syracuse students would think less of a person who has received mental health treatment.
- Scale (for all items): 1 = *Strongly Agree*; 2 = *Agree*; 3 = *Somewhat Agree*; 5 = *Somewhat Disagree*; 6 = *Strongly Disagree*

## Depression (i.e., the PHQ-9; Kroenke et al., 2001)

Instructions: Over the past 2 weeks, how often have you been bothered by the following problems:

### Items:

1. Little interest or pleasure in doing things.
2. Feeling down, depressed, hopeless.
3. Trouble falling or staying asleep or sleeping too much.
4. Feeling tired or having little energy.
5. Poor appetite or overeating.
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down.
7. Trouble concentrating on things, such as reading the newspaper or watching television.
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual.
9. Thoughts that you would be better off dead, or of hurting yourself in some way.

Scale (for all items): 0 = *Not at all*; 1 = *Several days*; 2 = *More than half the days*; 3 = *Nearly every day*

Note: The first two items were assessed separately from the remaining seven.

## Personal Mental Illness

Item: Do you identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

## Family Mental Illness

Item: Does at least one person in your family identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

## Mental Health Service Use

Item: Think about your use of mental health services over the past year. How often have you used a mental health service?

Scale: 1 = *Never*; 2 = *Monthly*; 3 = *2-4 times a month*; 4 = *2-4 times a week*; 5 = *4 or more times a week*

## Sleep Interference

Item: Unrelated to any recent illness or injury, to what extent do you consider your sleep to interfere with your daily functioning within the past 2 weeks (e.g., daytime fatigue, ability to function, concentration)?

Scale: 1 = *Not at all interfering*; 2 = *A little*; 3 = *Somewhat*; 4 = *Much*; 5 = *Very much interfering*

**Substance Use (i.e., pulled directly from and/or adapted from the AUDIT; Babor et al., 2001)**

*Cigarette/cigar Use*

Item: Currently, do you now smoke cigarettes/cigars every day, some days, or not at all?

Scale: 1 = *Everyday*; 2 = *Some days*; 3 = *Not at all*

Item: On the days you smoke, how many cigarettes/cigars do you smoke?

Scale: 1 = *1-9*; 2 = *10-19*; 3 = *20-29*; 4 = *30 or more*

*Alcohol Use*

Item: Think about your drinking over the past 6 months. How often do you have a drink containing alcohol?

Scale: 1 = *Never*; 2 = *Monthly*; 3 = *2-4 times a month*; 4 = *2-3 times a week*; 5 = *4 or more times a week*

Item: How many drinks (1 drink equals 12 oz. beer; 5 oz. glass of wine; 1.5 oz. of hard liquor) containing alcohol do you have on a typical day when you are drinking?

Scale: 1 = *1 or 2*; 2 = *3 or 4*; 3 = *5 or 6*; 4 = *7 to 9*; 5 = *10 or more*

Item: How often do you have 5 or more drinks on one occasion?

Scale: 1 = *Never*; 2 = *Less than monthly*; 3 = *Monthly*; 4 = *Weekly*; 5 = *Daily or almost daily*

**Demographic Questionnaire**

*College Year*

Item: What is your year in college?

Scale: 1 = *Freshman*; 2 = *Sophomore*; 3 = *Junior*; 4 = *Senior*; 5 = *Other (with open)*

*Political Affiliation (American National Election Studies, 2019)*

Item: Here is a 7-point scale on which political views that people might hold are arranged from extremely liberal to extremely conservative. Where would you place yourself on this scale, or haven't you thought about this much?

Scale: 1 = *Extremely Liberal*; 2 = *Liberal*; 3 = *Slightly Liberal*; 4 = *Moderate, Middle of the Road*; 5 = *Slightly Conservative*; 6 = *Conservative*; 7 = *Extremely Conservative*; 8 = *Don't Know, Haven't Thought*

### *Objective Social Class*

**Item:** Please indicate the category that would best describe your family annual income during childhood.

**Scale:** 1 = < \$15,000; 2 = 15,000-25,000; 3 = 25,001-35,000; 4 = 35,001-50,000; 5 = 50,001-75,000; 6 = 75,001-100,000; 7 = 100,001-150,000; 8 = > \$150,001

### *Subjective Social Class (Adler et al., 2000)*

**Item:** Think of this ladder as representing where people stand in the country you lived in as a child. If you lived in several countries, please think of the country you lived in longest. At the top of the ladder are the people who are best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—those who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Where would you place your family on this ladder? Please indicate the rung number where you think your family stood/stands, relative to other people in the country.

**Scale:** 1 = [highest rung on ladder]; 10 = [lowest rung on ladder]

### *Zip Code*

**Item:** Please provide the zip code in which your childhood home was located. This is a 5-digit number. If you do not remember your childhood zip code, please report the city in which grew up in. If you lived in several locations, please use the location you lived in

### *Childhood Neighborhood*

**Item:** Which of the following best describes the type of neighborhood where you have lived for the majority of your life?

**Scale:** 1 = Rural; 2 = Suburban 3 = Small City; 4 = Big City

### *Race/Ethnic Group Identification*

**Item:** What racial/ethnic group do you most identify with? Please select from the following categories. You will have the opportunity to provide your own nuanced identity in the next question.

**Scale:** 1 = American Indian or Alaska Native; 2 = Asian; 3 = Black or African American; 4 = Hispanic or Latino; 5 = Native Hawaiian or Other Pacific Islander; 6 = White or European American; 7 = Other; 8 = Multi-racial/Mixed; 9 = I prefer not to answer

### *Race Open*

**Item:** What is your racial/ethnic group identification? You can provide any response that best describes you.

*Gender*

Item: What is your gender/sex?

Scale: 1 = *Male*; 2 = *Female*; 3 = *Other*; 4 = *I prefer not to answer*

*Age*

Item: What is your current age (in years)?

*Birthplace*

Item: Where were you born?

Scale: 1 = *United States*; 2 = *Other*; 3 = *I prefer not to answer*

*Years in US*

Item: How many years have you lived in the United States?

*English First Language*

Item: Is English your first language

Scale: 1 = *Yes*; 2 = *No*

*English Fluency*

Item: How fluent are you in English?

Scale: 1 = *Not At All*; 7 = *Extremely*



**Appendix B: Study 2 Measures**

### **Willingness to Use Mental Health Services (adapted from Karaffa & Koch, 2016)**

Instructions: Please respond to the following questions about your willingness to use mental health services (e.g., counseling). / Please respond to the following questions about your perception of other Syracuse students' willingness to use mental health services (e.g., counseling).

Items: I would want to use mental health services if . . . / Other Syracuse students would want to use mental health services if . . .

1. I were experiencing problems in my family relationships. / They were experiencing problems in their family relationships.
2. I were experiencing problems in my romantic relationship(s). / They were experiencing problems in their romantic relationship(s).
3. I were experiencing problems with my friendship(s). / they were experiencing problems with their friendship(s).
4. I were experiencing depression. / They were experiencing depression.
5. I were experiencing problems with substance abuse (e.g., drug and/or alcohol). / They were experiencing problems with substance abuse (e.g., drug and/or alcohol).
6. I were experiencing physical symptoms due to stress. / They were experiencing physical symptoms due to stress.
7. I were experiencing post traumatic stress disorder (PTSD). / They were experiencing post traumatic stress disorder (PTSD).
8. I were struggling academically. / They were struggling academically.
9. I were experiencing problems with my finances. / They were experiencing problems with their finances.
10. I were experiencing anxiety. / They were experiencing anxiety.

Scale (for all items): 1 = *Very Unwilling*; 2 = *Unwilling*; 3 = *Somewhat Unwilling*; 4 = *Neutral*; 5 = *Somewhat Willing*; 6 = *Willing*; 7 = *Very Willing*

## **Mental Health Service Use Stigma (adapted Healthy Minds Network, 2019)**

Instructions: How much do you agree with the following statements?

Items (reverse-score items are identified with an asterisk):

1. \* I would willingly accept someone who has received mental health treatment as a close friend. / Most Syracuse students would willingly accept someone who has received mental health treatment as a close friend.
2. I feel that receiving mental health treatment is a sign of personal failure. / Most Syracuse students feel that receiving mental health treatment is a sign of personal failure.
3. I would think less of a person who has received mental health treatment. / Most Syracuse students would think less of a person who has received mental health treatment.
4. \* I believe that people who use mental health services can significantly benefit from the services they receive. / Most Syracuse students believe that people who use mental health services can significantly benefit from the services they receive.
5. I believe that people who use mental health services are unstable and/or dangerous. / Most Syracuse students believe that people who use mental health services are unstable and/or dangerous.

Scale (for all items): 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Somewhat Disagree*; 4 = *Somewhat Agree*; 5 = *Agree*; 6 = *Strongly Agree*

## **General Attitudes Toward Mental Health Services (Healthy Minds Network, 2019))**

### *Knowledge About Campus Services*

Item: If I needed to seek professional help for my mental or emotional health, I would know where to go on my campus.

Scale: 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Somewhat Disagree*; 4 = *Somewhat Agree*; 5 = *Agree*; 6 = *Strongly Agree*

Item: Are you aware of mental health outreach efforts on your campus (such as educational programs, awareness events, anti-stigma campaigns, screening days)?

Scale: 1 = *Yes*; 2 = *No*

Item: What have you heard from other students about the quality of mental health and psychological counseling services on your campus?

Scale: 1 = *I have mostly heard negative opinions*; 2 = *I have heard an even mix of negative and positive opinions*; 3 = *I have mostly heard positive opinions*; 4 = *I haven't heard anything*

Item: There is a good support system on campus for students going through difficult times.

Scale: 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Somewhat Disagree*; 4 = *Somewhat Agree*; 5 = *Agree*; 6 = *Strongly Agree*

*Beliefs about Effectiveness of Treatment in General*

Items:

1. How helpful on average do you think medication is, when provided competently, for people your age who are clinically depressed?
2. How helpful on average do you think medication would be for you if you were having mental or emotional health problems?
3. How helpful on average do you think therapy or counseling is, when provided competently, for people your age who are clinically depressed?
4. How helpful on average do you think therapy or counseling would be for you if you were having mental or emotional health problems?
5. How helpful on average do you think wellness or mental/emotional health apps are for people your age who are having mental or emotional health problems?

Scale: 1 = *Not Helpful*; 2 = *Somewhat Helpful*; 3 = *Helpful*; 4 = *Very Helpful*

*Ambivalence About Mental Health Services in General (adapted Priester et al., 2007)*

Instruction: Considering just your positive (and ignoring any negative) thoughts and feelings—how much positivity do you feel for each of the statements listed below?

Items:

1. Mental health services
2. Using mental health services
3. The effectiveness of mental health services in helping me
4. The ability of mental health service staff to determine if treatment is needed
5. Time and location convenience of mental health services

Scale: 1 = *Not At All Positive*; 2 = *Just a Little Bit Positive*; 3 = *Somewhat Positive*; 4 = *Positive*; 5 = *Mostly Positive*; 6 = *Very Positive*; 7 = *Completely Positive*

Instruction: Considering just your negative (and ignoring any positive) thoughts and feelings—how much negativity do you feel for each of the statements listed below?

Items: (same as above)

Scale: 1 = *Not At All Negative*; 2 = *Just a Little Bit Negative*; 3 = *Somewhat Negative*; 4 = *Negative*; 5 = *Mostly Negative*; 6 = *Very Negative*; 7 = *Completely Negative*

Instruction: Considering your thoughts and feelings, would you say you are mostly on one side or the other on each of that statements presented below, or would you say your feelings and beliefs are mixed?

Items: (same as above)

Scale: 1 = *Not At All Mixed*; 2 = *Just a Little Bit Mixed*; 3 = *Somewhat Mixed*; 4 = *Mixed*; 5 = *Mostly Mixed*; 6 = *Very Mixed*; 7 = *Completely Mixed*

**Instruction:** Considering your thoughts and feelings, would you say you are not at all conflicted about each of the statements presented below, or would you say your feelings and beliefs are completely conflicted?

**Items:** (same as above)

**Scale:** 1 = *Not At All Conflicted*; 2 = *Just a Little Bit Conflicted*; 3 = *Somewhat Conflicted*; 4 = *Conflicted*; 5 = *Mostly Conflicted*; 6 = *Very Conflicted*; 7 = *Completely Conflicted*

**Instruction:** Considering your thoughts and feelings, would you say you are not at all indecisive about each of the statements presented below, or would you say your feelings and beliefs are completely indecisive?

**Items:** (same as above)

**Scale:** 1 = *Not At All Indecisive*; 2 = *Just a Little Bit Indecisive*; 3 = *Somewhat Indecisive*; 4 = *Indecisive*; 5 = *Mostly Indecisive*; 6 = *Very Indecisive*; 7 = *Completely Indecisive*

**Instruction:** Considering your thoughts and feelings, would you say you are not at all tense about each of the statements presented below, or would you say your feelings and beliefs are completely tense?

