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Infographics on ADHD Literacy Promotion and Stigma Reduction

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Infographics on ADHD Literacy Promotion and Stigma Reduction

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Abstract

Infographics on ADHD Literacy Promotion and Stigma-Reduction

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Individuals with ADHD are discriminated against due to inaccurate and stereotypic information often published on media platforms. The scarcity of accurate and accessible content results in a lack of knowledge held by individuals, which can exacerbate stereotyping and prejudice. Thus, there is a need for the development and dissemination of comprehensible information related to ADHD that provide a more accurate portrayal of relevant problems, symptoms, and management tools.

In this dissertation, I sought to answer the following questions: (a) Does infographic-based psychoeducation increase mental health literacy associated with ADHD; and (b) Are infographics more effective than textually presented information at increasing ADHD knowledge and positive attitudes? One hundred forty-six students recruited through a university's Research Participation Program (RPP; *M* age = 21.06) reviewed either a series of three infographic- or text-based educational materials about ADHD. Participants completed a pre- and post-questionnaire to measure ADHD knowledge, attitudes, and social distance. Results indicated that participants' knowledge of ADHD significantly increased. Findings did not reveal a significant difference between the two psychoeducation methods on ADHD knowledge or stigma. Results did suggest a decrease in stigma for participants who themselves self-identified as having ADHD and an increase in knowledge for participants who knew someone with ADHD.

These findings highlight the role of personal connection with respect to an individual's openness to learn and correct misunderstandings toward ADHD. It may be that longer exposure to textual information and infographics would be needed to yield clearer effects. Future researchers and practitioners must continue to develop accessible, evidence-based interventions that integrate education and humanism to foster a greater understanding and acceptance of ADHD.

Keywords: ADHD, stigma, psychoeducation, infographic

Infographics on Literacy Promotion and Stigma-Reduction for ADHD

Individuals with learning-related conditions such as attention-deficit/hyperactivity disorder (ADHD) often experience a variety of challenges across multiple settings (e.g., academic, social; Ahlberg et al., 2023; Hinshaw et al., 2022; Loe & Feldman, 2007; Na & Mikami, 2018; Zentall, 1993). Beyond the unique and pervasive struggles experienced by individuals with ADHD, they frequently fall victim to public discrimination due to the presence of inaccurate, stereotypic, and stigmatizing information published on media platforms and in the "general lore" (Haft et al., 2022; Lebowitz, 2016; Law et al., 2007; Nguyen & Hinshaw, 2020), perpetuating negative judgments and precipitating public stigma. Moreover, even when accurate information is presented, an abundance of text–or that are accompanied by little relevant context–can adversely affect a reader's understanding of the content, thereby enabling subjective interpretation (Traboco et al., 2022) or prompting not fully comprehending relevant information (in the case of long essays, etc.) . The lack of easily accessible and digestible content results in a lack of knowledge held by individuals in the community, which can further exacerbate stereotype-based judgment and discrimination (Cheng et al., 2018; Nguyen & Hinshaw, 2020).

Although the media (e.g., social media, news sources, webpages) may contain important information about ADHD, content is often presented in a manner that lacks consideration for the diversity in knowledge or personal experiences of those with ADHD. Moreover, professional resources (e.g., informational pamphlets, guidebooks) and scientific literature often make use of clinical jargon and inaccessible language when describing mental-health-related conditions like ADHD, which can further obfuscate a reader's understanding (Campbell, 2021). Thus, there is a need for the development and dissemination of comprehensible psychoeducation that provides an accurate portrayal of relevant problems, symptoms, and management tools related to ADHD in a manner that is representative of individuals' lived experiences with the diagnosis. With such materials, along with other strategies to increase knowledge and social contact (e.g., Pettigrew, 1998), it is likely that public knowledge will increase and stereotyping, prejudice, and discrimination will decrease.

Approximately 75% of mental health conditions have their first onset by the age of 24 (Kessler et al., 2007). Thus, by an individual's college years, there is a high likelihood that they will have experienced a challenge related to their mental health, known an individual with a mental health condition, or both. Additionally, emerging adults (i.e., 18–26 years old) are the most likely of any age group to experience mental health challenges but they are the least likely to seek out treatment (National Institute of Mental Health, 2019). In fact, upwards of 50% fail to seek out support for their mental health-related challenges (Eisenberg et al., 2011; Fleary et al., 2022; Mental Health America, 2023). In conjunction with this disheartening lack of treatment-seeking for emerging adults, the average delay between an individual's first onset of symptoms and their first treatment-seeking attempt is 11 years (Wang et al., 2004). Given the importance and efficacy of timely intervention for conditions such as ADHD, a lack of adequate treatment, especially after an individual reaches emerging adulthood, can portend lifelong consequences.

As the lives of individuals—especially those in college and/or starting in the workforce—become more intertwined with advancements in technology and social media,

providing psychoeducation through such modalities may be a viable way of enhancing the accessibility of information dissemination. Indeed, recent exploration of *infographics* as a potential way to transit information has yielded promising results (Bicen & Beheshti, 2017; Ozdamli et al., 2016; Taspolat et al., 2017; see also the review of Naparin & Saad, 2017). Infographics involve the creative use of graphic visual images, data visualizations (e.g., charts and graphs), and concise and non-technical texts to create a system of information presentation that is both accessible and comprehensible to the general public. Furthermore, infographics are intended to be easily scalable, enabling researchers and other professionals to reach and connect with large communities. Although infographics have been used to transmit information in the field of education (Naparin & Saad, 2017), to my knowledge, this method has not been adequately extended to the teaching of psychological science, particularly in the arena of ADHD.

In this dissertation, I investigated the effectiveness of an infographic-based psychoeducation tool to increase knowledge and decrease negative attitudes and stigma toward ADHD. In the literature review, I first provide background information regarding ADHD. Then, I outline three hypotheses that may explain the lack of treatment-seeking behaviors for ADHD: a lack of adequate knowledge; a lack of access to treatment; and a high level of stigma toward ADHD. Third, I draw connections between the research on ADHD and interventions that have been developed to increase treatment-seeking by way of bolstering knowledge and reducing stigmatization. As such, I explore the research behind infographic-based interventions for the purpose of psychoeducation and the translation of psychological science in particular.

Attention-Deficit/Hyperactivity Disorder

ADHD, a neurodevelopmental disorder included in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013), is extensively researched and discussed in education and psychology. ADHD is marked by several diagnostic criteria, including a persistent pattern of inattention (i.e., failure to sustain attention for a designated amount of time) and/or hyperactivity and impulsivity (i.e., seeming to always be "on the go," performing thoughtless actions). Given that ADHD is the most commonly diagnosed neurodevelopmental disorder in children, with approximately 10% of youth in the United States receiving a diagnosis of ADHD by the end of adolescence (Centers for Disease Control and Prevention, 2020; Perou et al., 2013)—and with prevalence rates in the United States rising by 41% in the past decade (Hinshaw, 2018)—researchers have sought to understand factors that influence or are influenced by ADHD. Overall, ADHD increases an individual's risk for a number of impairments throughout their lifetime, including academic underachievement, problems in the workplace, relational challenges, internalizing and externalizing behavior, substance abuse, accidental injuries, and self-harm (see Hinshaw, 2018). In adulthood specifically, the presence of ADHD symptoms increases an individual's probability of divorce, marital turbulence, and workplace challenges (Babinski et al., 2011).

For many children, the diagnosis of ADHD persists into adulthood, even though its presentation may change (American Psychiatric Association, 2013) and more subtle (yet still impairing) issues related to inattention/poor executive functioning typically predominate (Hinshaw et al., 2022). Meta-analytic reviews of ADHD and its prevalence rates have indicated that nearly 70% of children diagnosed with ADHD manifest symptoms in adolescence, and up to 33% of individuals with child-diagnosed ADHD continue to present symptoms in adulthood

(Knies et al., 2020). Recent research reveals that, short of meeting full diagnostic criteria, the vast majority of young adults with childhood ADHD remain at or near the diagnostic threshold, often with a fluctuating course depending on situational factors and supports (Hinshaw et al., 2022; Sibley et al., 2022). In short, it is mythical to believe that ADHD is a childhood-only phenomenon.

Hogue and colleagues (2014) posited that ADHD persisting into adulthood often stems from inadequate treatment in childhood. Furthermore, adolescents who have not received effective treatment for ADHD symptoms are at an increased risk for substance use, accidental injuries, delinquency, low self-esteem, and poor social skills throughout adolescence and into adulthood (Barkley, 2008; Barry & Gaines, 2008; Hinshaw, 2018). Although it is evident that adolescents with ADHD struggle more in their day-to-day lives and are at a higher risk for psychopathology than other same-age individuals, there are empirically based methods that can be utilized to manage and mitigate the effects of ADHD (Charach et al., 2006; Hinshaw, 2018). Among the evidence-based approaches are pharmacological management, behavioral intervention (and cognitive-behavioral therapy for adults), and multimodal treatment (i.e., a combination of medication and behavioral therapy/CBT)--with the multimodal combination likely to portend better long-term functioning..

Despite the existence of evidence-based treatment strategies for the management of ADHD symptoms and related challenges, approximately 26% of children and adolescents with ADHD do not receive any treatment (Danielson et al., 2018), and far more receive treatments that do not qualify as evidence-based. Although research on ADHD and treatment rates in adult populations is scarce, so that specific treatment rates cannot be determined, it is probable that the percentage of adults who do not receive treatment is similar to or greater than that of children and adolescents. The discrepancy between identification and treatment-seeking illustrates the need to investigate why this gap exists—as a spur toward more effectively supporting adults with ADHD.

Knowledge Acquisition

Knowledge acquisition is a multifaceted construct that is heavily dependent on the contexts in which an individual is socialized. Researchers have posited that information can be learned through both direct and indirect methods, where *direct* knowledge acquisition refers to first-hand experience (e.g., possessing a mental health condition), and *indirect* knowledge acquisition refers to information passed from individual to individual (or even through reading) (Lockhart et al., 2017). Prior to technological advancements, indirect knowledge acquisition was heavily influenced by an individual's contacts with others in their social circle. In recent years, technology has increased exposure and access to indirect information exponentially, which is especially evident in younger generations (Lockhart et al., 2017). Because of the abundance of information present though technological platforms, the onus is on the consumer to filter out misinformation.

Psychologically based, indirect knowledge acquisition can occur through many modalities of media. However, the opportunity to consume more unbiased information largely occurs through the review of texts, such as theoretical and empirical written works published in scientific journals. Much information presented in scientific journals, despite being empirically driven and unbiased, is often filled with an excessive amount of jargon and data that are difficult

to interpret without expertise in the field. The result may be an individual's inability to grasp the content (Plavén-Sigray et al., 2017). Therefore, although there is a wealth of information present in the media, individuals likely struggle to readily access quality information with an absence of jargon. The lack of adequate access to quality information can disincentivize many from seeking out what is evidence-based, and rather consume what is most convenient. Furthermore, the dearth of understandable content can result in stereotyping and a continuous spread of misinformation.

In order for psychological scientists to maximize the potential of educational interventions, it is important to identify effective instructional strategies and incorporate them into the implementation process. Some neuroscientists posit that individuals learn best through a *dual-model* approach, which consists of information being presented through both auditory and visual channels (Mayer & Moreno, 2003). Moreover, research indicates that, in addition to identifying styles of learning, it is important for researchers to consider the cognitive load being demanded of an individual when consuming content. For example, teachers have been tasked with checking their course content for clarity in order to better support the learning of students, especially those with ADHD (Centers for Disease Control, 2022). For individuals with ADHD who struggle with reading comprehension, presenting information in a pictorial format may be especially beneficial (Sfiri et al., 2017).

Mental Health Stigma as a Barrier to Treatment Seeking

Researchers investigating mental health conditions have outlined imbalances among the existence of mental health challenges, related services, and the utilization of services (Pescosolido et al., 2008). For instance, only one-fourth (Danielson et al., 2018) to one-half of those diagnosed with ADHD receive treatment (Pescosolido et al., 2008). Moreover, racial discrepancies have been found in ADHD-related treatment-seeking, utilization, and adherence; Black, Asian, and Hispanic individuals are less likely to have access to and adhere to treatment than White individuals. The clear difference in treatment-seeking relative to the amount of individuals with a mental health condition highlights the need for accessible, equitable support (Yang et al., 2022).

To better understand the lack of treatment-seeking behaviors, researchers have posited that negative attitudes may contribute uniquely and significantly (Pescosolido et al., 2008). *Stigmatization* has been defined as a social judgment placed on members of groups deemed deviant or immoral (Martinez & Hinshaw, 2016; Nguyen & Hinshaw, 2020). Stigma originated from social psychology, where researchers have suggested that individuals in a society strongly desire to develop social groups and be a part of the in-group. Accordingly, stigma occurs when a symbolic threat toward the ingroup arises from members of an out-group (e.g., individuals having a diagnosis). Furthermore, stigma occurs when a group with social power (e.g., individuals without a diagnosis) chooses to discriminate against those in the out-group. Because stigma can affect individuals in multiple domains of life functioning, individuals with mental health conditions often attempt to conceal their condition to prevent othering (Pescosolido et al., 2008). The internalization of stigma can result in lowered self-esteem and feelings of shame, which have been seen to directly affect individuals' willingness to seek out treatment (Corrigan et al., 2004).

Social psychologists have outlined several specific components that drive mental health stigma. The first are *cues,* or inferences that individuals make about mental health based on characteristics such as symptoms, skill deficits, physical appearances, and labels, which can be assumed to exist through a formal diagnostic process. Individuals who are attuned to cues begin to develop internalized *stereotypes*, or quickly-generated, implicit, automatic ways of categorizing information related to mental health and diagnoses. Prejudices and discriminatory actions toward those with mental health conditions or identifying characteristics may occur as a result of stereotyping (Corrigan et al., 2004).

Stigma and ADHD

Whereas much of the mental health-related research on stigma has been broad in scope, less research has been conducted on ADHD in particular. In one study, conducted by Pescosolido and colleagues (2008), the researchers investigated the impact of several diagnostic labels (i.e., depression, ADHD, "daily troubles") on views held about such labels in a representative sample of adults in the United States. Findings revealed that ADHD was less likely to be labeled as a mental illness, yet it was viewed as serious in comparison to conditions such as depression. Many participants also indicated that ADHD could improve on its own (Lebowitz, 2016; Pescosolido et al., 2008). Other vignette-based research has suggested that those with ADHD are perceived by the public as less intelligent and more likely to take risks, which furthers the drive to maintain social distance from those with the diagnosis (Lebowitz, 2016).

Researchers have also investigated whether it is the diagnostic label or the behavioral symptoms related to ADHD that are more influential in the development of stigma. Meza and colleagues (2019) found that, for children, the presence of behavioral symptoms led to more negative attitudes, anger, and dehumanizing language about those with ADHD than the label itself. Other researchers have posited that the label alone results in stigmatization. For example, Nguyen and Hinshaw (2020) suggested that children with an ADHD diagnosis may be subject to increased discrimination by teachers who have lower expectations and levels of patience for those entering the classroom with the label. Other researchers have asserted that the label itself may serve as a protective factor, given that it provides an explanation for the presence of certain behavioral symptoms (Lebowitz, 2016). As evidenced by these conflicting findings, more research is necessary to further understand how the label and associated features of ADHD impact stigma, treatment seeking, and treatment adherence.

Types of Stigma

Per social psychology, individuals experience perceived pressure to conform with an in-group in order to gain social power. Furthermore, individuals presume that they will be ostracized if they are a member of an out-group, which further drives the desire to remain with the in-group, even at the cost of concealing aspects of their identities. As a response to such pressure, a general public dislike of and distrust toward those with mental health may emerge. *Public stigma* is defined as public discrimination toward an individual/group with a mental health condition(s). Public stigma is especially prevalent for ADHD, given that both the diagnosis and presentation of behavioral symptoms can elicit stereotyping (Corrigan et al., 2004).

Because of the public's negative perceptions about ADHD and associated behaviors, it is common that those with the diagnosis attempt to understate their challenges. An individual's

internalization of prejudices and discrimination related to a mental health condition is referred to as *self-stigma* (Cheng et al., 2018; Nguyen & Hinshaw, 2020). *Self-stigma* is a significant barrier to support-seeking for individuals with mental health and learning-related difficulties (Cheng et al., 2018), and those with high levels of self-stigma may experience feelings of shame, which can then lead them to conceal their condition (Corrigan et al., 2004). The hope is that self-stigma can be prevented or mitigated through quality psychoeducation and social relations with similar individuals, which promotes empathy and solidarity. Therefore, a method by which to clearly and concisely disseminate information is a promising next step in supporting individuals with and without ADHD to (a) reduce prejudice and discrimination; (b) overcome stigmatization; and (c) increase the likelihood of help-seeking behaviors (Campbell, 2021).

Those who personally identify with a condition are not the only individuals who experience the negative effects of mental health stigma. *Courtesy stigma* (also termed associated stigma; see Goffman, 1963) exists when members of an individual's close community (e.g., family members, friends) are discriminated against for their connection to an individual with out-group membership. Courtesy stigma can be particularly prevalent for parents and caregivers who experience high levels of self-blame, responsibility, and stress associated with their child's condition. In fact, parents have traditionally been blamed for causing such conditions as ADHD, autism spectrum disorders, and schizophrenia (e.g., Nguyen & Hinshaw, 2020). Additionally, professionals serving those with mental health conditions (e.g., mental health workers, teachers) may also experience courtesy stigma, which can result in altered perceptions and lowered expectations for their clients (Nguyen & Hinshaw, 2020). Thus, parents and professionals must be equipped with information to best support children and adolescents who experience mental health and learning-related challenges.