**Items:** (same as above)

**Scale:** 1 = *Not At All Tense*; 2 = *Just a Little Bit Tense*; 3 = *Somewhat Tense*; 4 = *Tense*; 5 = *Mostly Tense*; 6 = *Very Tense*; 7 = *Completely Tense*

**Instruction:** Considering your thoughts and feelings, would you say you are not at all ambivalent about each of the statements presented below, or would you say your feelings and beliefs are completely ambivalent?

**Items:** (same as above)

**Scale:** 1 = *Not At All Ambivalent*; 2 = *Just a Little Bit Ambivalent*; 3 = *Somewhat Ambivalent*; 4 = *Ambivalent*; 5 = *Mostly Ambivalent*; 6 = *Very Ambivalent*; 7 = *Completely Ambivalent*

## **Mental Health Service Use (Healthy Minds Network, 2019)**

### *Use of Therapy or Counseling Services*

**Item:** Have you ever received counseling or therapy for mental health concerns?

**Scale:** 1 = *No, never*; 2 = *Yes, prior to starting college*; 3 = *Yes, since starting college*; 4 = *Yes, both of the above (prior to college and since starting college)*

**Item:** How many total visits or sessions for counseling or therapy have you had in the past 12 months?

**Scale:** 0 = 0; 1 = 1-3; 2 = 4-6; 3 = 7-9; 4 = 10 or more

Item: Think about your use of mental health services over the past year. How often have you used a mental health service?

Scale: 1 = *Never*; 2 = *Monthly*; 3 = *2-4 times a month*; 4 = *2-4 times a week*; 5 = *4 or more times a week*

Item: Are you currently receiving counseling or therapy?

Scale: 1 = *Yes*; 2 = *No*

*Type of Provider (if services were used)*

Instruction: From which of the following places did you receive counseling or therapy? (Select all that apply)

Items:

1. Counseling services
2. Health services
3. Other campus counseling or health services on campus
4. Psychiatric Emergency Services/Psych Emergency Room (ER)
5. Inpatient psychiatric hospital
6. Partial hospitalization program
7. Provider in the local community (not on campus)
8. Provider in another location (such as your hometown)
9. Other (please specify)
10. Don't know

*Visit to Health Professional*

Item: In the past 12 months, have you visited any medical provider, such as primary care doctor or other type of doctor, for a check-up or any other medical reasons?

Scale: 1 = *Yes*; 2 = *No*

*Informal Support (Help-seeking from Nonclinical Sources)*

Instructions: In the past 12 months have you received counseling or support for your mental and emotional health from any of the following sources? (Select all that apply)

Items:

1. Roommate
2. Friend (who is not a roommate)
3. Significant other
4. Family member
5. Religious counselor or other religious contact
6. Support group
7. Other non-clinical source (please specify)
8. No, none of these

### *Barriers to Service Use*

**Instructions:** In the past 12 months, which of the following factors have caused you to receive fewer services (counseling, therapy, or medication) for your mental or emotional health than you would have otherwise received? (Select all that apply)

**Items:**

1. No need for services
2. Financial reasons (too expensive, not covered by insurance)
3. Not enough time
4. Not sure where to go
5. Difficulty finding an available appointment
6. Prefer to deal with issues on my own or support from family/friends
7. Other (please specify)
8. No barriers

### **Depression (i.e., the PHQ-9; Kroenke et al., 2001)**

**Instructions:** Over the past 2 weeks, how often have you been bothered by the following problems?

**Items:**

1. Little interest or pleasure in doing things.
2. Feeling down, depressed, hopeless.
3. Trouble falling or staying asleep or sleeping too much.
4. Feeling tired or having little energy.
5. Poor appetite or overeating.
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down.
7. Trouble concentrating on things, such as reading the newspaper or watching television.
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual.
9. Thoughts that you would be better off dead, or of hurting yourself in some way.

**Scale (for all items):** 0 = *Not at all*; 1 = *Several days*; 2 = *More than half the days*; 3 = *Nearly every day*

### **Mental Health (i.e., the SRQ-20; Beusenberg & Orley, 1994)**

Instructions: The following questions are related to certain pains and problems that may have bothered you in the last 30 days. If you think the question applies to you and you had the described problem in the last 30 days answer “yes.” On the other hand, if the question does not apply to you and you did not have the problem in the last 30 days, answer “no.”

Items:

1. Do you often have headaches?
2. Is your appetite poor?
3. Do you sleep badly?
4. Are you easily frightened?
5. Do your hands shake?
6. Do you feel nervous, tense or worried?
7. Is your digestion poor?
8. Do you have trouble thinking clearly?
9. Do you feel unhappy?
10. Do you cry more than usual?
11. Do you find it difficult to enjoy your daily activities?
12. Do you find it difficult to make decisions?
13. Is your daily work suffering?
14. Are you unable to play a useful part in life?
15. Have you lost interest in things?
16. Do you feel that you are a worthless person?
17. Has the thought of ending your life been on your mind?
18. Do you feel tired all the time?
19. Do you have uncomfortable feelings in your stomach?
20. Are you easily tired?

Scale (for all items): 1 = *Yes*; 0 = *No*

### **Personal Mental Illness**

Item: Do you identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

### **Family Mental Illness**

Item: Does at least one person in your family identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

### **Medication Use**

Item: Are you currently taking prescription medication for your mental health?

Scale: 1 = *Yes*; 2 = *No*



## Physical Health (i.e., the PHQ; Schat et al., 2005)

Instruction: Over the past 12 months . . .

Items (reverse-score items are identified with an asterisk):

1. How often have you had difficulty getting to sleep at night?
  2. How often have you woken up during the night?
  3. How often have you had nightmares or disturbing dreams?
  4. \* How often has your sleep been peaceful and undisturbed?
  5. How often have you experienced headaches?
  6. How often did you get a headache when there was a lot of pressure on you to get things done?
  7. How often did you get a headache when you were frustrated because things were not going the way they should have or when you were annoyed at someone?
  8. How often have you suffered from an upset stomach (indigestion)?
  9. How often did you have to watch what you ate carefully to avoid stomach upsets?
  10. How often did you feel nauseated (“sick to your stomach”)?
  11. How often were you constipated or did you suffer from diarrhea?
  12. How often have you had minor colds (that made you feel uncomfortable but didn’t keep you sick in bed or make you miss work/school)?
  13. How often have you had respiratory infections more severe than minor colds that “laid you low” (such as bronchitis, sinusitis, etc.)?
  14. When you have a bad cold or flu, how often does it last longer than it should?
- Scale (for all items): 1 = *Not at all*; 2 = *Rarely*; 3 = *Once in a while*; 4 = *Some of the time*; 5 = *Fairly often*; 6 = *Often*; 7 = *All of the time*

## Sleep Interference

Item: Unrelated to any recent illness or injury, to what extent do you consider your sleep to interfere with your daily functioning within the past 2 weeks (e.g., daytime fatigue, ability to function, concentration)?

Scale: 1 = *Not at all interfering*; 2 = *A little*; 3 = *Somewhat*; 4 = *Much*; 5 = *Very much interfering*

## Cigarette/e-cigarette/cigar Use

Item: Currently, do you now use an e-cigarette or vape every day, some days, or not at all?

Scale: 1 = *Not at all*; 2 = *Some days*; 3 = *Everyday*

Item: Currently, do you now smoke cigarettes/cigars every day, some days, or not at all?

Scale: 1 = *Not at all*; 2 = *Some days*; 3 = *Everyday*

Item: On the days you smoke, how many cigarettes/cigars do you smoke?

Scale: 1 = *1-9*; 2 = *10-19*; 3 = *20-29*; 4 = *30 or more*

**Substance Use (i.e., the ASSIST [Version 3.0 scoring]; Humeniuk et al., 2006; World Health Organization, 2020)**

Instruction: In your life, which of the following substances have you ever used? (NON-MEDICAL USE ONLY)

Items:

1. Tobacco products (cigarettes, chewing tobacco, cigars, etc.)
2. Alcoholic beverages (beer, wine, spirits, etc.)
3. Cannabis (marijuana, pot, grass, hash, etc.)
4. Cocaine (coke, crack, etc.)
5. Amphetamine type stimulants (speed, diet pills, ecstasy, etc.)
6. Inhalants (nitrous, glue, petrol, paint thinner, etc.)
7. Sedatives or Sleeping Pills (Valium, Serepax, Rohypnol, etc.)
8. Hallucinogens (LSD, acid, mushrooms, PCP, Special K, etc.)
9. Opiates (heroin, morphine, methadone, codeine, etc.)
10. Other- specify:

Scale (for all items): 1 = *Yes (have had)*; 2 = *No (have not had)*

If “yes” to any item, ask next question about each substance used:

Item: In the past three months, how often have you used the substances you mentioned? (FIRST DRUG, SECOND DRUG, ETC)?

Scale: 0 = *Never*; 2 = *Once or Twice*; 3 = *Monthly*; 4 = *Weekly*; 6 = *Daily or Almost Daily*

If “never” to all items, skip the next three questions. If any substances used in the previous three months, ask next three questions about each substance used:

Item: During the past three months, how often have you had a strong desire or urge to use (FIRST DRUG, SECOND DRUG, ETC)?

Scale: 0 = *Never*; 3 = *Once or Twice*; 4 = *Monthly*; 5 = *Weekly*; 6 = *Daily or Almost Daily*

Item: During the past three months, how often has your use of (FIRST DRUG, SECOND DRUG, ETC) led to health, social, legal, or financial problems?

Scale: 0 = *Never*; 4 = *Once or Twice*; 5 = *Monthly*; 6 = *Weekly*; 7 = *Daily or Almost Daily*

Item: During the past three months, how often have you failed to do what was normally expected of you because of your use of (FIRST DRUG, SECOND DRUG, ETC)?

Scale: 0 = *Never*; 5 = *Once or Twice*; 6 = *Monthly*; 7 = *Weekly*; 8 = *Daily or Almost Daily*

Item: Has a friend or relative or anyone else ever expressed concern about your use of (FIRST DRUG, SECOND DRUG, ETC)?

Scale: 0 = *No, Never*; 3 = *Yes, but not in the past 3 months*; 6 = *Yes, in the past 3 months*

Item: Have you ever tried to control, cut down or stop using (FIRST DRUG, SECOND DRUG, ETC)?

Scale: 0 = *No, Never*; 3 = *Yes, but not in the past 3 months*; 6 = *Yes, in the past 3 months*

Item: Have you ever used any drug by injection? (NON-MEDICAL USE ONLY)

Scale: 0 = *No, Never*; 1 = *Yes, but not in the past 3 months*; 2 = *Yes, in the past 3 months*

### Alcohol Use (i.e., the AUDIT; Babor et al., 2001)

#### Items:

1. How often do you have a drink containing alcohol?  
Scale: 0 = *Never*; 1 = *Monthly or less*; 2 = *2-4 times a month*; 3 = *2-3 times a week*; 4 = *4 or more times a week*
2. How many drinks containing alcohol do you have on a typical day when you are drinking?  
Scale (T1): 0 = *1 or 2*; 1 = *3 or 4*; 2 = *5 or 6*; 3 = *7 to 9*; 4 = *10 or more*  
Scale (T2): 0 = *0 to 2*; 1 = *3 or 4*; 2 = *5 or 6*; 3 = *7 to 9*; 4 = *10 or more*
3. How often do you have six or more drinks on one occasion?  
Scale: 0 = *Never*; 1 = *Less than monthly*; 2 = *Monthly*; 3 = *Weekly*; 4 = *Daily or almost daily*
4. How often during the last year have you found that you were not able to stop drinking once you had started?  
Scale: same as above
5. How often during the last year have you failed to do what was normally expected of you because of drinking?  
Scale: same as above
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?  
Scale: same as above
7. How often during the last year have you had a feeling of guilt or remorse after drinking?  
Scale: same as above
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?  
Scale: same as above
9. Have you or someone else been injured because of your drinking?  
Scale: 0 = *No*; 2 = *Yes, but not in the last year*; 4 = *Yes, during the last year*
10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?  
Scale: same as above

### Self-consciousness (i.e., the SCS-R; Scheier & Carver, 1985)

Instruction: Please answer the following questions about yourself. For each of the statements, indicate how much each statement is like you.

Items (reverse-score items are identified with an asterisk):

*Private self-consciousness subscale:*

1. I'm always trying to figure myself out
2. I think about myself a lot
3. I often daydream about myself
4. \* I never take a hard look at myself
5. I generally pay attention to my inner feelings
6. I'm constantly thinking about my reasons for doing things
7. I sometimes step back (in my mind) in order to examine myself from a distance
8. I'm quick to notice changes in my mood
9. I know the way my mind works when I work through a problem

*Public self-consciousness subscale:*

1. I'm concerned about my style of doing things
2. I care a lot about how I present myself to others
3. I'm self-conscious about the way I look
4. I usually worry about making a good impression
5. Before I leave my house, I check how I look
6. I'm concerned about what other people think of me
7. I'm usually aware of my appearance

Scale (for all items): 0 = *Not like me at all*; 1 = *A little like me*; 2 = *Somewhat like me*; 3 = *A lot like me*

### Need to Belong Scale (Leary et al., 2013)

Instruction: Please indicate the degree to which each statement is true or characteristic of yourself.