Contributors to Stigmatization

Researchers hoping to better understand the existence of mental health stigma have found that stigma can be attributed to a lack of knowledge and inadequate access to support (Nguyen & Hinshaw, 2020). First, inadequate public ADHD knowledge is exacerbated by both a lack of accessible information as well as misconceptions held by primary-care providers (Al-Ahmari et al., 2018; Murtani et al., 2020; Tatlow-Golden et al., 2016). Given that primary-care physicians are often the first point of contact and referral source for ADHD, the variation in their understandings related to diagnosis and treatment perpetuate misidentification and mistreatment. In college students, low mental health literacy has contributed to greater hesitance on the part of these individuals to participate in mental health-related support (Cheng et al., 2018). In addition to a lack of knowledge, many individuals are unable to access information and resources necessary for support, which can evoke feelings of shame and frustration associated with a diagnosis.

Approaches to ADHD-Related Stigma Reduction

Given the dearth of research ADHD-related theory and stigma, it is understandable that there have been even fewer empirical works on ADHD-related stigma reduction. Still, several researchers have provided suggestions for ADHD-specific stigma reduction (Corrigan, 2004; also see Martinez & Hinshaw, 2016, for a more comprehensive review), with the caveat that change will take time and require intervention implementation efforts at different levels (e.g.,

media depictions, enforcement of anti-discrimination policies; greater access to treatment; see Martinez & Hinshaw, 2016).

Related to a general lack of ADHD knowledge, it is crucial to provide consistent, comprehensive *education*. Education can be integrated into holistic healthcare services through which conversations with mental health professionals become integrated into primary care. In addition, considering that mental health issues often originate in childhood, early education via the school system can be an accessible way of teaching youth about mental health through critical conversations and educational programming. Another way to support ADHD knowledge is continued research on mental health conditions, their etiologies, and treatment approaches. However, it is important to note that *more* education is not sufficient to support the mitigation of stigmatization. *Quality* education with accurate information presented in a human-centered manner, is essential. Educational content alone may in fact serve to perpetuate stereotypes. In the media, mental health conditions can be demonized or glorified, which perpetuates negative and inaccurate perceptions that can be difficult to undo (Martinez & Hinshaw, 2016).

Beyond education, it has been posited that increased *contact* between those with and without ADHD is necessary for an improved understanding of and empathy toward the diagnosis. Researchers have extrapolated from the *contact hypothesis* (Corrigan et al., 2012; Pettigrew, 1998), asserting that in order to change implicit attitudes and overt behaviors, there must be opportunities for direct behavioral contact with members of a specific out-group (in this case, ADHD). Contact may be fostered through real conversations/interactions or via hypothetical scenarios in which individuals may be asked to imagine specific interactions with those who have ADHD. By increasing direct exposure to and interaction between individuals with various neurobiological experiences, those without ADHD will, it is hoped, develop a more refined and compassionate understanding of ADHD and its realities (Martinez & Hinshaw, 2016). Interventions focused on psychoeducation and empowerment through contact have been demonstrated to support individuals with ADHD in reducing negative self-perceptions, which, ultimately, may increase their willingness to seek out and adhere to treatment (Corrigan, 2004).

Increased Prevalence of Public Mental Health Discussions and Interventions

In recent years, mental health has become a prevalent topic of conversation for many, including policymakers, educators, social media influencers. For example, state and federal policymakers have developed mental health initiatives. Influencers have taken to social media to share their own mental health journeys. Mental-health professionals have led educational programs for stakeholders to learn more about mental health and available resources, and some medical professionals have integrated mental-health conversations into routine health examinations. Consequently, researchers have been urged to empirically investigate the efficacy of mental health efforts. In the following section, I will highlight several educational programs and campaigns that were developed by researchers to combat mental health stigma.

Campaigns and Programs to Reduce Mental Health Stigma

Interventions to address mental health have become more prevalent in recent years; however, few researchers have investigated the efficacy of public and mass-media campaigns on mental health stigma reduction. Moreover, given that mental-health stigma is multifaceted and deeply embedded in society, it is difficult to effect large-scale change as the result of a single intervention tool. However, it is still crucial that researchers investigate mechanisms for

improving public attitudes toward mental health conditions in order for professionals, policymakers, and other stakeholders to advocate for mental health-related societal changes (e.g., through funding, mental health-related education, insurances).

An investigation by Giroux and Geiss (2019) is one example. In their study, the researchers evaluated the impact of a student-led program to promote mental-health awareness and help-seeking behaviors on a college campus. In 2017, students participating in psychology-focused clubs and classes organized a "mental health awareness week" intervention. In the intervention, students distributed tangible mental health-related items (e.g., stress balls, informational brochures, mental health awareness ribbons) around campus. All participants were also invited to attend events where students spoke about mental health challenges faced at school and home. As well, a school counselor was present to moderate the conversation and provide psychoeducation about mitigating feelings of stress. Results indicated a self-reported decrease in help-seeking stigma for students involved in the intervention, especially for those who actively participated (i.e., obtained a tangible item or attended a discussion about mental health). Therefore, the researchers suggested that interactive psychoeducational programs may greatly benefit in reducing help-seeking stigma.

Onnela and colleagues (2021) investigated the impact of four mental-health-focused psychoeducation sessions on mental- health-related attitudes and knowledge with 162 eighth graders at two schools in Finland. The intervention sessions were described as interactive, utilizing both whole-class and small-group discussions to facilitate conversation. It was found that, upon participating in the informational sessions, students were more likely to report mental health conditions (i.e., anxiety, eating disorders, conduct disorder, depression, substance use) as real and valid. Students also reported that the intervention increased their awareness of and open-mindedness toward receiving mental health support.

Another example of a stigma reduction educational campaign is Time to Change (T2C), which has existed in England since 2009 (Sampogna et al., 2017). T2C seeks to destigmatize mental health via increasing knowledge and decreasing prejudice and discrimination. In empirical investigations of the T2C social marketing campaign, participation was associated with improved mental health knowledge and positive attitudes. Moreover, pre- and post-tests indicated a significant decrease in individuals' intent to engage in discriminatory behaviors, thus demonstrating a change in social distance (Sampogna et al., 2017).

Social Media, Psychoeducation, and Stigma

Today, social media is one of the most common methods by which individuals learn. Through technological advances, each person with access to a device is frequently exposed to content curated to their particular interests. In recent years, social marketing campaigns have been created for researchers and policymakers to better understand public media consumption of information related to mental health. Social marketing campaigns are intended to utilize social media as the "channel of communication," with "the individual at the centre" of the campaign (Sampogna et al., 2017, p. 116). Social marketing campaigns may be an efficient method through which information can be disseminated from researchers to the general public. Still, it is important to consider the distinction between *quantity* and *quality* of media-based information dissemination. As mentioned previously, quality psychoeducational programs integrate humanization and contact to create a better sense of understanding and empathy toward mental

health conditions. Quality psychoeducation also serves a more crucial purpose for increasing an individual's *accuracy* of knowledge (Neubauer, 2022).

The Importance of Investigating College-Aged Individuals (Emerging Adults)

As noted earlier, approximately three-fourths of mental health disorders become present in an individual prior to the age of 24 (Kessler et al., 2007). Moreover, 18–24 year-olds (i.e., emerging adults) have the highest rates of mental health disorders but are the least likely age group to seek out treatment (National Institute of Mental Health, 2019). Approximately 64% of emerging adults in college do not seek out mental health support (Eisenberg et al., 2011). Given the prevalence rates of mental health conditions among emerging adults, there is a high demand for institutions to provide prevention, intervention, psychoeducation, and resource connection as means of support. However, university administrators often fail to address the mental health needs of their students because of a lack of available resources, high levels of stigma, or low mental health literacy themselves (Eva, 2019). Therefore, it is imperative that researchers and practitioners improve mental health-related knowledge and attitudes in emerging adults to ensure they feel better equipped to access and advocate for necessary support for themselves and the broader community.