Items (reverse-score items are identified with an asterisk):

1. \* If other people don't seem to accept me, I don't let it bother me
2. I try hard not to do things that will make other people avoid or reject me
3. \* I seldom worry about whether other people care about me
4. I need to feel that there are people I can turn to in times of need
5. I want other people to accept me
6. I do not like being alone
7. \* Being apart from my friends for long periods of time does not bother me
8. I have a strong "need to belong"
9. It bothers me a great deal when I am not included in other people's plans
10. My feelings are easily hurt when I feel that others do not accept me

Scale: 1 = *Not At All*; 2 = *Slightly*; 3 = *Moderately*; 4 = *Very*; 5 = *Extremely*

### **Classroom Performance (experimenter generated and adapted from Lipson & Eisenberg, 2018)**

Item: What is your GPA as of last semester—that is, what is your GPA not including the classes you are currently taking?

Item: What is your anticipated GPA for the current semester—that is, what GPA do you expect to receive for the classes you are currently taking (e.g., if you expect to receive all A's this semester, you would expect to receive a 4.0 semester GPA)? At Syracuse, letter grades have the following GPA weights: A = 4.0; A- = 3.6666; B+ = 3.3333; B = 3.0; B- = 2.6666; C+ = 2.3333; C = 2.0; C- = 1.6666; D = 1.0; D- = .666; F = 0.

Item: Consider your academic success. At this point in time, would you consider yourself not academically successful, academically successful, or somewhere in between using the scale provided?

Scale: 1 = *Not At All Successful (1)*; 2 = (2); 3 = (3); 4 = (4); 5 = *Very Successful (5)*

Item: In the past 4 weeks, how many days have you felt that emotional or mental difficulties have hurt your academic performance?

Scale: 1 = *None*; 2 = *1-2 days*; 3 = *3-5 days*; 4 = *6 or more days*

### **Demographic Questionnaire**

#### *College Year*

Item: What is your year in college?

Scale: 1 = *Freshman*; 2 = *Sophomore*; 3 = *Junior*; 4 = *Senior*; 5 = *Other (with open)*

#### *Political Affiliation (American National Election Studies, 2019)*

Item: Here is a 7-point scale on which political views that people might hold are arranged from extremely liberal to extremely conservative. Where would you place yourself on this scale, or haven't you thought about this much?

Scale: 1 = *Extremely Liberal*; 2 = *Liberal*; 3 = *Slightly Liberal*; 4 = *Moderate, Middle of the Road*; 5 = *Slightly Conservative*; 6 = *Conservative*; 7 = *Extremely Conservative*; 8 = *Don't Know, Haven't Thought*

#### *Objective Social Class (Childhood)*

Item: Please indicate the category that would best describe your family annual income during childhood.

Scale: 1 = *< \$15,000*; 2 = *15,000-25,000*; 3 = *25,001-35,000*; 4 = *35,001-50,000*; 5 = *50,001-75,000*; 6 = *75,001-100,000*; 7 = *100,001-150,000*; 8 = *> \$150,001*

*Objective Social Class (Current)*

**Item:** Please indicate the category that would best describe your current family annual income.

**Scale:** 1 = < \$15,000; 2 = 15,000-25,000; 3 = 25,001-35,000; 4 = 35,001-50,000; 5 = 50,001-75,000; 6 = 75,001-100,000; 7 = 100,001-150,000; 8 = > \$150,001

*Subjective Social Class (Childhood; Adler et al., 2000)*

**Item:** Think of this ladder as representing where people stand in the country you lived in as a child. If you lived in several countries, please think of the country you lived in longest. At the top of the ladder are the people who are best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—those who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Where would you place your family on this ladder? Please indicate the rung number where you think your family stood/stands, relative to other people in the country.

**Scale:** 1 = [highest rung on ladder]; 10 = [lowest rung on ladder]

*Subjective Social Class (Current; Adler et al., 2000)*

**Item:** Think of this ladder as representing where people stand currently in the United States. At the top of the ladder are the people who are best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—those who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Where would you place your family on this ladder? Please indicate the rung number where you think you stand, relative to other people in the United States.

**Scale:** 1 = [highest rung on ladder]; 10 = [lowest rung on ladder]

*Zip Code (Childhood)*

**Item:** Please provide the zip code in which your childhood home was located. This is a 5-digit number. If you do not remember your childhood zip code, please report the city in which grew up in. If you lived in several locations, please use the location you lived in longest.

*Zip Code (Current)*

**Item:** Please provide the zip code in which your current home is located. This is a 5-digit number. If you do not remember your current zip code, please report the city in which you live in.

*Childhood Neighborhood*

**Item:** Which of the following best describes the type of neighborhood where you have lived for the majority of your life?

**Scale:** 1 = Rural; 2 = Suburban; 3 = Small City; 4 = Big City

*Race/Ethnic Group Identification*

Item: What racial/ethnic group do you most identify with? Please select from the following categories. You will have the opportunity to provide your own nuanced identity in the next question.

Scale: 1 = *American Indian or Alaska Native*; 2 = *Asian*; 3 = *Black or African American*; 4 = *Hispanic or Latino*; 5 = *Native Hawaiian or Other Pacific Islander*; 6 = *White or European American*; 7 = *Other*; 8 = *Multi-racial/Mixed*; 9 = *I prefer not to answer*

*Race Open*

Item: What is your racial/ethnic group identification? You can provide any response that best describes you.

*Gender*

Item: What is your gender/sex?

Scale: 1 = *Male*; 2 = *Female*; 3 = *Other*; 4 = *I prefer not to answer*

*Age*

Item: What is your current age (in years)?

*Birthplace*

Item: Where were you born?

Scale: 1 = *United States*; 2 = *Other*; 3 = *I prefer not to answer*

*Years in US*

Item: How many years have you lived in the United States?

*English First Language*

Item: Is English your first language

Scale: 1 = *Yes*; 2 = *No*

*English Fluency*

Item: How fluent are you in English?

Scale: 1 = *Not At All*; 7 = *Extremely*

## **Appendix C: Study 3 Intervention Materials and Measures**



## Pluralistic Ignorance Intervention

### *No Intervention*

\* Participants did not review any intervention materials in this condition.

### *Combined Pluralistic Ignorance Lesson and Misperception Correction*

\* Participants reviewed all intervention materials described below in this condition.

### *Pluralistic Ignorance Lesson (Intervention Material)*

In the first part of this study, we would like to take a moment to tell you a bit about our research:

Some of our research investigates **pluralistic ignorance**, and we would like to take this unique opportunity to teach you about it!

IMAGINE THIS SITUATION:

1. You are student in a classroom and the professor is lecturing about a difficult concept.
2. You do not understand the lesson.
3. You consider raising your hand to ask a question, but first look around to see if anyone else is confused.
4. No other hands are raised! You conclude that no one else is confused and decide *not* to raise your hand.

Most of us have been in that situation. BUT, what happens when *everyone in the class* did the same thing?:

1. *Everyone* was confused.
2. *Everyone* considered raising their hand.
3. *Everyone* saw that no one else had their hand raised.
4. *Everyone* assumed this meant no one else was confused.
5. *Everyone* decided not to raise their hand.

This situation, where everyone came to a mistaken conclusion about others' attitudes, beliefs, and feelings, is **pluralistic ignorance**.

In other words, **people mistakenly believed others' thoughts were different from their own, when in reality, everyone was thinking and feeling similarly.**

**In response, people acted in line with their *incorrect* perceptions and were reluctant to raise their hand.**

Here's another example of pluralistic ignorance:

**Drinking example: Students *incorrectly* view other students as having more positive attitudes toward alcohol use than they actually do.** In reality, however, everyone has *less* positive attitudes toward alcohol use than students think they do. In response, students drink more alcohol and display more positive attitudes toward alcohol to “fit in,” even if they do not actually have those desires or opinions.

In fact, pluralistic ignorance occurs quite often. Researchers have also found individuals to misperceive others’ attitudes toward sexual behavior (“others seem to think cheating is okay”), climate change (“other people must not be that concerned about climate change”), prejudice (“others don't seem to want members of that group in our club”), and bullying (“others don't seem to care about how that kid is being treated”), among many other topics.

With this in mind, **we hope that you consider the ways in which these misperceptions could have an unwanted influence on your own thoughts and behaviors!**

*Pluralistic Ignorance Lesson (Comprehension Questions)*

**Item:** Based on the information provided, what is the definition of pluralistic ignorance?

**Scale:** 1 = *A situation where everyone incorrectly perceives other people as being different from themselves, and they act in line with the incorrect (wrong) perception;* 2 = *A situation where everyone correctly perceives other people as being different from themselves, and they act in line with the correct (accurate) perception;* 3 = *A situation where everyone incorrectly perceives other people as being different from themselves, but they act in line with their own attitudes and desires regardless.*

**Item:** Imagine a situation where a person is concerned about a dog wandering alone in a park. The person looks around to see if others are concerned, but no one appears to be concerned. In reality, everyone is concerned, and they all have mistakenly perceived the attitudes of others. Based on the information provided about pluralistic ignorance, what would the person do?

**Scale:** 1 = *Go help the dog;* 2 = *Not help the dog in order to fit in with others;* 3 = *Begin approaching others to see if they are in fact not concerned.*

**Item:** Imagine a situation where a person wants to intervene in a bullying situation. The person looks around to see if others want to intervene too. The person then decides not to intervene. Based on the information provided about pluralistic ignorance, what did the person see/conclude when they looked at others?

**Scale:** 1 = *No one seemed as though they wanted to intervene, so they must not be concerned;* 2 = *No one seemed as though they wanted to intervene, so they must be concerned like me;* 3 = *Others seemed as though they wanted to intervene.*

*Misperception Correction (Intervention Material)*

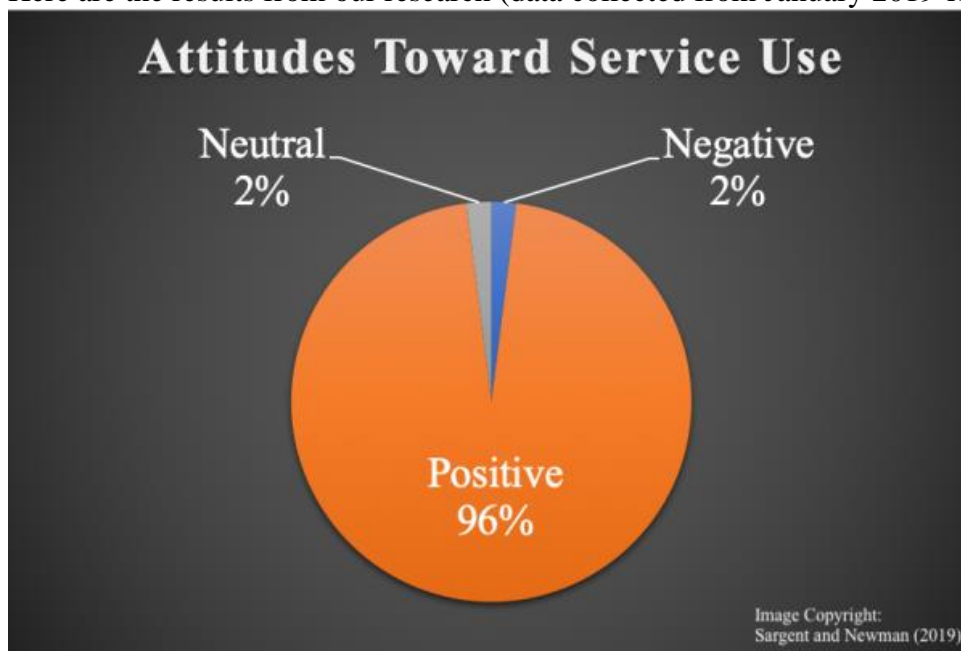
In the first part of the study, we would like to take a moment to tell you a bit about our research:

Over the past year we have been researching **attitudes toward mental health services among college students**, and we found that students tend to have fairly favorable attitudes toward mental health services!

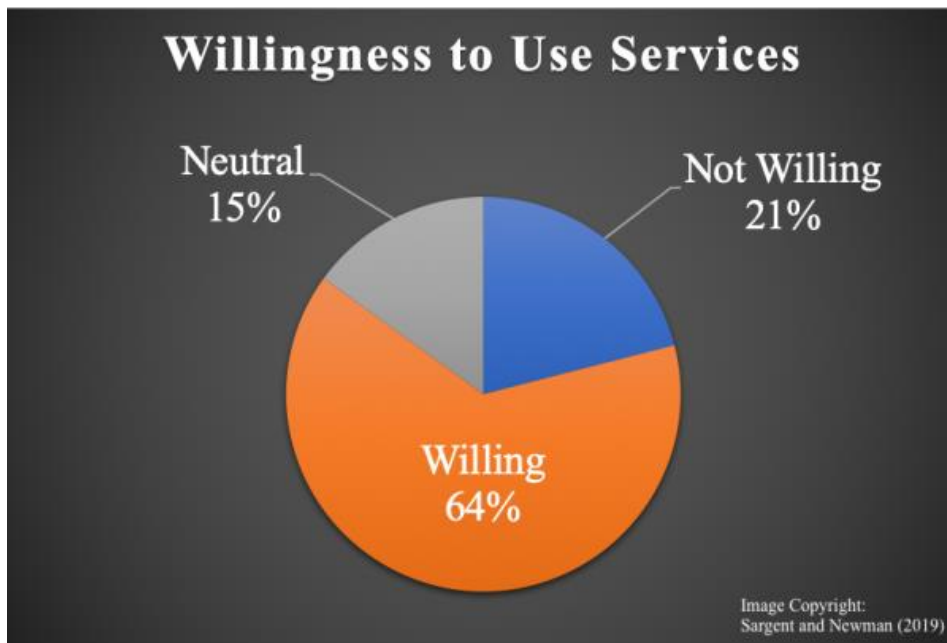
Students report having positive attitudes toward the use of mental health services—that is, they do not think poorly of people for using mental health services. For example, they agree with the statement, “I would willingly accept someone who has received mental health treatment as a close friend.”

Students also report being fairly willing to use mental health services for many reasons, including relationship problems and anxiety.

Here are the results from our research (data collected from January 2019-March 2019):



**Explanation:** As you can see, people report favorable attitudes toward mental health service use, and do not think poorly of people who use mental health services—**over 95%** of students report having positive attitudes toward mental health service use.



**Explanation:** As you can see, people are fairly willing to use services—**almost two-thirds** of the students surveyed indicated that they would be willing to use mental health services for a variety of reasons.

**It is clear that most students have favorable attitudes toward mental health services.** With this in mind, we hope that you have better insight into other college students' attitudes toward mental health services!

#### *Misperception Correction (Comprehension Questions)*

**Item:** Based on the information provided, did college students have mostly favorable, neutral, or unfavorable attitudes toward mental health services?

**Scale:** 1 = *Favorable*; 2 = *Neutral*; 3 = *Unfavorable*

**Item:** Based on the information provided, what percentage of students reported having positive attitudes toward mental health service use?

**Scale:** 1 = *under 10%*; 2 = *about 50%*; 3 = *over 95%*

**Item:** Based on the information provided, what proportion of students were willing to use services?

**Scale:** 1 = *less than one-third*; 2 = *about one-half*; 3 = *almost two-thirds*

### **Willingness to Use Mental Health Services (adapted from Karaffa & Koch, 2016)**

Instructions: Please respond to the following questions about your willingness to use mental health services (e.g., counseling). / Please respond to the following questions about your perception of other students' willingness to use mental health services (e.g., counseling).

Items: I would want to use mental health services if . . . / Other students would want to use mental health services if . . .

1. I were experiencing problems in my family relationships. / They were experiencing problems in their family relationships.
2. I were experiencing problems in my romantic relationship(s). / They were experiencing problems in their romantic relationship(s).
3. I were experiencing problems with my friendship(s). / they were experiencing problems with their friendship(s).
4. I were experiencing depression. / They were experiencing depression.
5. I were experiencing problems with substance abuse (e.g., drug and/or alcohol). / They were experiencing problems with substance abuse (e.g., drug and/or alcohol).
6. I were experiencing physical symptoms due to stress. / They were experiencing physical symptoms due to stress.
7. I were experiencing post traumatic stress disorder (PTSD). / They were experiencing post traumatic stress disorder (PTSD).
8. I were struggling academically. / They were struggling academically.
9. I were experiencing problems with my finances. / They were experiencing problems with their finances.
10. I were experiencing anxiety. / They were experiencing anxiety.

Scale (for all items): 1 = *Very Unwilling*; 2 = *Unwilling*; 3 = *Somewhat Unwilling*; 4 = *Neutral*; 5 = *Somewhat Willing*; 6 = *Willing*; 7 = *Very Willing*

### **Mental Health Service Use Stigma (adapted Healthy Minds Network, 2019)**

Instructions: How much do you agree with the following statements? / How much do you agree with the following statements about other students?

Items (reverse-score items are identified with an asterisk):

1. \* I would willingly accept someone who has received mental health treatment as a close friend. / Most students would willingly accept someone who has received mental health treatment as a close friend.
2. I feel that receiving mental health treatment is a sign of personal failure. / Most students feel that receiving mental health treatment is a sign of personal failure.
3. I would think less of a person who has received mental health treatment. / Most students would think less of a person who has received mental health treatment.
4. \* I believe that people who use mental health services can significantly benefit from the services they receive. / Most students believe that people who use mental health services can significantly benefit from the services they receive.
5. I believe that people who use mental health services are unstable and/or dangerous. / Most students believe that people who use mental health services are unstable and/or dangerous.

Scale (for all items): 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Somewhat Disagree*; 4 = *Somewhat Agree*; 5 = *Agree*; 6 = *Strongly Agree*

### **Service Use Interest (experimenter generated and adapted from Prentice & Miller, 1993)**

#### *Friend Support*

Instructions: Please indicate the likelihood that you would partake in the following behaviors if one of your close friends began experiencing distress.

Items:

1. Suggest to your friend that they should consider using mental health services.
2. Assist your friend in accessing information about mental health services.
3. Accompany your friend in getting to mental health services, such as driving them or walking with them.

Scale (for all items): 1 = *Very Unlikely*; 2 = *Unlikely*; 3 = *Somewhat Unlikely*; 4 = *Neutral*; 5 = *Somewhat Likely*; 6 = *Likely*; 7 = *Very Likely*

#### *Campaign Support*

Instructions: A group of students on your campus are asking the university to administer a university-wide campaign on mental health service use awareness. In the event that you did decide to help this group, please respond to the following questions about this effort:

Item: How many flyers in support of this campaign would you be willing to go out and post?

Scale (in increments of 10): 1 = *0 flyers*; 11 = *100 or more flyers*

Item: How much of your time would you be willing to spend promoting this campaign?

Scale (in increments of 1): 1 = *no time*; 7 = *6 or more hours*

### *Information Interest*

**Item:** How interested would you be in receiving information about mental health services available to you?

**Scale:** 1 = *not at all interested*; 2 = *slightly interested*; 3 = *moderately interested*; 4 = *very interested*; 5 = *extremely interested*

### **Mental Health Service Use (Healthy Minds Network, 2019)**

#### *Use of Therapy or Counseling Services*

**Item:** Have you ever received counseling or therapy for mental health concerns?

**Scale:** 1 = *No, never*; 2 = *Yes, prior to starting college*; 3 = *Yes, since starting college*; 4 = *Yes, both of the above (prior to college and since starting college)*

**Item:** How many total visits or sessions for counseling or therapy have you had in the past 12 months?

**Scale:** 0 = 0; 1 = 1-3; 2 = 4-6; 3 = 7-9; 4 = 10 or more

**Item:** Think about your use of mental health services over the past year. How often have you used a mental health service?

**Scale:** 1 = *Never*; 2 = *Monthly*; 3 = *2-4 times a month*; 4 = *2-4 times a week*; 5 = *4 or more times a week*

**Item:** Are you currently receiving counseling or therapy?

**Scale:** 1 = *Yes*; 2 = *No*

#### *Barriers to Service Use*

**Instructions:** In the past 12 months, which of the following factors have caused you to receive fewer services (counseling, therapy, or medication) for your mental or emotional health than you would have otherwise received? (Select all that apply)

#### **Items:**

1. No need for services
2. Financial reasons (too expensive, not covered by insurance)
3. Not enough time
4. Not sure where to go
5. Difficulty finding an available appointment
6. Prefer to deal with issues on my own or support from family/friends
7. Other (please specify)
8. No barriers

### **Depression (i.e., the PHQ-9; Kroenke et al., 2001)**

Instructions: Over the past 2 weeks, how often have you been bothered by the following problems?

Items:

1. Little interest or pleasure in doing things.
2. Feeling down, depressed, hopeless.
3. Trouble falling or staying asleep or sleeping too much.
4. Feeling tired or having little energy.
5. Poor appetite or overeating.
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down.
7. Trouble concentrating on things, such as reading the newspaper or watching television.
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual.
9. Thoughts that you would be better off dead, or of hurting yourself in some way.

Scale (for all items): 0 = *Not at all*; 1 = *Several days*; 2 = *More than half the days*; 3 = *Nearly every day*

### **Personal Mental Illness**

Item: Do you identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

### **Family Mental Illness**

Item: Does at least one person in your family identify as having a mental illness?

Scale: 1 = *Yes*; 2 = *No*; 3 = *I prefer not to answer*

### **Medication Use**

Item: Are you currently taking prescription medication for your mental health?

Scale: 1 = *Yes*; 2 = *No*



### Need to Belong Scale (Leary et al., 2013)

Instruction: Please indicate the degree to which each statement is true or characteristic of yourself.

Items (reverse-score items are identified with an asterisk):

1. \* If other people don't seem to accept me, I don't let it bother me
  2. I try hard not to do things that will make other people avoid or reject me
  3. \* I seldom worry about whether other people care about me
  4. I need to feel that there are people I can turn to in times of need
  5. I want other people to accept me
  6. I do not like being alone
  7. \* Being apart from my friends for long periods of time does not bother me
  8. I have a strong "need to belong"
  9. It bothers me a great deal when I am not included in other people's plans
  10. My feelings are easily hurt when I feel that others do not accept me
- Scale: 1 = *Not At All*; 2 = *Slightly*; 3 = *Moderately*; 4 = *Very*; 5 = *Extremely*

### Classroom Performance

Item: What is your GPA as of last semester—that is, what is your GPA not including the classes you are currently taking? As a reminder, your GPA is an average of the GPA weights associated with the letter grades you receive in your courses. For example, letter grades might have the following GPA weights, which would be averaged across your courses: A = 4.0; A- = 3.6666; B+ = 3.3333; B = 3.0; B- = 2.6666; C+ = 2.3333; C = 2.0; C- = 1.6666; D = 1.0; D- = .666; F = 0.

### Demographic Questionnaire

#### *College Year*

Item: What is your year in college?

Scale: 1 = *Freshman*; 2 = *Sophomore*; 3 = *Junior*; 4 = *Senior*; 5 = *Other (with open)*

#### *College Type*

Item: What best describes the type of college you attend?

Scale: 1 = *Community or Junior College*; 2 = *Historically Black College or University*; 3 = *Liberal Arts College*; 4 = *Women's College*; 5 = *Tribal College*; 6 = *Technical Institute or Professional School*; 7 = *University*; 8 = *Other (with open)*

#### *College Location/Format*

Item: Where do you take your courses?

Scale: 1 = *Completely on-campus*; 2 = *Mix of on-campus and online*; 3 = *Completely online*

*Political Affiliation (American National Election Studies, 2019)*

Item: Here is a 7-point scale on which political views that people might hold are arranged from extremely liberal to extremely conservative. Where would you place yourself on this scale, or haven't you thought about this much?

Scale: 1 = *Extremely Liberal*; 2 = *Liberal*; 3 = *Slightly Liberal*; 4 = *Moderate, Middle of the Road*; 5 = *Slightly Conservative*; 6 = *Conservative*; 7 = *Extremely Conservative*; 8 = *Don't Know, Haven't Thought*

*Objective Social Class (Current)*

Item: Please indicate the category that would best describe your current family annual income.

Scale: 1 = < \$15,000; 2 = 15,000-25,000; 3 = 25,001-35,000; 4 = 35,001-50,000; 5 = 50,001-75,000; 6 = 75,001-100,000; 7 = 100,001-150,000; 8 = > \$150,001

*Subjective Social Class (Current; Adler et al., 2000)*

Item: Think of this ladder as representing where people stand currently in the United States. At the top of the ladder are the people who are best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—those who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Where would you place your family on this ladder? Please indicate the rung number where you think you stand, relative to other people in the United States.

Scale: 1 = [highest rung on ladder]; 10 = [lowest rung on ladder]

*Zip Code (Current)*

Item: Please provide the zip code in which your current home is located. This is a 5-digit number. If you do not remember your current zip code, please report the city in which you live in.

*Childhood Neighborhood*

Item: Which of the following best describes the type of neighborhood where you have lived for the majority of your life?

Scale: 1 = *Rural*; 2 = *Suburban*; 3 = *Small City*; 4 = *Big City*

*Race/Ethnic Group Identification*

Item: What racial/ethnic group do you most identify with? Please select from the following categories. You will have the opportunity to provide your own nuanced identity in the next question.

Scale: 1 = *American Indian or Alaska Native*; 2 = *Asian*; 3 = *Black or African American*; 4 = *Hispanic or Latino*; 5 = *Native Hawaiian or Other Pacific Islander*; 6 = *White or European American*; 7 = *Other*; 8 = *Multi-racial/Mixed*; 9 = *I prefer not to answer*

*Race Open*

Item: What is your racial/ethnic group identification? You can provide any response that best describes you.