The Current Study

This dissertation is an initial step in a planned set of investigations exploring the effectiveness of psychoeducation on knowledge and stigmatization of learning-related conditions (e.g., ADHD, reading disorders, autism spectrum disorders) across a variety of populations (e.g., emerging adults, children, parents, teachers). In the present study, I aimed to fill a gap in ADHD stigma research and practice by investigating two psychoeducational techniques (e.g., textually presented reading, infographics) focused on improving ADHD knowledge and attitudes in a sample of emerging-adult college students. Specifically, my overarching goals are as follows: (a) to increase ADHD literacy and, ultimately, decrease ADHD stigma through the use of psychoeducation; and (b) to assess the efficacy of infographics— compared to text-based psychoeducation— as a mechanism for disseminating comprehensible, empirically-driven information about ADHD. Because the efficacy of psychoeducation through visual aids and storytelling methodologies has been supported (Broussard et al., 2014; Dahl et al., 2020), I hypothesized that visual psychoeducation—via the use of infographics—will promote ADHD knowledge and reduce ADHD stigma. Infographic-based interventions are cost-effective and have the potential to be scalable, easily disseminated, and comprehensible by many. Within my translational aim were two sub-aims, which contributed to the generation of my research questions and hypotheses.

The first sub-aim of my study was to *develop a novel intervention tool* (i.e., infographics) to increase ADHD literacy and decrease ADHD stigma. My first research question was, "Does the infographic-based intervention increase ADHD knowledge in a sample of college students?" Based on this research inquiry and the supporting literature, I hypothesized that psychoeducation via infographics would increase ADHD-related knowledge. My second sub-aim was to *evaluate the efficacy of infographics* as a method to increase ADHD knowledge and decrease ADHD stigma. Based on my research question, I hypothesized that infographic-based psychoeducation would be more effective than text-based psychoeducation for increasing ADHD knowledge and positive attitudes and decreasing ADHD stigma among college students.

Methodology

Participants

The study sample comprised 146 college students from a large university on the west coast of the United States. All 146 participants had complete data. Ninety eight percent of participants self-reported their gender as follows: 111 (76.0%) female, 22 (15.1%) male, 3 (7.5%) gender non-conforming , and 2 (1.4%) preferred not to say. The racial/ethnic demographic membership of the sample was as follows: 71 (48.6%) Asian American/Pacific Islander, 32 (21.9%) White/Caucasian, 28 (19.2%) Hispanic/Latine/Latinx, 7 (4.8%) Bi-racial/Multiracial, 2 (1.4%) Middle Eastern, 1 (0.7%) Black/African American, and 5 (3.4%) preferred not to say. Participants' ages ranged from 18 to 41 (*M* age = 21.06). Fifteen (10.3%) of the participants self-reported having a diagnosis of ADHD, consistent with recent prevalence rate estimates in extant research. One hundred and twelve participants (76.7%) reported knowing someone with ADHD.

Measures

Demographic Variables

At the beginning of the survey, participants were asked to provide demographic information about their place of birth (i.e., birthplace, number of years living in birthplace), identity (i.e., age, gender identity, ethnic/racial identity), familial educational history (i.e., participants' highest level of education; parents' highest level of education), and mental health-related history (i.e., past, current, or suspected diagnosis; past, current or suspected ADHD; family history of mental health diagnoses/challenges; personal knowledge of/experience with mental health conditions; personal knowledge of/experience with ADHD). Depending on the item, participants responded via multiple choice, select all that apply, or short-answer format.

ADHD Knowledge

Test of ADHD Knowledge (TOAK). The TOAK (Anastopoulos et al., 2021; DuPaul et al., 2022) is a recently developed 40-item scale that functions to assess individuals' understandings of ADHD. The TOAK includes items related to ADHD symptoms/diagnosis (e.g., "there currently are no agreed upon criteria for diagnosing ADHD among children"), challenges (e.g., "anxiety problems occur more often in those with ADHD than they do in non-ADHD individuals"), and treatment (e.g., "Certain non-stimulant medications [e.g., Strattera] can be effective in reducing ADHD symptoms"). Respondents select if they *agree*, *disagree*, or are *not sure* for each of the items. Scores on the TOAK demonstrate strong internal consistency ($\alpha = .82$) and moderate test-retest reliability ($r = .58$; DuPaul et al., 2022). Unpublished results referenced by the TOAK creators demonstrate preliminary evidence of convergent validity (Anastopoulos et al., 2021).

For the purpose of this study, a subset of 24 items from the scale was used in statistical analyses after a thorough comparison was made between the TOAK and the developed psychoeducational materials. This decision was made to ensure that the analysis included only items that were adequately covered by the educational materials. The research team, consisting of three individuals, independently chose relevant items for the statistical analysis, and a larger discussion among the team members was then held to ensure consistency between individuals' responses and to develop a consensus. The adapted TOAK will be referred to as the TOAK-24

throughout the remainder of this dissertation. In the present sample, the TOAK-24 score demonstrated sufficient evidence of internal consistency (α = 0.84; 95% CI = 0.80 – 0.88).

Attitudes toward ADHD

Scale for ADHD-Specific Attitudes (SASA). The SASA is a 30-item subscale within a larger knowledge and attitude scale: the ADHD-Specific Knowledge and Attitudes of Teachers (ASKAT) Scale (Mulholland et al., 2016). The ASKAT and its subscales were developed to measure teachers' feelings, cognitive beliefs, and perceived control toward working with students who have ADHD. For this study, the wording on several items was adapted to better suit the target sample. Items in the adapted version addressed college students' *feelings* (e.g., "Students who exhibit behaviors associated with ADHD are rewarding to work with"), *cognitive beliefs* (e.g., "Students who exhibit behaviors associated with ADHD misbehave because they don't want to follow the set rules"), and *perceived control* (e.g., "Students who exhibit behaviors associated with ADHD need more structure and discipline, not assistance with their academic work") about peers with ADHD. Participants respond to items on a 6-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (6). Exploratory factor analyses have provided structural validity evidence in support of SASA scores, and scores for each factor indicated sufficient evidence of internal consistency (α = 0.77 – 0.89; Mulholland et al., 2016). In this sample, the SASA score demonstrated lower than ideal internal consistency estimates (α = 0.65; 95% CI = 0.56 – 0.73), which may be explained by the multidimensional nature of the scale.

Stigma/Social Distance toward ADHD

Social Distance Scale (SDS). The Social Distance Scale (SDS) was developed from the World Psychiatric Association (2001) Programme to Reduce Stigma and Discrimination of Schizophrenia and is one of the most frequently used scales in research to measure public stigmatization. The SDS was first created to gather information about public stigma and prejudice toward individuals with schizophrenia but was modified by Gureje and colleagues (2005) to measure stigmatization toward mental illness more generally. In Meza and colleagues' (2019) study, items on the SDS were applied specifically to ADHD on a sample of college students; this adapted survey was used in the present study. When taking the SDS, participants are first asked to read a vignette about a person with ADHD. Then, participants respond to five items about their willingness to engage in various interactions with the person (e.g., become friends with the person, move next door to the person). Each response is on a 5-point Likert scale, ranging from *definitely yes* (1) to *definitely no* (5). The SDS score has demonstrated strong internal consistency in community samples of youth (α = 0.88; Lu et al., 2023) and adults (α = 0.93; Meza et al., 2019). Jorm and Oh (2009) provided evidence to support the validity of the SDS in their study, as participants' scores on the SDS were associated with self-reported contact. In the current study, the SDS score demonstrated sufficient evidence of internal consistency (α = 0.82; 95% CI = 0.77 – 0.86).

Exit Survey

Upon completing Part 2 of the study (see below for procedures), participants were asked to complete an exit survey. The exit survey was composed of 10 items related to participants' engagement with their respective educational materials (i.e., infographic or text-based). First, participants noted how frequently they engaged with their educational materials between Parts 1 and 2 on a 6-point Likert scale, ranging from *not at all* (1) to *more than once a day* (6). If a

participant endorsed any level of engagement other than *not at all,* they were asked to describe the type of engagement (e.g., annotations, discussion with others, independent research). Participants also provided feedback regarding how informative they thought the intervention was on a 5-point Likert scale, ranging from *very informative* (1) to *very uninformative* (5). Next, participants reported how novel the intervention's information was on a five-point Likert scale ranging from *very novel* (1) to *not novel at all* (5). Finally, participants noted the intervention's perceived effectiveness in facilitating a better understanding of ADHD (e.g., definitions, symptoms and associated challenges, treatment) on a 5-point Likert scale, ranging from *strongly agree* (1) to *strongly disagree* (5). Information from the exit interview provided additional feedback to support evaluation of the intervention, and more specifically, the infographics as a novel approach to psychoeducation.

Procedure

Participants were recruited through their university's Research Participation Program (RPP). The RPP provides undergraduate students the opportunity to serve as participants in on-campus research. Participants were compensated by the RPP for their participation through earning credits to redeem in their psychology courses. The number of credits allotted by the RPP is individualized for each study and based on an estimated amount of time for completion. In accordance with RPP guidelines, participants for this study earned a total of 1.5 credits for completing the study. There were no inclusion or exclusion criteria based on gender, race, ethnicity, or a prior mental health diagnosis. However, participants had to be at least 18 years old and proficient in English.