*Gender Identity*

Item: What is your gender identity?

Scale: 1 = *Man*; 2 = *Woman*; 3 = *Non-binary/Gender Fluid*; 4 = *I prefer a different term (with open)*; 5 = *I prefer not to answer*

*Age*

Item: What is your current age (in years)?

*Birthplace*

Item: Where were you born?

Scale: 1 = *United States*; 2 = *Other*; 3 = *I prefer not to answer*

*Years in US*

Item: How many years have you lived in the United States?

*English First Language*

Item: Is English your first language

Scale: 1 = *Yes*; 2 = *No*

*English Fluency*

Item: How fluent are you in English?

Scale: 1 = *Not At All*; 7 = *Extremely*

## References

- Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. *Health Psychology, 19*(6), 586-592.  
<https://doi.org/10.1037//0278-6133.19.6.586>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Springer.
- Allport, F. H. (1924). *Social psychology*. Houghton-Mifflin.
- American National Election Studies. (2019, September 4). *User's guide codebook for the ANES 2016 time series study* [PDF file]. [https://electionstudies.org/wp-content/uploads/2018/12/anes\\_timeseries\\_2016\\_userguidecodebook.pdf](https://electionstudies.org/wp-content/uploads/2018/12/anes_timeseries_2016_userguidecodebook.pdf)
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monterio, M. G. (2001). *The Alcohol Use Disorders Identification Test (AUDIT): Guidelines for use in primary care* (2<sup>nd</sup> ed.). Department of Mental Health and Substance Dependence, World Health Organization.  
[https://apps.who.int/iris/bitstream/handle/10665/67205/WHO\\_MSD\\_MSB\\_01.6a-eng.pdf?sequence=1&isAllowed=y](https://apps.who.int/iris/bitstream/handle/10665/67205/WHO_MSD_MSB_01.6a-eng.pdf?sequence=1&isAllowed=y)
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>
- Beusenbergh, M., & Orley, J. (1994). *A user's guide to the Self-Reporting Questionnaire (SRQ)*. Division of Mental Health, World Health Organization.  
<https://apps.who.int/iris/handle/10665/61113>

- Birnbaum, H. G., Kessler, R. C., Kelley, D., Ben-Hamadi, R., Joish, V. N., & Greenberg, P. E. (2010). Employer burden of mild, moderate, and severe major depressive disorder: mental health services utilization and costs, and work performance. *Depression and Anxiety, 27*(1), 78-89. <https://doi.org/10.1002/da.20580>
- Boon, S. D., Watkins, S. J., & Sciban, R. A. (2014). Pluralistic ignorance and misperception of social norms concerning cheating in dating relationships. *Personal Relationships, 21*(3), 482–496. <https://doi.org/10.1111/pere.12044>
- Bourgeois, M. J., & Bowen, A. (2001). Self-organization of alcohol-related attitudes and beliefs in a campus housing complex: An initial investigation. *Health Psychology, 20*(6), 434–437. <https://doi.org/10.1037//0278-6133.20.6.434>
- Brière, F. N., Rohde, P., Seeley, J. R., Klein, D., & Lewinsohn, P. M. (2014). Comorbidity between major depression and alcohol use disorder from adolescence to adulthood. *Comprehensive Psychiatry, 55*(3), 526-533. <https://doi.org/10.1016/j.comppsy.2013.10.007>
- Burton, W. N., Schultz, A. B., Chen, C., & Edington, D. W. (2008). The association of worker productivity and mental health: A Review of the literature. *International Journal of Workplace Health Management, 1*(2), 78-94. <https://doi.org/10.1108/17538350810893883>
- Buzinski, S. G., Clark, J., Cohen, M., Buck, B., & Roberts, S. P. (2018). Insidious assumptions: How pluralistic ignorance of studying behavior relates to exam performance. *Teaching of Psychology, 45*(4), 333–339. <https://doi.org/10.1177/0098628318796919>

- Cage, E., Stock, M., Sharpington, A., Pitman, E., & Batchelor, R. (2020). Barriers to accessing support for mental health issues at university. *Studies in Higher Education, 45*(8), 1637-1649. <https://doi.org/10.1080/03075079.2018.1544237>
- Chen, J., Rizzo, J. A., & Rodriguez, H. P. (2011). The health effects of cost-related treatment delays. *American Journal of Medical Quality, 26*(4), 261-271. <https://doi.org/10.1177/1062860610390352>
- Clement, S., Schauman, O., Graham, F., Maggioni, F., Evans-Lacko, S., Bezborodovs, N., Morgan, C., Rüsch, N., Brown, J. S. L., & Thornicroft, G., (2015). What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychological Medicine, 45*(1), 11-27. <https://doi.org/10.1017/s0033291714000129>
- Conley, C. S., Durlak, J. A., & Dickson, D. A. (2013). An evaluative review of outcome research on universal mental health promotion and prevention programs for higher education students. *Journal of American College Health, 61*(5), 286-301. <https://doi.org/10.1080/07448481.2013.802237>
- Crosby, J. R., King, M., & Savitsky, K. (2014). The minority spotlight effect. *Social Psychological and Personality Science, 5*(7), 743–750. <https://doi.org/10.1177/1948550614527625>

- Drake, R. J., Husain, N., Marshall, M., Lewis, S. W., Tomenson, B., Chaudhry, I. B., Everard, L., Singh, S., Freemantle, N., Fowler, D., Jones, P. B., Amos, T., Sharma, V., Green, C. D., Fisher, H., Murray, R. M., Wykes, T., Buchan, I., & Birchwood, M. (2020). Effect of delaying treatment of first-episode psychosis on symptoms and social outcomes: a longitudinal analysis and modelling study. *The Lancet Psychiatry*, 7(7), 602–610. [https://doi.org/10.1016/S2215-0366\(20\)30147-4](https://doi.org/10.1016/S2215-0366(20)30147-4)
- Ebert, D. D., Mortier, P., Kahlke, F., Bruffaerts, R., Baumeister, H., Auerbach, R. P., Alonso, J., Vilagut, G., Martínez, K. U., Lochner, C., Cuijpers, P., Kuechler, A., Green, J., Hasking, P., Lapsley, C., Sampson, N. A., Kessler, R., & WHO World Mental Health-International College Student Initiative collaborators (2019). Barriers of mental health treatment utilization among first-year college students: First cross-national results from the WHO World Mental Health International College Student Initiative. *International Journal of Methods in Psychiatric Research*, 28(2), 1-14. <https://doi.org/10.1002/mpr.1782>
- Eisenberg, D., Downs, M. F., Golberstein, E., Zivin, K. (2009). Stigma and help seeking for mental health among college students. *Medical Care Research and Review*, 66(5), 522-541. <https://doi.org/10.1177/1077558709335173>
- Eisenberg, D., Hunt, J., Speer, N., & Zivin, K. (2011). Mental health service utilization among college students in the United States. *The Journal of Nervous and Mental Disease*, 199(5), 301-308. <https://doi.org/10.1097/nmd.0b013e3182175123>
- Eisenberg, D., & Lipson, S. K. (2019). *The Healthy Minds Study: 2018-2019 data report*. Healthy Minds Network. [https://healthymindsnetwork.org/wp-content/uploads/2019/09/HMS\\_national-2018-19.pdf](https://healthymindsnetwork.org/wp-content/uploads/2019/09/HMS_national-2018-19.pdf)

- Eisenberg, D., & Lipson, S. K. (2020). *The Healthy Minds Study: 2019 Fall data report*. Healthy Minds Network. [https://healthymindsnetwork.org/wp-content/uploads/2020/08/f2019\\_HMS\\_national\\_final.pdf](https://healthymindsnetwork.org/wp-content/uploads/2020/08/f2019_HMS_national_final.pdf)
- Eva, A. L. (2019, January 11). *How colleges today are supporting student mental health*. Greater Good Science Center. [https://greatergood.berkeley.edu/article/item/how\\_colleges\\_today\\_are\\_supporting\\_student\\_mental\\_health](https://greatergood.berkeley.edu/article/item/how_colleges_today_are_supporting_student_mental_health)
- Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology, 43*(4), 522–527. <https://doi.org/10.1037/h0076760>
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.
- Flave-Novak, D. E., & Coleman, J. M. (2019). Pluralistic ignorance of physical attractiveness in the gay male community. *Journal of Homosexuality, 66*(14), 2002-2020. <https://doi.org/10.1080/00918369.2018.1522811>
- Foster, D. W., Neighbors, C., & Krieger, H. (2015). Alcohol evaluations and acceptability: Examining descriptive and injunctive norms among heavy drinkers. *Addictive Behaviors, 42*, 101-107. <https://doi.org/10.1016/j.addbeh.2014.11.008>
- Gaddis, S. M, Ramirez, D., & Hernandez, E. L. (2018). Contextualizing public stigma: Endorsed mental health treatment stigma on college and university campuses. *Social Science and Medicine, 197*, 183-191. <https://doi.org/10.2139/ssrn.2978228>
- Geiger, N., & Swim, J. K. (2016). Climate of silence: Pluralistic ignorance as a barrier to climate change discussion. *Journal of Environmental Psychology, 47*, 79–90. <https://doi.org/10.1016/j.jenvp.2016.05.002>



- Goffman, E. (1963). *Stigma; notes on the management of spoiled identity*. Prentice Hall.
- Gronholm, P. C., Henderson, C., Deb, T., & Thornicroft, G. (2017). Interventions to reduce discrimination and stigma: The state of the art. *Social Psychiatry and Psychiatric Epidemiology*, 52, 249-258. <https://doi.org/10.1007/s00127-017-1341-9>
- Halbesleben, J. R. B. (2009). The role of pluralistic ignorance in the reporting of sexual harassment. *Basic and Applied Social Psychology*, 31(3), 210–217. <https://doi.org/10.1080/01973530903058284>
- Hays, R. D., Merz, J. F., & Nicholas, R. (1995). Response burden, reliability, and validity of the CAGE, Short MAST, and AUDIT alcohol screening measures. *Behavioral Research Methods, Instruments & Computers*, 27(2), 277-280. <https://doi.org/10.3758/bf03204745>
- Healthy Minds Network (2019). *The Healthy Minds Study (HMS): Questionnaire modules* [Questionnaire modules for academic year 2019-2020]. [https://healthymindsnetwork.org/wp-content/uploads/2019/09/HMS-Questionnaire\\_19-20-1.pdf](https://healthymindsnetwork.org/wp-content/uploads/2019/09/HMS-Questionnaire_19-20-1.pdf)
- Humeniuk, R., Ali, R., Babor, T. F., Farrell, M., Formigoni, M. L., Jittiwutikarn, J., de Lacerda RB, Ling W, Marsden J, Monteiro M, Nhiwatiwa S, Pal H, Poznyak V, & Simon, S. (2008). Validation of the alcohol, smoking and substance involvement screening test (ASSIST). *Addiction*, 103(6), 1039-1047. <https://doi.org/10.1111/j.1360-0443.2007.02114.x>

- Humeniuk R., Ali, R., & World Health Organization ASSIST Phase II Study Group (2006). *Validation of the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and pilot brief intervention [electronic resource]: A technical report of phase II findings of the WHO ASSIST Project*. World Health Organization.  
<https://apps.who.int/iris/handle/10665/43504>
- Hunt, J., & Eisenberg, D. (2010). Mental health problems and help-seeking behavior among college students. *Journal of Adolescent Health, 46*(1), 3-10.  
<https://doi.org/10.1016/j.jadohealth.2009.08.008>
- Jané-Llopis, E., & Matytsina, I. (2006). Mental health and alcohol, drugs and tobacco: A review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug and Alcohol Review, 25*(6), 515-536.  
<https://doi.org/10.1080/09595230600944461>
- Jimenez, D. E., Bartels, S. J., Cardenas, V., & Alegría, M. (2013). Stigmatizing attitudes toward mental illness among racial/ethnic older adults in primary care. *International journal of geriatric psychiatry, 28*(10), 1061–1068. <https://doi.org/10.1002/gps.3928>
- Katz, D., & Allport, F. H. (1931). *Student attitudes: A report of the Syracuse University research study*. Craftsman Press.
- Karaffa, K. M., & Koch, J. M. (2016). Stigma, pluralistic ignorance, and attitudes toward seeking mental health services among police officers. *Criminal Justice and Behavior, 43*(6), 759–777. <https://doi.org/10.1177/0093854815613103>
- Karaffa, K. M., & Tochkov, K. (2013). Attitudes toward seeking mental health treatment among law enforcement officers. *Applied Psychology in Criminal Justice, 9*(2), 75-99.  
[http://dev.cjcenter.org/\\_files/apcj/apcjspring%202013karaffa.pdf\\_1383836355.pdf](http://dev.cjcenter.org/_files/apcj/apcjspring%202013karaffa.pdf_1383836355.pdf)

- Kessler, R. C., Amminger, G. P., Aguilar-Gaxiola, S., Alonso, J., Lee, S., & Ustun, T. B. (2007). Age of onset of mental disorders: a review of recent literature. *Current Opinion in Psychiatry*, 20(4), 359-364. <https://doi.org/10.1097/yco.0b013e32816ebc8c>
- Kessler, R. C., Demler, O., Frank, R. G., Ofelson, M., Pincus, H. A., Walters, E. E., Wang, P., Wells, K. B., & Zaslavsky, A. M. (2005). Prevalence and treatment of mental disorders, 1990 to 2003. *The New England Journal of Medicine*, 352(24), 2515-2523. <https://doi.org/10.1056/nejmsa043266>
- Keum, B. T., Hill, C. E., Kivlighan, D. M., & Lu, Y. (2018). Group- and individual-level self-stigma reductions in promoting psychological help-seeking attitudes among college students in helping skills courses. *Journal of Counseling Psychology*, 65(5), 661–668. <https://doi.apa.org/doi/10.1037/cou0000283>
- Krech, D., & Crutchfield, R. S. (1948). *Theory and problems of social psychology (1st ed.)*. McGraw-Hill Book Co.
- Krendl, A. C., & Pescosolido, B. A. (2020). Countries and cultural differences in the stigma of mental illness: The East–West divide. *Journal of Cross-Cultural Psychology*, 51(2), 149–167. <https://doi.org/10.1177/0022022119901297>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. W. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16, 606-613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Kypri, K., & Maclellan, B. (2011). Commentary on Melson et al (2011): Pluralistic ignorance is probably real but important questions remain about its relation to drinking and role in intervention. *Addiction*, 106(6), 1085–1086. <https://doi.org/10.1111/j.1360-0443.2011.03457.x>

- Lally, J., ó Conghaile, A., Quigley, S., Bainbridge, E., & McDonald, C. (2013). Stigma of mental illness and help-seeking intention in university students. *The Psychiatrist, 37*(8), 253–260. <https://doi.org/10.1192/pb.bp.112.041483>
- Lambert, T. A., Kahn, A. S., & Apple, K. J. (2003). Pluralistic ignorance and hooking up. *Journal of Sex Research, 40*(2), 129–133. <https://doi.org/10.1080/00224490309552174>
- Latalova, K., Kamaradova, D., & Prasko, J. (2014). Perspectives on perceived stigma and self-stigma in adult male patients with depression. *Neuropsychiatric Disease and Treatment, 10*, 1399-1405. <https://doi.org/10.2147/ndt.s54081>
- Leary, M. R., Kelly, K. M., Cottrell, C. A., & Schreindorfer, L. S. (2013). Construct validity of the Need to Belong Scale: Mapping the nomological network. *Journal of Personality Assessment, 95*(6), 610-624. <https://doi.org/10.1080/00223891.2013.819511>
- LeViness, P., Gorman, K., Braun, L., Koenig, L., Bershad, C. (2020). *The Association for University and College Counseling Center Directors annual survey: 2019*. Association for University and College Center Directors. <https://www.aucccd.org/assets/documents/Survey/2019%20AUCCCD%20Survey-2020-05-31-PUBLIC.pdf>
- Levitan, L. C., & Verhulst, B. (2016). Conformity in groups: The effects of others' views on expressed attitudes and attitude change. *Political Behavior, 38*(2), 277–315. <https://doi.org/10.1007/s11109-015-9312-x>
- Link, B. G. (1987). Understanding labeling effects in the area of mental disorders: An assessment of the effects of expectations of rejection. *American Sociological Review, 52*(1), 96-112. <https://doi.org/10.2307/2095395>

- Link, B. G., Cullen, F., Struening, E., Shrout, P., & Dohrenwend, B. (1989). A modified labeling theory approach to mental disorders: An empirical assessment. *American Sociological Review*, *54*(3), 400-423. <https://doi.org/10.2307/2095613>
- Lipson, S. K., & Eisenberg, D. (2018). Mental health and academic attitudes and expectations in university populations: Results from the Healthy Minds Study. *Journal of Mental Health*, *27*(3), 205-213. <https://doi.org/10.1080/09638237.2017.1417567>
- Mandeville, A., Halbesleben, J., & Whitman, M. (2016). Misalignment and misperception in preferences to utilize family-friendly benefits: Implications for benefit utilization and work–family conflict. *Personnel Psychology*, *69*(4), 895–929. <https://doi.org/10.1111/peps.12124>
- Miller, D. T., & McFarland, C. (1991). When social comparison goes awry: The case of pluralistic ignorance. In J. Suls & T. Wills (Eds.), *Social comparison: Contemporary theory and research* (pp. 287-313). Lawrence Erlbaum.
- Miyajima, T., & Yamaguchi, H. (2017). I want to but I won't: Pluralistic ignorance inhibits intentions to take paternity leave in Japan. *Frontiers in Psychology*, *8*, 1-12. <https://doi.org/10.3389/fpsyg.2017.01508>
- Munsch, C. L., Ridgeway, C. L., & Williams, J. C. (2014). Pluralistic ignorance and the flexibility bias: Understanding and mitigating flextime and flexplace bias at work. *Work and Occupations*, *41*(1), 40–62. <https://doi.org/10.1177/0730888413515894>
- Munsch, C. L., Weaver, J. R., Bosson, J. K., & O'Connor, L. T. (2018). Everybody but me: Pluralistic ignorance and the masculinity contest. *Journal of Social Issues*, *74*(3), 551–578. <https://doi.org/10.1111/josi.12282>

- Oswalt, S. B., Lederer, A. M., & Chestnut-Steich, K. (2019). Who is willing to come back? College students' willingness to seek help after using campus mental health services. *Journal of American College Health, 67*(1), 10-16.  
<https://doi.org/10.1080/07448481.2018.1462818>
- Pace, K., Silk, K., Nazione, S., Fournier, L., & Collins-Eaglin, J. (2018). Promoting mental health help-seeking behavior among first-year college students. *Health Communication, 33*(2), 102-110. <https://doi.org/10.1080/10410236.2016.1250065>
- Parcesepe, A. M., & Cabassa, L. J. (2013). Public stigma of mental illness in the United States: A systematic literature review. *Administration and Policy in Mental Health and Mental Health Services Research, 40*, 384–399. <https://doi.org/10.1007/s10488-012-0430-z>
- Pedersen, E., & Paves, A. P. (2014). Comparing perceived public stigma and personal stigma of mental health treatment seeking in a young adult sample. *Psychiatry Research, 219*(1), 143-150. <https://doi.org/10.1016/j.psychres.2014.05.017>
- Perkins, D. O., Gu, H., Boteva, K., & Lieberman, J. A. (2005). Relationship between duration of untreated psychosis and outcome in first-episode schizophrenia: A critical review and meta-analysis. *American Journal of Psychiatry, 162*(10), 1785–1804.  
<https://doi.org/10.1176/appi.ajp.162.10.1785>
- Pompeo-Fargnoli, A. (2020). Mental health stigma among college students: Misperceptions of perceived and personal stigmas. *Journal of American College Health*. Advance online publication. <https://doi.org/10.1080/07448481.2020.1784904>

- Post, R. M., Leverich, G. S., Kupka, R. W., Keck, P. E., Jr., McElroy, S. L., Altshuler, L. L., Frye, M. A., Luckenbaugh, D. A., Rowe, M., Grunze, H., Suppes, T., & Nolen, W. A. (2010). Early-onset bipolar disorder and treatment delay are risk factors for poor outcome in adulthood. *The Journal of Clinical Psychiatry, 71*(7), 864-872.  
<https://doi.org/10.4088/JCP.08m04994ye1>
- Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: Some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology, 64*(2), 243-256. <https://doi.org/10.1037//0022-3514.64.2.243>
- Priester, J. R., Petty, R. E., & Park, K. (2007). Whence univalent ambivalence? From the anticipation of conflicting reactions. *Journal of Consumer Research, 34*(1), 11–21.  
<https://doi.org/10.1086/513042>
- Prince, M., Patel, V., Saxena, S., Maj, M., Maselko, J., Philips, M. R., & Rahman, A. (2007). No health without mental health. *Lancet, 370*(9590), 859-877. [https://doi.org/10.1016/s0140-6736\(07\)61238-0](https://doi.org/10.1016/s0140-6736(07)61238-0)
- Quinn, D. M., & Earnshaw, V. A. (2011). Understanding concealable stigmatized identities: The role of identity in psychological, physical, and behavioral outcomes. *Social Issues and Policy Review, 5*(1), 160–190. <http://dx.doi.org/10.1111/j.1751-2409.2011.01029.x>
- Rammstedt, B., & Krebs, D. (2007). Does response scale format affect the answering of personality scales?: Assessing the Big Five dimensions of personality with different response scales in a dependent sample. *European Journal of Psychological Assessment, 23*(1), 32–38. <https://doi.org/10.1027/1015-5759.23.1.32>

- Rinker, D. V., Young, C. M., Krieger, H., Lembo, J., & Neighbors, C. (2017). Evaluations and perceptions of others' evaluations of negative alcohol-related consequences predict negative alcohol-related consequences among college drinkers. *Journal of Studies on Alcohol and Drugs*, 78(2), 249–257. <https://doi.org/10.15288/jsad.2017.78.249>
- Sandstrom, M. J., & Bartini, M. (2010). Do perceptions of discrepancy between self and group norms contribute to peer harassment at school? *Basic and Applied Social Psychology*, 32(3), 217–225. <https://doi.org/10.1080/01973533.2010.495645>
- Sandstrom, M., Makover, H., & Bartini, M. (2013). Social context of bullying: Do misperceptions of group norms influence children's responses to witnessed episodes? *Social Influence*, 8(2–3), 196–215. <https://doi.org/10.1080/15534510.2011.651302>
- Sargent, R. H., & Newman, L. S. (2021). Pluralistic ignorance research in psychology: A scoping review of topic and method variation and directions for future research. *Review of General Psychology*. Advance online publication. <https://doi.org/10.1177/1089268021995168>
- Sassenberg, K., & Ditrich, L. (2019). Research in social psychology changed between 2011 and 2016: Larger sample sizes, more self-report measures, and more online studies. *Advances in Methods and Practices in Psychological Science*, 2(2), 107-114. <https://doi.org/10.1177/2515245919838781>
- Schanck, R. L. (1934). A study of change in institutional attitudes in a rural community. *The Journal of Social Psychology*, 5(1), 121–128. <https://doi.org/10.1080/00224545.1934.9921592>



- Schat, A. C. H., Kelloway, E. K., & Desmarais, S. (2005). The Physical Health Questionnaire (PHQ): Construct validation of a self-report scale of somatic symptoms. *Journal of Occupational Health Psychology, 10*(4), 363-381. <https://doi.org/10.1037/1076-8998.10.4.363>
- Scheier, M. F., & Carver, C. S. (1985). The Self-Consciousness Scale: A revised version for use with general populations. *Journal of Applied Social Psychology, 15*(8), 687-699. <https://doi.org/10.1111/j.1559-1816.1985.tb02268.x>
- Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: Systematic review and meta-analysis. *The British Journal of Psychiatry, 210*(4), 261-268. <https://doi.org/10.1192/bjp.bp.116.189464>
- Schroeder, C. M., & Prentice, D. A. (1998). Exposing pluralistic ignorance to reduce alcohol use among college students. *Journal of Applied Social Psychology, 28*(23), 2150–2180. <https://doi.org/10.1111/j.1559-1816.1998.tb01365.x>
- Segrist, D. J., Corcoran, K. J., Jordan-Fleming, M. K., & Rose, P. (2007). Yeah, I drink...but not as much as other guys: The majority fallacy among male adolescents. *North American Journal of Psychology, 9*(2), 307–320. <http://najp.us/>
- Slutske, W. S. (2005). Alcohol use disorders among US college students and their non-college-attending peers. *Archives of General Psychiatry, 62*(3), 321-327. <https://doi.org/10.1001/archpsyc.62.3.321>

- Stanley, I. H., Hom, M. A., & Joiner, T. E. (2018). Modifying mental health help-seeking stigma among undergraduates with untreated psychiatric disorders: A pilot randomized trial of a novel cognitive bias modification intervention. *Behaviour Research and Therapy, 103*, 33-42. <https://doi.org/10.1016/j.brat.2018.01.008>
- Substance Abuse and Mental Health Services Administration. (2020). *Key substance use and mental health indicators in the United States: Results from the 2019 National Survey on Drug Use and Health (HHS Publication No. PEP20-07-01-001, NSDUH Series H-55)*. Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/>
- van der Westhuizen, C., Wyatt, G., Williams, J. K., Stein, D. J., & Sorsdahl, K. (2016). Validation of the Self Reporting Questionnaire 20-item (SRQ-20) for use in low- and middle-income country emergency centre setting. *International Journal of Mental Health and Addiction, 14*, 37-48. <https://doi.org/10.1007/s11469-015-9566-x>
- Van Grootel, S., Van Laar, C., Meeussen, L., Schmader, T., & Sczesny, S. (2018). Uncovering pluralistic ignorance to change men's communal self-descriptions, attitudes, and behavioral intentions. *Frontiers in Psychology, 9*, 1-12. <https://doi.org/10.3389/fpsyg.2018.01344>
- Vidourek, R. A., King, K. A., Nabors, L. A., & Merianos, A. L. (2014). Students' benefits and barriers to mental health help-seeking. *Health Psychology and Behavioral Medicine: An Open Access Journal, 2*(1), 1009-1022. <https://doi.org/10.1080/21642850.2014.963586>
- Vogel, D. L., Bitman, R. L., Hammer, J. H., & Wade, N. G. (2013). Is stigma internalized? The longitudinal impact of public stigma on self-stigma. *Journal of Counseling Psychology, 60*(2), 311–316. <https://doi.org/10.1037/a0031889>