The study consisted of two asynchronous sessions. Data from both sessions were collected through a licensed Qualtrics account. After providing their written consent to participate, participants completed the questionnaires (see Appendix A) and engaged in their respective interventions. A post-questionnaire was completed by participants in a second asynchronous session. Information regarding each asynchronous session is detailed below.

Asynchronous Study Sessions

Part 1. During the first asynchronous session of the study, participants completed a set of surveys in which they provided demographic information and completed questions designed to assess their ADHD knowledge (i.e., TOAK-24), attitudes (i.e., SASA), and social distance (i.e., SDS). Next, participants were asked to review three pieces of educational material related to ADHD. Participants were randomly assigned (i.e., utilizing the automated Qualtrics algorithm) to intervention groups and viewed information through infographics (n = 69) or text-based documents (n = 77). Information provided to each group was consistent in content, but varied in presentation. The educational materials were structured to address and challenge several common ADHD-related myths inspired by the format of several psychoeducational organizations' websites, such as Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD; CHADD, 2022) and Child Mind (Cornwell, 2023).

The first piece of educational material addressed the myths that *ADHD is not a valid diagnosis* and *everyone has ADHD*. The definition, presentations, diagnostic considerations, and brain differences related to ADHD were presented. The second piece of educational material aimed to debunk the myth that *ADHD only consists of the hyperactive presentation and only presents in young, White boys,* where participants reviewed information regarding the persistence

and prevalence of ADHD across age, gender, and race/ethnicity. In the third piece of educational material, the myth that *ADHD is overtreated and/or treated ineffectively* was discussed. Here, participants were exposed to definitions and examples of evidence-based treatments for ADHD, age-based differences in treatment efficacy for ADHD, rates of treatment-seeking by age and treatment type, and psychoeducation about potential interactions between stimulant medications and substance use.

At the conclusion of Part 1, participants were asked to download their respective educational materials. Participants earned 0.5 credits for their participation in Part 1 and were informed that they would receive an additional credit upon completing Part 2. In subsequent sections of this dissertation, Part 1 data are referred to as W1 or Wave 1.

Part 2. Approximately one to four weeks after participation in W1, participants were granted access to Part 2 of the study. Part 2 comprised the same set of surveys used in Part 1 (i.e., subscales related to participants' ADHD knowledge, attitudes, and social distance). Participants also completed a short questionnaire to disclose any continued engagement with the educational materials, independent investigations of ADHD after W1, and feedback related to the educational materials. After completing Part 2, participants earned their remaining credit. In subsequent sections of this dissertation, Part 2 data are referred to as W2 or Wave 2.

Results

Preliminary Analyses

The Statistical Package for the Social Sciences (SPSS) software was used for the dissertation study's statistical analyses. First, I explored descriptive statistics of chosen demographic variables. Means and standard deviations for continuous variables are reported in Table 1. Skewness values ranged from –0.29 to 0.19 and kurtosis values ranged from –0.39 to 0.60, suggesting a relatively normal distribution among continuous variables. I then examined correlations among the outcome variables of interest by intervention group. Table 2 presents the correlations among the variables. The following correlations were significant for the infographic group: social distance in W1 and social distance in W2 ($r = 0.53$), attitudes in W1 and attitudes in W2 ($r = 0.67$), and knowledge in W1 and knowledge in W2 ($r = 0.65$). For the text-based intervention group, the following correlations were significant (i.e., $p < .003$): social distance in W1 and social distance in W2, social distance in W1 and attitudes in W2, social distance in W2 and attitudes in W2, attitudes in W1 and attitudes in W2, and knowledge in W1 and knowledge in W2. These correlations and several others met the effect size threshold for interpretation ($r > .20$; Ferguson, 2009).

Primary Analyses

Psychoeducational Interventions and Knowledge Acquisition

Using a paired sample *t*-test, I examined differences between W1 and W2 scores on the TOAK-24 to understand whether and to what extent the disseminated educational materials significantly influenced participants' knowledge regarding ADHD. Results on the *t*-test indicated a significant difference, $t(145) = 2.22$, $p = 0.03$ in mean scores on the TOAK-24 from W1 ($M = 10.69$, $SD = 4.03$) to W2 ($M = 11.40$, $SD = 4.98$). The effect size, as measured by Cohen's *d*, was 0.18, indicating a small effect.

Infographic-Based Psychoeducation and Knowledge, Social Distance, and Attitudinal Change

To investigate whether infographic-based psychoeducation was more effective than text-based psychoeducation at increasing ADHD knowledge and decreasing social distance among college students, I initially planned to run a multivariate analysis of covariance (MANCOVA). However, due to low correlations among the three outcome variables, a one-way repeated measures analysis of covariance (ANCOVA) was conducted for each of the three variables. The outcome measures (i.e., TOAK-24, SASA, SDS) were used as dependent variables and the intervention method (i.e., infographic- or text-based) was the independent variable in the analysis. Two variables were included as covariates: prior diagnosed/suspected ADHD and familiarity with someone diagnosed with ADHD. I chose to include these two variables as covariates because an individual with personal connections to ADHD may begin the study with a different baseline of knowledge and attitudes, which can potentially confound the results.

Three one-way repeated measures ANCOVAs were used to examine the influence of psychoeducation format (infographic- vs. text-based) on outcome variables from W1 to W2. No significant main effects of the psychoeducation format were found on TOAK-24, SDS, or SASA scores (see Tables 3–5). Moreover, the interaction between psychoeducation format and time was not significant. However, the covariate–participants' knowledge of an individual with ADHD, contributed significantly. This ANCOVA result suggests that knowing an individual with ADHD contributes to ADHD knowledge even without the presence of additional education on ADHD. Similarly, results indicated that having diagnosed/suspected ADHD contributed to a reduction in social distance score.

Discussion

The purpose of this dissertation was to explore a novel, accessible way of disseminating information related to ADHD in a sample of undergraduate students at a large university on the west coast of the United States. Specific objectives of this study were to (a) examine differences in ADHD knowledge from pre- to post-intervention and (b) explore whether infographic-based psychoeducation was more effective than text-based psychoeducation at improving ADHD-related knowledge and stigma/attitudes. An empirically established relation exists among mental health-related knowledge, attitudes, stigma, and their impacts on treatment-seeking behaviors (Cheng et al., 2018; Nguyen & Hinshaw, 2020; Pescosolido et al., 2008). Even so, no intervention, to my knowledge, has been developed to connect these constructs. Moreover, although researchers have deemed infographics as a generally effective method of psychoeducation, infographic-based interventions have not been adequately investigated in the field of psychological science. Therefore, in this dissertation study, I built upon the current literature by researching the particular impact of infographic-based psychoeducation on knowledge acquisition and attitudinal change related to ADHD.

Researchers assert that stigma is a key contributor to a pervasive lack of mental-health treatment-seeking, and psychoeducation has been deemed a crucial component of stigma reduction (Campbell, 2021; Corrigan, 2004; Giroux & Geiss, 2019; Onnela et al., 2021). More recently, researchers have hypothesized that psychoeducation itself is not sufficient to eliminate stigma globally; rather, they assert that stigma can be better addressed through the incorporation of humanizing elements into interventions (Corrigan, 2004; Martinez & Hinshaw, 2016). By disseminating comprehensible and accessible information to the public, psychologists can bridge

the research-to-practice gap, correct misconceptions about mental health conditions, and support individuals to understand mental health through a humanistic lens.

Ultimately, reduced stigma should increase the likelihood of treatment-seeking for those with mental health conditions. Moreover, stigma reduction enables those without a particular mental-health condition to better understand and empathize with individuals who have mental health conditions. Given the prevalence of ADHD, it was likely that prospective participants either knew someone with ADHD or had a diagnosis/suspected diagnosis of ADHD. In addition, although a large *quantity* of information exists about ADHD that can be viewed and interpreted by the public, the content present in the media lacks *quality* and contains stereotypes that can perpetuate misconceptions, social distance, and less acceptance of ADHD.

Psychoeducational Interventions and Knowledge Acquisition

One of my research aims was to explore whether psychoeducational interventions resulted in a significant increase in ADHD knowledge from pre- to post-intervention. Given that psychoeducation is a preliminary step in the stigma reduction process (Campbell, 2021; Corrigan, 2004), it was important to investigate the impact of the psychoeducational intervention on knowledge acquisition prior to any subsequent analyses on attitudinal change. The TOAK, a recently developed and empirically validated scale, was used to measure knowledge acquisition (Anastopoulos et al., 2021; DuPaul et al., 2022).