- Wang, P. S., Berglund, P., Olfson, M., Pincus, H. A., Wells, K. B., & Kessler, R. C. (2005). Failure and delay in initial treatment contact after first onset of mental disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 603-613. <https://doi.org/10.1001/archpsyc.62.6.603>
- Wang, P.S., Lane, M., Olfson, M., Pincus, H. A., Wells, K. B., & Kessler, R. C. (2005). Twelve-month use of mental health services in the United States: Results from the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 629-640. <https://doi.org/10.1001/archpsyc.62.6.629>
- WHO ASSIST Working Group. (2002). The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): Development, reliability, and feasibility. *Addiction*, *97*(9), 1183-1194. <https://doi.org/10.1046/j.1360-0443.2002.00185.x>
- Williams, K. D. (1997). Social ostracism. In R. Kowalski (Ed.), *Aversive interpersonal behaviors* (pp. 133-170). Plenum.
- World Health Organization. (2020). *The ASSIST screening test version 3.0 and feedback card*. [https://www.who.int/substance\\_abuse/activities/assist\\_test/en/](https://www.who.int/substance_abuse/activities/assist_test/en/)
- Wu, I. H. C., Bathje, G. J., Kalibatseva, Z., Sung, D., Leong, F. T. L., & Collins-Eaglin, J. (2017). Stigma, mental health, and counseling service use: A person-centered approach to mental health stigma profiles. *Psychological Services*, *14*(4), 490–501. <https://doi.org/10.1037/ser0000165>
- Yang, K. G., Rodgers, C. R. R., Lee, E., & Lê Cook, B. (2020). Disparities in mental health care utilization and perceived need among Asian Americans: 2012-2016. *Psychiatric Services*, *71*(1), 21-27. <https://doi.org/10.1176/appi.ps.201900126>

Zhu, D. H., & Westphal, J. D. (2011). Misperceiving the beliefs of others: How pluralistic ignorance contributes to the persistence of positive security analyst reactions to the adoption of stock repurchase plans. *Organization Science*, 22(4), 869–886.  
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### **FELLOWSHIPS, GRANTS, AND AWARDS:**

#### Fellowships:

- Summer Dissertation Fellowship**, Syracuse University 2020  
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#### External Research Grants:

- Association for Psychological Science Student Grant Competition (\$500)** 2020  
 Project Title: *Pluralistic Ignorance of Attitudes Toward Mental Health Services Among College Students*

#### Internal Travel Grants:

- Graduate Student Organization Travel Grant**, Syracuse University 2019-2020  
 Project Title: *Pluralistic Ignorance of Attitudes Toward Mental Health Services Among College Students*
- Graduate Student Organization Travel Grant**, Syracuse University 2018-2019  
 Project Title: *An Investigation of Emotional and Evaluative Implicit Associations with Police Using Four Versions of the Implicit Association Test*
- Graduate Student Organization Travel Grant**, Syracuse University 2017-2018  
 Project Title: *Priming Police: Implicit Safety and Fear Construct Activation among Civilians*
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**FELLOWSHIPS, GRANTS, AND AWARDS CONTINUED:**Awards:

<b>SPSP Graduate Travel Award</b> , Society for Personality and Social Psychology	2018
<b>Outstanding Teaching Assistant Award</b> , Syracuse University	2018
<b>Certificate in University Teaching</b> , Syracuse University	2018
<b>William H. Mackaness Psychology Award</b> , Shippensburg University of Pennsylvania	2016

**PEER REVIEWED PUBLICATIONS:**Published Journal Articles:

**Sargent, R. H.**, & Newman, L. S. (in press). Attitudes toward guns and mental illness stigma among college students in the United States. *American Journal of Orthopsychiatry*.

**Sargent, R. H.**, & Newman, L. S. (2021). Pluralistic ignorance research in psychology: A scoping review of topic and method variation and directions for future research. *Review of General Psychology*. Advance online publication.  
<https://doi.org/10.1177/1089268021995168>

**Sargent, R. H.**, & Newman, L. S. (2020). Conservatism and attitudinal ambivalence: Investigating conflicting findings. *Personality and Individual Differences*. Advance online publication. <https://doi.org/10.1016/j.paid.2020.109996>

**Sargent, R. H.**, Caselli, A. J., Machia, L. V., & Newman, L. S. (2020). General perceptions of police mediate relationships between police contact and anticipated police behavior in imagined roadside encounters. *Current Psychology*. Advance online publication.  
<https://doi.org/10.1007/s12144-020-00952-5>

Newman, L. S., & **Sargent, R. H.** (2020). Liberals report lower levels of attitudinal ambivalence than conservatives. *Social Psychological and Personality Science*. Advance online publication. <https://doi.org/10.1177%2F1948550620939798>

**Sargent, R. H.**, & Newman, L. S. (2020). An investigation of civilian implicit attitudes toward police officers. *Journal of Police and Criminal Psychology*, 35, 360-376.  
<https://doi.org/10.1007/s11896-019-09330-9>

Ren, Z., **Sargent, R. H.**, Griffith, J. D., Adams, L. T., Kline, E., & Hughes, J. (2019). A cross-cultural investigation of early memories using Amazon's Mechanical Turk: Comparing the early memories of American and Indian turkers. *Journal of Cognition and Culture*, 19(1-2), 59-77. <https://doi.org/10.1163/15685373-12340056>

Griffith, J. D., Gasse, M., Hart, C. L., Adams, L. T., & **Sargent, R.** (2018). A cross sectional view of fear of death and dying among skydivers. *Omega: Journal of Death and Dying*, 77(2), 173 -187. <https://doi.org/10.1177/0030222815600178>

Published Journal Articles Continued:

Aberizk, K., Newman, L. S., & **Sargent, R. H.** (2017). Attributional complexity and the illusory correlation: A test of the inverted-U hypothesis. *North American Journal of Psychology*, 19(3), 601-620. <https://doi.org/10.1037/e580612007-001>

Shawver, Z., Griffith, J. D., Adams, L. T., Evans, J., Benchoff, B., & **Sargent, R.** (2015). An examination of the WHOQOL-BREF using four popular data collection methods. *Computers in Human Behavior*, 55, 446-454. <https://doi.org/10.1016/j.chb.2015.09.030>

Published Chapters:

Winer, E. S., Newman, L. S., & **Sargent, R. H.** (2020). Defensive Processes. In Dunn, D. S. (Ed.), *Oxford Bibliographies in Psychology*. New York: Oxford University Press.

**PROFESSIONAL CONFERENCE PRESENTATIONS:**

*Note. Authors designated with an asterisk (\*) are mentored undergraduate researchers.*

International:

**Sargent, R. H.**, Newman, L. S., & \*Pedroza, E. A. (2021, February). *Addressing Pluralistic Ignorance: An Experimental Study Assessing Intervention Components*. Poster presented at the 2021 Society for Personality and Social Psychology Virtual Annual Convention.

\*McArdle, K. L., \*Pedroza, E. A., **Sargent, R. H.**, & Newman, L. S. (2021, February). *Attitudes Toward Guns and Mental Illness Stigma in the United States*. Poster presented at the 2021 Society for Personality and Social Psychology Virtual Annual Convention.

\*Pedroza E. A., **Sargent, R. H.**, & Newman, L. S. (2021, February). *Substance Use Among College Students as Related to Mental Health and Service Use: The Differential Roles of Alcohol and Cannabis in an At-risk Population*. Poster presented at the 2021 Society for Personality and Social Psychology Virtual Annual Convention.

**Sargent, R. H.**, & Newman, L. S. (2020, February). *Pluralistic Ignorance of Attitudes Toward Mental Health Services Among College Students*. Poster presented at the Attitudes and Social Influence Preconference for the 2020 Society for Personality and Social Psychology Annual Convention, New Orleans, LA.

\*Cosgrove, A. J., \*McArdle, K. L., & **Sargent, R. H.** (2020, February). *Stigma, Health, and Willingness to Use Mental Health Services*. Poster presented at the 2020 Society for Personality and Social Psychology Annual Convention, New Orleans, LA.

**Sargent, R. H.**, & Newman, L. S. (2019, February). *An Investigation of Emotional and Evaluative Implicit Associations with Police Using Four Versions of the Implicit Association Test*. Poster presented at the 2019 Society for Personality and Social Psychology Annual Convention, Portland, OR.

International Continued:

Caselli, A., **Sargent, R. H.**, Newman, L. S., VanderDrift, L. E., & \*Murphy-Stanley, A. B. (2019, February). *Changes in Anticipated Police Officer Behavior in the Presence of White or Black Civilians*. Poster will be presented at the 2019 Society for Personality and Social Psychology Annual Convention, Portland, OR.

**Sargent, R. H.**, & Newman, L. S. (2018, March). *Priming Police: Implicit Safety and Fear Construct Activation among Civilians*. Poster presented at the 2018 Society for Personality and Social Psychology Annual Convention, Atlanta, GA.

Corsbie-Massay, C. L., & **Sargent, R. H.** (2018, March) *A Methodological Review of Selfie Studies in Social Psychology*. Poster presented at the 2018 Society for Personality and Social Psychology Annual Convention, Atlanta, GA.

**Sargent, R. H.**, Huber, K., & VanderDrift, L. (2017, July). *Emotional Disclosure and Trait Self-Control: Implications for Relationship and Basic Need Satisfaction*. Poster presented at the 2017 International Association for Relationship Research Mini-Conference, Syracuse, NY.

**Sargent, R.**, & Griffith, J. (2016, May). *Time Allocation and Sexual Behavior Differences between Collegiate Female Volleyball Athletes and Non-Athletes*. Poster presented at the Association for Psychological Science Convention, Chicago, IL.

**Sargent, R.**, & Griffith, J. (2015, May). *Perceived Pressures and Time Allocation Differences among NCAA Female Volleyball Athletes*. Poster presented at the Association for Psychological Science Convention, New York, NY.

Seibert, A., & **Sargent, R.** (2015, May). *Attachment and Friendship: The Mediating Role of Peer Competence*. Poster Presented at the Association for Psychological Science Convention, New York, NY.

Regional:

**Sargent, R. H.**, & Newman, L. S. (2019, May). *An Investigation of Implicit Associations with Police Using Four Modified Versions of the Implicit Association Test*. Talk presented at the Social Psychologists Around Western New York Conference, Syracuse, NY.

\*Cosgrove, A., & **Sargent, R. H.** (2019, May). *Stigma, Mental Health, and Willingness to use Mental Health Services*. Poster presented at the Social Psychologists Around Western New York Conference, Syracuse, NY.

\*Mendez, N. R., & **Sargent, R. H.** (2019, May). *Perceptions of Police: An Examination of Power and Trust*. Poster presented at the Social Psychologists Around Western New York Conference, Syracuse University, Syracuse, NY.



Regional Continued:

\*Guzman, I., & **Sargent, R. H.** (2018, May). *Investigation of the Police Prototype in the United States*. Poster presented at the Social Psychologists Around Western New York Conference, Buffalo, NY.

**Sargent, R. H.**, & Newman, L. (2017, August). *Civilian Attitudes Toward Police: Assessing Safety and Fear Construct Activation*. Talk presented at the Social Psychologists Around Western New York Conference, Rochester, NY.

**Sargent, R.**, & Zaccagnini, C. (2015, November). *Investigation of Perceived Accessibility among Shippensburg University Students with Disabilities and the Impact on University Students and of Secondary Students Transitioning to College Settings*. Poster presented at the Pennsylvania Association Council for Exceptional Children 56<sup>th</sup> Annual Convention, Harrisburg, PA.

**Sargent, R.**, & Griffith, J. (2015, March). *Coach Influences on Daily Stressors Among NCAA Female Volleyball Athletes*. Poster presented at the Eastern Psychological Association Conference, Philadelphia, PA.

**TEACHING EXPERIENCE:**Instructor of Record:

**Laboratory in Social Psychology**, Syracuse University Jan. 2021-Present

- Instructor of Record for course (14 students; primarily Junior/Senior-level)
- Developed hybrid course, including the syllabus, pre-recorded asynchronous lectures, in-person and group-based activities and assignments, and examinations
- Delivered lectures and activities (activities and topics included research methods in social psychology, critical analysis of social psychological research, design and execution of social psychological replication study, etc.)