According to *t*-test results, there was a statistically significant increase in participants' ADHD knowledge between W1 and W2. In other words, the hypothesis *was supported*, suggesting that the psychoeducational interventions led to an increase in TOAK-24 scores (*M* change = 0.71 points). Prior research has posited that quality psychoeducation, which focuses on increasing accessibility and readability of information, can increase an individual's mental health literacy (Campbell, 2021). The focus of both the infographic- and text-based interventions was to present evidence-based material in a humanized, myth-debunking manner. As evidenced by results, it will be important for future researchers and practitioners to focus on disseminating information in a digestible manner to increase comprehension, elicit attitudinal change, and motivate treatment-seeking behavior.

It is important to note that, although the implementation of the intervention in the present study resulted in a significant increase in TOAK-24 scores, both mean scores were lower than initially expected (M_1 = 10.61; M_2 = 11.40) and below 50% correctness, even after the intervention. This finding is consistent with extant research, which asserts that, societally, there is a low level of mental health literacy (Cheng et al., 2018). It may have been that the content in the psychoeducational intervention needed adjustment to better address the items on the TOAK. Alternatively, it may well be that the measure itself needed to be altered. Limitations in the TOAK will be discussed further in subsequent sections.

Infographic-Based Psychoeducation and Knowledge, Social Distance, and Attitudinal Change

The second aim of this dissertation was to learn more about the effectiveness of infographic- as compared to text-based intervention at facilitating changes in ADHD knowledge, social distance, and attitudes from W1 to W2. Three one-way repeated measures ANCOVAs were used to examine this aim statistically. Covariates included in the analyses were (a) having diagnosed/suspected ADHD, and (b) personally knowing someone with ADHD. There was no

effect of psychoeducation condition on ADHD knowledge, attitude, or social distance scores. In addition, the interaction between psychoeducation format and time was not statistically significant.

Thus, the hypothesis was not supported, which suggests that the infographic-based intervention developed for this specific study was not more effective at fostering a change in knowledge, attitudes, and social distance toward ADHD from W1 to W2 than the text-based alternative. Although the results did not support the hypothesis, several interesting findings emerged in the analysis of covariates.

Knowing Someone with ADHD and Knowledge

The first result indicated that participants' personal connections to an individual with ADHD contributed significantly to their ADHD knowledge, as evidenced by TOAK-24 scores. There is research evidence to suggest that *contact* plays an important role in the process of increasing mental health literacy and decreasing mental health stigma (Corrigan, 2004; Martinez & Hinshaw, 2016). Participants who had personal contact with individuals diagnosed with ADHD demonstrated a more substantial increase in ADHD-related knowledge compared to participants without such personal connections as evidenced by TOAK-24 scores. Therefore, contact may have played a greater role in knowledge acquisition than the psychoeducational intervention itself. In addition, personally knowing an individual with ADHD may have provided a point of reference when completing the TOAK-24 and/or reading the psychoeducational materials presented. Understanding the unique experiences of individuals with ADHD through interpersonal connections likely fosters a deeper understanding and empathy for the challenges faced by individuals with ADHD, which extends beyond factual knowledge that can be gleaned from literature or the media alone.

This result also suggests that personal contact with individuals who have ADHD plays a vital role in enhancing knowledge and understanding of the disorder over time. Future researchers may seek to learn more about the impact of knowing someone with ADHD by incorporating connection building into the study. One idea may be to pair participants who have ADHD with participants who do not know someone with ADHD. Then, participants can work together to complete a task, play a game, or become pen pals. Through interactive activities, participants may build rapport and exchange personal experiences, potentially enhancing understanding and acceptance of ADHD for those who were originally unfamiliar.

Having ADHD and Social Distance

Another interesting finding was that having ADHD contributed significantly to the variance between a participant's SDS scores at W1 and W2. In other words, a significant reduction in social distance scores from pre- to post-intervention was better attributed to the presence of ADHD rather than the psychoeducational intervention. This finding exemplifies the complex connection between ADHD, psychoeducation, and stigma reduction. The results demonstrate the importance of accounting for participants' individual differences when examining the efficacy of educational interventions on social perceptions. Individuals with ADHD often face both public- and self-stigma related to the unique challenges they experience, which can influence their interpersonal functioning. Therefore, it is not surprising that the presence of ADHD significantly influenced their stigma by way of the SDS.

In addition, given that there was not a significant main effect of intervention condition on social distance scores, it is suggested that merely altering the intervention format did not significantly change one's social distance. This finding is not unexpected, as recent research has suggested that psychoeducation alone is not sufficient to reduce stigma related to ADHD. These results suggest that the presence and personal relevance of ADHD plays a larger role in social distance changes than the format of intervention. A humanistic, contact-focused approach to intervention may be even more important for those who do not have ADHD themselves, as they may be subject to more prejudice, discrimination, and feelings consistent with public-stigma than individuals with ADHD.

Understanding the Lack of a Significant Main Effect

A few possible theories were generated to investigate the lack of significance of intervention format on each of the outcome variables. First, participants may not have been exposed to a sufficient amount of information about ADHD in this brief, three-page intervention. There is a vast amount of information about ADHD that is readily available for public consumption; however, in the development of infographics and textually presented materials, the researchers intentionally focused on accessibility of content and demystification of myths, thereby prioritizing clarity and precision of language. As such, content in each of the three handouts was brief and may not have been comprehensive and all-encompassing enough to result in clearer impacts on knowledge, attitudes, and social distance from W1 to W2.

In addition to the content, results of the ANCOVAs may have been impacted by time. For example, participants were asked to carefully review their respective educational materials, but there was no time limit enforced or eye-tracking technology used to ensure participants truly spent an adequate amount of time on reading each material. It may have been that the time spent on each material accurately reflected the amount of time and effort put into consuming the content, but it may also have been that participants allowed their timers to continue running while focusing their attention elsewhere (e.g., other computer tabs, a conversation in the room, their phone, the television). Because participants completed the surveys asynchronously and without proctoring, it is difficult to ensure that the timer used on each participant's intervention page accurately depicted their *focus* time. Another component of time that may have impacted the clarity of results was the amount of time that passed between the first and second asynchronous session– there may not have been enough time for the effects of the intervention to settle prior to participants' completion of the second survey. Given the time constraints of distributing a two-part survey to university students who are bound to a semester schedule, it was not possible for the research team to examine longer-term effects of the intervention on each of the outcome variables. However, it is speculated that with more time between sessions, participants may have been able to develop more curiosity and compassion for ADHD, which may have clarified the significance of ANCOVA results.

Lastly, it may be that creating a one-size-fits-all intervention with the intent of yielding significant main effects across a diverse group of participants is not be possible. In other words, an infographic-based intervention may better facilitate changes in knowledge, attitudes, and stigma for some individuals, whereas textually presented information (among other methods of psychoeducation) may lead to more significant impacts for other individuals. Thus, expecting one method of intervention to be significantly more effective at changing knowledge, attitudes,

and stigma may not be realistic. Additionally, given that each person's baseline of ADHD knowledge, attitudes, and stigma were likely different at the beginning of the study, it may be that adjusting the presented content in breadth and depth based on baseline could facilitate more meaningful change.

Limitations

There are several limitations in the present study. First, the study is not broadly generalizable as the sample is not representative. Due to financial constraints, I recruited participants at a specific university from a research participant program, which is exclusive to psychology majors. Being psychology majors, the participants may have a higher level of understanding and a lower level of stigma related to mental-health than other same-age individuals. In addition, given that the field of psychology is majority female, it is not surprising that a large majority of the sample was female; however, it does limit the study's generalizability. Relatedly, the age of participants was fairly homogenous given the nature of a college-based sample, so it is not possible to generalize these results to other age groups. It is hoped that future researchers aim to recruit a more representative, heterogeneous sample, which will not only support its generalizability, but also provide additional variables to account for in analyses.

It was also difficult to balance RPP's regulations and deadlines with the research team's plans to expose participants to pre- and post-questionnaires in a consistent time frame. Originally, it was planned that participants would be granted access to the W2 questionnaire between 21 to 28 days after completing W1. However, given semester deadlines and technological challenges with locking and unlocking the survey on Qualtrics, there was variability in length of time between sessions (minimum = 11 days, maximum = 51 days, $M = 28$ days). Future researchers should ensure that consistency in administration of pre- and post-surveys exists among all participants. Moreover, given that time is necessary to unlearn misconceptions and ultimately reduce stigma, researchers should explore longitudinal effects of interventions by following up with participants long after their first exposure to the materials.

Another limitation was the absence of a true control group in this study. Although the two groups received a different intervention format, there was no *without intervention* group to which the two interventions were able to be compared. The absence of a control group served as a limitation when conducting group difference analyses, as it was difficult to determine the variability of results between and within groups without a formal control group.

Finally, although ADHD is a widely-researched topic, interventions implemented to increase ADHD knowledge and decrease ADHD stigma/negative attitudes are less prevalent in the research literature. As such, there is a dearth of accessible, empirically validated scales to measure these constructs. Furthermore, though an abundance of information exists about ADHD, not all of it may be relevant for public psychoeducation. The onus is on psychological researchers to comb through extant information and select the content that is crucial for all to understand in order to attain a broad conceptualization of ADHD. Additionally, despite the presence of published validation studies for each of the three measures in this study (i.e., TOAK, SASA, SDS), there is not a robust amount of research supporting the use of these scales. Moreover, items on each measure were adapted to be most applicable to college students. In turn, the validity of chosen measures was limited in the present study. In future research, it is

suggested that an abridged rating scale be created to ensure that scales are valid and scores are reliable.

Conclusions, Implications, and Future Directions

In this dissertation study, I investigated the effectiveness of a brief psychoeducational intervention presented in two different formats: infographics and text. The goal was to examine how the interventions impacted ADHD knowledge, attitudes, and social distance among emerging-adult college students. Both psychoeducation formats resulted in a significant albeit small increase in knowledge from W1 to W2, which underscores the importance of accessible and fact-based information dissemination in promoting an understanding of ADHD.

Moreover, the present study is one of the first, to my knowledge, to provide empirical evidence supporting the contact hypothesis within the scope of ADHD and psychoeducation research. Contact with individuals diagnosed with ADHD– either through acquaintance or a personal diagnosis– significantly influenced participants' knowledge acquisition and social distance toward the disorder. These results highlight the critical role of interpersonal connections in shaping perceptions and openness to the learning process. It is imperative that future researchers incorporate elements of contact and personal relevance into the intervention implementation process to enhance a more holistic understanding of ADHD.

It will also be important for future researchers to continue investigating various psychoeducational formats that best suit individuals' needs. Although there was not a significant difference between conditions in the present study, it may be possible that infographics, while equal in content to text-based methods, were a more time-efficient method of psychoeducation. Other psychoeducational methods such as audiobooks and picture stories may also be appropriate for individuals of different ages and stages of life. Moreover, future researchers can apply psychoeducation to other diagnoses (e.g., Autism) and new target samples (e.g., parents, teachers, mental health professionals) to expand the effects of accessible intervention.

In order to more accurately assess the impact of psychoeducation on constructs such as knowledge, attitudes, and social distance, it is imperative that reliability and validity of core outcome measures are established. Although the measures used in the present study have been investigated empirically, there is a lack of evidence to support them. Moreover, multiple measures were upwards of 40 items, which may have dissuaded participants from completing the survey honestly or remaining motivated throughout. It is urged that researchers challenge extant scales to develop measures that are not only accurate, but also time-efficient for participants. If the same construct can be measured effectively with fewer items, participants may feel less burnt out and more interested, which, in turn, may result in more thoughtful responses.

Additionally, researchers must continue to investigate the influence of culture on mental health knowledge and stigma, as findings can inform interventions to more accurately reflect the diversity of cultural norms and practices. For example, in cultures where mental health issues are commonly understood through a somatic perspective, interventions that utilize somatic-related language to address topics may foster greater receptiveness to education and a sense of belonging in research and implementation endeavors.

Overall, this dissertation contributes to the growing body of literature on ADHD literacy and stigma reduction by exploring an innovative educational approach to intervention. Future research and practice endeavors must continue to prioritize the development of accessible,

evidence-based interventions that integrate both psychoeducational content and humanistic perspectives. I believe that comprehensive, relevant education can foster greater understanding and acceptance of neurodevelopmental disorders such as ADHD. By exploring ways of disseminating information to the public while simultaneously integrating personal relevance, researchers and practitioners can collectively work towards building an inclusive, well-informed, and less stigmatizing society for individuals with ADHD among other mental health- and learning-related conditions.

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Table 1

Descriptive Statistics for Continuous Variables

Variable	*Mean* (Info)	*SD* (Info)	*Mean* (Text)	*SD* (Text)	*Mean* (Total)	*SD* (Total)

Age	–	–	–	–	21.06	3.36
SASA (W1)	3.19	0.38	3.15	0.44	3.17	0.41
SASA (W2)	3.20	0.36	3.16	0.43	3.18	0.40
SDS (W1)	2.82	0.64	2.96	0.64	2.89	0.64
SDS (W2)	2.67	0.63	2.79	0.65	2.73	0.64
TOAK-24 (W1)	10.96	3.99	10.45	4.07	10.69	4.03
TOAK-24 (W2)	11.58	5.01	11.25	4.97	11.40	4.98

Table 2
Correlations for Study Variables

Variable	1	2	3	4	5	6
1. SDS (W1)	–	.53*	.03	-.06	–.24	–.37
2. SDS (W2)	.72*	–	.20	.06	–.04	–.28
3. SASA (W1)	.28	.28	–	.67*	.11	–.04
4. SASA (W2)	.33*	.37*	.63*	–	.15	–.06
5. TOAK-24 (W1)	.00	-.09	-.07	.20	–	.65*
6. TOAK-24 (W2)	-.05	-.18	-.10	.03	.65*	–

Note. W1 = Wave 1; W2 = Wave 2. Correlation coefficients below the dashed line refer to participants in the text group, and correlation coefficients above the dashed line refer to participants in the infographic group.
*$p < 0.003$.

Table 3

One-way Repeated Measures ANCOVA on the Test of ADHD Knowledge from W1 to W2, by Intervention Condition

Knowledge (TOAK-24)	Condition	
	F(df)	*p*-value
Main Effect	0.81 (1)	0.37
Covariate: Yes_ADHD	3.57 (1)	0.06
Covariate: KnowAnyone_ADHD	7.57 (1)	0.01
Time*Condition	0.06 (1)	0.81

Note. ANCOVA = Analysis of Covariance.

Table 4

One-way Repeated Measures ANCOVA on the Scale for ADHD-Specific Attitudes from W1 to W2, by Intervention Condition

Attitudes (SASA)	Condition	
	F(df)	*p*-value
Main Effect	0.34 (1)	0.56
Covariate: Yes_ADHD	1.84 (1)	0.18
Covariate: KnowAnyone_ADHD	0.04 (1)	0.85
Time*Condition	0.00 (1)	0.99

Note. ANCOVA = Analysis of Covariance.

Table 5

One-way Repeated Measures ANCOVA on the Social Distance Scale from W1 to W2, by Intervention Condition

Social Distance (SDS)	Condition	
	F(df)	*p*-value
Main Effect	3.32 (1)	0.07
Covariate: Yes_ADHD	10.40 (1)	0.00
Covariate: KnowAnyone_ADHD	2.53 (1)	0.11
Time*Condition	0.02 (1)	0.89

Note. ANCOVA = Analysis of Covariance.

Appendix A: Survey

Pre-Survey

Objective:
This project aims to understand people's emotional experiences and perceptions of others. The questionnaire will take you approximately 30 minutes to complete. You must be at least 18 years old and be proficient in the English language in order to participate. Your anonymity is assured; no identifying information will be collected.

Compensation:
You will receive ___ units of RPP credit as compensation for your participation in this survey. You will need to complete part 1 and part 2 of this survey in order to receive compensation.

Throughout the study we will have several attention checks to ensure you're attentively answering questions. You must pass all attention checks in order to receive full compensation.

If you agree to participate in this study, please click on the "Agree to participate" button below and go on to the next page.

Demographics

Where were you born?

- United States of America
- North America (other than USA)
- South America
- Europe
- Asia
- Australia
- Other (please specify)

  _____

How many years did you live there/have you lived there?

___

Please enter your age (in years) below

___

To which gender do you self-identify?

- Female
- Male
- Non-binary/third gender
- Prefer not to say
- Prefer to self-describe:

With which race/ethnicity do you self-identify? Please select all that apply.

- Asian American/Pacific Islander
- Black/African American
- Hispanic/Latine
- Middle Eastern
- Multiracial
- White
- Other
- Prefer not to say
- Prefer to self-describe:

Please provide information about your educational history:

- Your highest level of education (Did not finish high school; high school grad, general education diploma, or some college; college graduate; postgraduate degree (e.g., Masters, PhD., MD.)
- Your father's highest level of education (Did not finish high school; high school grad, general education diploma, or some college; college graduate; postgraduate degree (e.g., Masters, PhD., MD.)
- Your mother's highest level of education (Did not finish high school; high school grad, general education diploma, or some college; college graduate; postgraduate degree (e.g., Masters, PhD., MD.)

Stigma Scales

Social Distance Scale (with adaptations for M/F)

In this part of the study, we are interested in understanding how people form impressions of others when given limited information. Please take a moment to imagine meeting a boy named Anthony, more information in the following page. After you have imagined Anthony, please rate your impressions of him after clicking on the continue button.