**Introduction to Research Methodology**, Syracuse University May-Jun. 2018; 2019

- Instructor of Record for course (28 students; primarily Junior/Senior-level)
- Developed course, including the syllabus, lectures (4 sessions per week), activities, assignments, and examinations
- Delivered lectures and activities (activities and topics included in-class lab sessions, correlational study design, implementation, and analyses, experimental methods, ethics in psychological research, etc.)

**Social Psychology**, Syracuse University Jul.-Aug. 2017

- Instructor of Record for course (12 students; Sophomore/Junior/Senior-level)
- Developed course, including the syllabus, lectures, activities, assignments, and examinations
- Delivered weekly lectures and activities (activities and topics included in-class demonstrations, social cognition, social influence, group processes, prejudice, etc.)

**TEACHING EXPERIENCE CONTINUED:**Teaching Assistant:

**Social Psychology**, Syracuse University Aug. 2020-Dec. 2020

- Supervisors: Dr. Leonard Newman and Dr. Laura Machia
- Primary instructor for four online discussion sections (~190 students; Sophomore/Junior/Senior-level)
- Presented weekly online lectures and activities (activities and topics included in-class demonstrations, discussions and review sessions, social cognition, person perception, cross-cultural psychology, social influence, etc.)

**Introduction to Research Methodology**, Syracuse University Aug. 2017-May 2018  
Aug. 2018-May 2019

- Supervisors: Dr. Amy Criss and Dr. Michael Kalish
- Primary instructor for twelve laboratory sections (~240 students; Junior/Senior-level)
- Executed weekly lectures and activities (activities and topics included observational study design and implementation, correlational study design, implementation, and analyses, experimental methods, ethics in psychological research, etc.)

**Foundations of Human Behavior**, Syracuse University Aug. 2016-May 2017

- Supervisor: Dr. Shannon Houck
- Primary instructor for seven recitation sections (~175 students; Freshman/Sophomore-level)
- Developed and presented weekly lectures and activities (activities and topics included in-class demonstrations and discussions, sensation and perception, learning, human memory, motivation and emotion, personality, etc.)

Guest Lecturer:

**Foundations of Human Behavior**, Syracuse University Feb. 2020

- Instructor: Dr. Meredith Martin
- Presented lecture on *Learning: Classical and Operant* (~1200 students; Freshman/Sophomore-level)

**Social Psychology**, Syracuse University Feb. 2019

- Instructor: Dr. Stanislav Treger
- Lectured on *Social Influence* (~100 students; Sophomore/Junior/Senior-level)

**Introduction to Research Methodology**, Syracuse University Feb. 2018

- Instructor: Dr. Amy Criss
- Lectured on *Descriptive Statistics* (~120 students; Junior/Senior-level)

Guest Lecturer Continued:**Introduction to Research Methodology**, Syracuse University Feb. 2018

- Instructor: Dr. Amy Criss
- Lectured on *Sampling Procedures in Psychological Research* (~120 students; Junior/Senior-level)

**Personality**, Syracuse University Nov. 2016

- Instructor: Dr. Stanislav Treger
- Lectured on *Intelligence and Personality* (~100 students; Sophomore/Junior/Senior-level)

Invited Course and Program Panelist:**Psychology Research Initiative in Diversity Enhancement Program**, Syracuse University Jun. 2020

- Panelists: **Rikki H. Sargent**, Tanya Eckert, Jessie Joyce, Catherine Cornwell, and Avery Albert
- Panel on *Curriculum Vitae and Resumes* in a mentored summer research experience program for psychology majors from underrepresented groups in science

**Race, Gender, and Media**, Syracuse University Jan. 2019

- Panelists: **Rikki H. Sargent**, Diane R. Wiener, Jason Harris, Kate Jean Corbett Pollack, and Bud Buckout
- Panel on *Representation of Disability and Ability in the Media* in a Sophomore/Junior/Senior-level seminar

**TEACHING AND PROFESSIONAL DEVELOPMENT:****Faculty Diversity, Equity, Inclusion, and Accessibility Workshop Series**, Center for Teaching and Learning Excellence, Syracuse University Jan. 2020-Aug. 2020

- Received training on issues of diversity, equity, inclusion, and access as they relate to the college classroom
- Workshop series included training on addressing bias, establishing civility, problematizing identity and intersectionality, increasing transparent teaching, and navigating challenges of diversity in the classroom context
- Awarded a Certificate of Completion for the workshop series (August 2020)

**WiSE Future Professionals Program (FPP)**, Syracuse University Oct. 2017-May 2019

- Received training to prepare women for careers in STEM fields through professional development seminars, professional portfolio development, coaching/mentoring experience, etc.

**TEACHING AND PROFESSIONAL DEVELOPMENT CONTINUED:**

**Future Professoriate Program (FPP),** Syracuse University

Sep. 2017-May 2019

- Faculty Liaison: Dr. Shannon Houck
- Received training targeted to prepare students for future faculty positions
- Awarded a Certificate in University Teaching upon completion of the program requirements (May 2018)

**PROFESSIONAL AFFILIATIONS:**

Society for Personality and Social Psychology (SPSP)

Association for Psychological Science (APS)

Society for the Teaching of Psychology (STP)

**PROFESSIONAL AND UNIVERSITY SERVICE:**

Service to the Field:

**Ad Hoc Reviewer-** *Journal of Black Studies*

**Reviewer-** 2020 Association for Psychological Science Student Research Award

**Writing Group Moderator-** 2020 Society for Personality and Social Psychology Student Committee Writing Group

Service to the University:

**Committee Member-** *2020-2021 Selection Committee for the Laura J. and L. Douglas Meredith Professorship of Teaching Excellence*, Syracuse University Oct. 2020-Present

- Member of the committee responsible for reviewing nomination letters, teaching-related project proposals, teaching portfolios, and curriculum vitae (with emphasis on teaching-related activity and service)
- The committee will recommend Meredith Professorship award recipients to the Chancellor
- The 2020-2021 Meredith Professorship Program uniquely recognizes faculty demonstrating excellence and innovation in teaching across modalities (online, hybrid, and/or mixed-modality environments)

Service to the University Continued:

**Research Analytics Intern-** *The Barnes Center at the Arch,* Jul. 2020-Present  
Syracuse University

- Analyzed consumer data and developed user reports, assessment summaries, and data visualizations for the Barnes Center's Tk20 assessment and accreditation, where assessment and accreditation reports highlighted utilization and success of recreation services (all services), and, more specifically, the personal training program, esports lounge, and the pet therapy program
- Data mined counseling and health provider data to create weekly utilization reports and data visualizations (using Tableau and R)
- Directly supported the Assistant Director of Health Analytics in providing consulting services to university stakeholders regarding data collection, data analysis, and interpretation of research findings, and independently provided consultation services to the Assistant Director of Health Promotion on survey development and data collection using Qualtrics
- Directly supported the Assistant Directors of Health Analytics and Health Promotion in the development and facilitation of semi-structured interview focus groups designed to gain key insights into MindSpa consumer needs, satisfaction, and service use trends, and leveraged qualitative data obtained from focus groups to highlight areas for growth and provide recommendations on strategies to enhance consumer satisfaction and engagement

**Committee Member-** *Committee for Diversity and Inclusion,* Jul. 2020-Present  
Syracuse University

- Member of the graduate student committee responsible for creating programming and initiatives aimed at fostering inclusive and supportive environments within the Psychology Doctoral Programs
- Collaborated with departmental leadership, including the Department Chair and members of the faculty Departmental Diversity and Inclusion Committee, and the broader department to achieve shared goals of diversity and inclusion and enhance diversity-related policies and procedures within the department

**Committee Member-** *Student Marketing Advisory Committee,* Oct. 2018-Present  
Syracuse University

- Member of the student advising body to Dara Royer, the Senior Vice President and Chief Marketing Officer for the Division of Marketing and Communications at Syracuse University
- Provided guidance on strategies to effectively communicate with prospective and current undergraduate and graduate students

Service to the University Continued:

**150<sup>th</sup> Celebration Graduate Student Organization Featured Event Taskforce Chair-** *Graduate Student Organization, Syracuse University* Oct. 2018-Present

- Formed and chaired taskforce (over \$36,000 event)
- Led the development of the application for the 150<sup>th</sup> Celebration Graduate Student Organization Featured Event, which solicited multiple applications from graduate student teams
- Facilitated the planning of the event in close collaboration with the team winners, taskforce members, and the Graduate Student Organization Executive Board

**Committee Member-** *Student Health Insurance Program Oversight Advisory Committee, Syracuse University* Oct. 2018-Present

- Effectively collaborated with leaders of the Graduate School, including the Dean and Associate Dean, to oversee a successful graduate health insurance transition

**Travel Grant Reviewer and Co-Chair-** *Graduate Student Organization, Syracuse University* Sep. 2018-Present

- Reviewed graduate student grant applications on criteria including ability to clearly and concisely present work to a lay audience, opportunity for professional development, and quality of recommendation letter
- Awarded travel grant funding according to the aforementioned criteria in collaboration with other reviewers

**Senator At-Large-** *Graduate Student Organization, Syracuse University* May 2018-Present

- Participated as a voting Senator At-Large in Graduate Student Organization monthly meetings and business
- Worked closely with the Graduate Student Organization Executive Board, committee chairs, and fellow Senators to determine funding for graduate student events and programming, assess and respond to graduate student needs, and promote graduate student intellectual, emotional, and physical well-being

**Committee Member-** *Sesquicentennial Celebration Steering Committee, Syracuse University* Nov. 2017-Present

- Member of the university steering committee to oversee and prepare for the Sesquicentennial Celebration
- Effectively communicated with steering committee chairs, the Dean of the Graduate School, and the Executive Board of the Graduate Student Organization to organize graduate-student related activities and events for the celebration, including the newly formed Graduate Dean's Award for Excellence in Research and Creative Work and the associated award event

Service to the University Continued:

**Committee Member-** *Psychology Action Committee*, Syracuse University Aug. 2016-Present

- Member of the graduate student committee responsible for advocating on behalf of Psychology graduate students, providing academic and social programming for graduate students, and increasing collaboration across areas and specializations (Social, Cognitive, School, and Clinical)
- Assisted in the creation of a recurring graduate student data blitz series where graduate students present their research to gather feedback and increase collaboration across areas

**Teaching Mentor-** *Graduate School Teaching Assistant Orientation*, Syracuse University May-Aug. 2018; 2019; 2020

- Assisted in planning and development of the Teaching Assistant Orientation scheduling and programming
- Led small group sessions and provided direct advice and guidance regarding teaching technique to incoming Teaching Assistants
- Provided ease and comfort to first-year Teaching Assistants

**Speaker-** *2018/2019/2020 Teaching Assistant Orientation*, Syracuse University Aug. 2018; 2019; 2020

- Developed and presented session on *Creating Your Teaching Persona* in collaboration with Morgan Proulx, Kathleen Huber, and Rose Bell

**Secretary-** *Psychology Action Committee*, Syracuse University Oct. 2018-May 2019

- Maintained and distributed detailed meeting minutes to Psychology graduate students
- Enhanced communication between the Psychology graduate students and faculty/staff

**Speaker-** *Office of Professional and Career Development Programming*, Syracuse University Oct. 2018

- Developed and presented session on *Teaching Controversial Topics* in collaboration with Kathleen Huber

**Vice President of Internal Affairs-** *Graduate Student Organization*, Syracuse University Jul. 2017-May 2018

- Served as Chair of the Graduate Student Organization Senate and member of the Graduate Student Organization Executive Board
- Maintained the records of academic plans, Senators, and Graduate Student Organization committees
- Oversaw Graduate Student Organization committee activity and elected University Senators
- Managed the registration and maintained communication with Graduate Student Organization recognized student organizations
- Collaborated with leaders of the Graduate School, including the Dean of the Graduate School, to provide programming and services to graduate students and address graduate student needs, including issues related to stipends and health insurance

Service to the University Continued:

**Academic Program Senator-** *Graduate Student Organization,* Aug. 2016-May 2017  
Syracuse University

- Participated as a voting Senator in Graduate Student Organization monthly meetings and business
- Collaborated with the Graduate Student Organization Executive Board and fellow Senators to determine funding for graduate student events and programming and respond to graduate student needs

**Graduate Student Organization Representative-** *Psychology Action* Aug. 2016-May 2017  
*Committee,* Syracuse University

- Maintained communication between the Graduate Student Organization and the Psychology Action Committee
- Attended Graduate Student Organization monthly meetings on behalf of Psychology graduate students

**Program Assistant-** *Disability Studies Minor,* Shippensburg University Aug. 2014-May 2016  
of Pennsylvania

- Supervisor: Dr. Allison Carey, Disability Studies Minor Director and Professor of Sociology
- Coordinated and implemented events relating to Disability Studies
- Maintained enrollment records and organized Disability Studies Minor files and proposals