**NEXT PAGE

(Behavior) Anthony is 12 years old, weighs 109 lb., and is 5'1'. He lives in Albany with his parents, little sister, and has two pets. Anthony enjoys eating pizza and playing with friends during lunch recess. Anthony is consistently disrupting the class environment by fidgeting in his seat at random intervals, speaking out of turn multiple times during a 50-minute class, getting distracted by his surroundings constantly; in general, Anthony has a hard time making friends, circulates around the room and up and down the rows to see what other students are doing, the students appear to be annoyed by him, and he disrupts the flow of the lecture or activity the class was participating in.

(Behavior + Diagnosis) Anthony is 12 years old, weighs 109 lb., and is 5'1'. He lives in Albany with his parents, little sister, and has two pets. Anthony enjoys eating pizza and playing with friends during lunch recess. Anthony was recently referred by his teacher to the school psychologist because he is consistently disrupting the class environment by fidgeting in his seat at random intervals, speaking out of turn multiple times during a 50-minute class, getting distracted by his surroundings constantly; in general, Anthony has a hard time making friends, circulates around the room and up and down the rows to see what other students are doing, the students appear to be annoyed by him, and he disrupts the flow of the lecture or activity the class was participating in. Results from the school psychologist show that Anthony meets the criteria for an attention deficit/ hyperactivity disorder (ADHD) diagnosis, a common childhood disorder.

In thinking about Anthony, how willing are you to

		Definitely willing	Probably willing	Neutral	Probably not willing	Definitely not willing
1	Rent a room in your home to him?					
2	Work on the same job with him?					
3	Have him as a neighbor?					
4	Be his friend?					
5	Spend an evening socializing with him?					

In thinking about Anthony, what would help you connect more with him?

_____

ADHD Knowledge Scales

Test of ADHD Knowledge (TOAK)

1. Hereditary (Genetic) factors play a major role in determining if someone will develop ADHD. Agree Disagree Not Sure

2. Students with ADHD maintain grade point averages comparable to students without ADHD.	Agree	Disagree	Not Sure
3. Adults with ADHD are often late or forget to keep appointments.	Agree	Disagree	Not Sure
4. The most common side effects of stimulant medications are decreased appetite and sleep difficulties.	Agree	Disagree	Not Sure
5. As compared to students without ADHD, students with ADHD are more likely to drop courses or withdraw from courses.	Agree	Disagree	Not Sure
6. Biofeedback is not a well-established or proven treatment for ADHD.	Agree	Disagree	Not Sure
7. Most children with ADHD will no longer have problems once they are finished with school.	Agree	Disagree	Not Sure
8. ADHD seldom impacts relations with friends or romantic partners.	Agree	Disagree	Not Sure
9. Individuals with ADHD display symptoms of inattention, impulsivity, and/or hyperactivity.	Agree	Disagree	Not Sure
10. Students with ADHD graduate from college at about the same rate as do students who do not have ADHD.	Agree	Disagree	Not Sure
11. Most individuals with ADHD who take stimulant medication benefit from its use.	Agree	Disagree	Not Sure
12. Individuals with ADHD are more likely than individuals without ADHD to be aggressive.	Agree	Disagree	Not Sure
13. To confirm a diagnosis of ADHD, it is usually necessary to conduct neurological testing.	Agree	Disagree	Not Sure
14. The driving behavior of adults with ADHD is no different than that of adults without ADHD.	Agree	Disagree	Not Sure
15. College students with ADHD are at increased risk for smoking cigarettes.	Agree	Disagree	Not Sure
16. Medication is the only treatment necessary for most individuals with ADHD.	Agree	Disagree	Not Sure

17. Adults with ADHD change jobs more frequently than adults without ADHD.	Agree	Disagree	Not Sure
18. Students with ADHD take longer to complete college than do students without ADHD.	Agree	Disagree	Not Sure
19. Low levels of the brain chemical, serotonin, are a major cause of ADHD.	Agree	Disagree	Not Sure
20. Divorce rates among adults with ADHD are no different than those for adults without ADHD.	Agree	Disagree	Not Sure
21. Many students with ADHD display poor organizational skills and time management difficulties.	Agree	Disagree	Not Sure
22. Clinical interviews and behavior rating scales are important tools in assessing ADHD.	Agree	Disagree	Not Sure
23. ADHD is a condition that typically arises in early childhood and persists across the life span.	Agree	Disagree	Not Sure
24. Adults with ADHD commonly have problems managing their money.	Agree	Disagree	Not Sure
25. Anxiety problems occur more often in those with ADHD than they do in non-ADHD individuals.	Agree	Disagree	Not Sure
26. As compared to non-ADHD adults, adults with ADHD are more likely to have a child with ADHD.	Agree	Disagree	Not Sure
27. A diagnosis of ADHD is appropriate for any student reporting severe concentration problems.	Agree	Disagree	Not Sure
28. Individuals with ADHD often have difficulty planning ahead and remembering things.	Agree	Disagree	Not Sure
29. Teachers are obligated to give easier exam questions to students with ADHD.	Agree	Disagree	Not Sure
30. Adults with ADHD are at increased risk for getting into trouble with the law.	Agree	Disagree	Not Sure
31. Cognitive-behavioral interventions have been shown to be effective in treating individuals with ADHD.	Agree	Disagree	Not Sure

32. Children with ADHD experience depression at about the same rate as children without ADHD.	Agree	Disagree	Not Sure
33. In-class use of an audio/tape recorder and priority seating are examples of accommodations that students with ADHD may receive.	Agree	Disagree	Not Sure
34. To be effective, stimulant medications must build up in the bloodstream over a period of many days.	Agree	Disagree	Not Sure
35. Students with ADHD may benefit from receiving classroom accommodations.	Agree	Disagree	Not Sure
36. There currently are no agreed upon criteria for diagnosing ADHD among children.	Agree	Disagree	Not Sure
37. Certain non-stimulant medications (e.g., Strattera) can be effective in reducing ADHD symptoms.	Agree	Disagree	Not Sure
38. An underactive inhibition center in the brain may cause ADHD.	Agree	Disagree	Not Sure
39. Students with ADHD are just as likely to engage in risky sexual behavior as students without ADHD.	Agree	Disagree	Not Sure

Attitudes Scales

ADHD Specific Attitudes Scale (SASA)

Students who exhibit behaviors associated with ADHD...

		Strongly disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1	Are rewarding to work with.						
2	Have no excuse for their poor behavior if they don't have a formal diagnosis.						

3	Misbehave because they don't want to follow the set rules.						
4	Need more structure and discipline, not assistance with their academic work.						
5	Need to try harder to focus on their school work.						

	Please note the extent to which you agree or disagree with the follow statements:	Strongly disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1	ADHD is overdiagnosed.						
2	ADHD is a valid diagnosis.						
3	ADHD is an excuse for poor parenting.						
4	Children who exhibit ADHD type behaviors are deliberately misbehaving.						
5	I find behaviors associated with ADHD irritating.						
6	I find students who exhibit ADHD-type behaviors to be rude.						

7	Students who display ADHD-type behaviors cause me to experience stress.						
8	I would like to know more about ADHD and its associated behaviors						
9	I would like to have more information about interventions to assist me in interacting with those who display ADHD-type behaviors						

END OF PRE-SURVEY

Here is where the survey will end at T1 and participants will be given infographics to view and download. They will receive the following instructions on the next steps for T2.

“Thank you for participating in the first portion of this study. You will be asked to download the infographics/ documents that you reviewed today. Though you are not required to engage with the documents any further between now and the time of the follow-up survey, you are encouraged to if you would like. You will be contacted in approximately 1 month with the link to complete the study’s short follow-up questionnaire. Upon completion of the follow-up, you will receive your full RPP credit.”

POST SURVEY

Include all of the above information (Stigma, Knowledge, and Attitudes scales), plus below:

Follow-up Survey Items

		Not at all	Once a week	2-3 times a week	4-5 times a week	Nearly every day	More than once a day
1	How often did you engage with any of the flyers since our preliminary survey and before the follow-up survey?						
a	If you engaged with any of the flyers, please elaborate on what this looked like for you (e.g., annotations, viewing, discussions with others).						

		Very informative	Informative	Slightly informative	Not informative	Very uninformative
1	How informative did you find the flyers to be?					

		Very new	New	Slightly new	Not new	Not new at all
1	How novel was this information to you?					

Please indicate the degree to which you agree or disagree with the following:

		Strongly Agree	Agree	Neither agree or Disagree	Disagree	Strongly disagree
1	The infographics helped facilitate a clear understanding of the definitions related to ADHD.					
2	The infographics helped facilitate clear understanding of the symptoms and associated challenges related to ADHD.					
3	The infographics helped facilitate clear understanding of the treatment options related to ADHD.					
4	I liked the infographics.					
5	What did you like about the infographics?					
6	What did you dislike about the					

	infographics?	
7	What would have made it easier for you to engage with the infographics? (i.e., anything you would change?)	