The role of stigma-identity constructs in psychological health outcomes among adults who stutter

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THE ROLE OF STIGMA-IDENTITY CONSTRUCTS IN PSYCHOLOGICAL HEALTH OUTCOMES AMONG ADULTS WHO STUTTER

by

Hope Gerlach

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Speech and Hearing Science in the Graduate College of The University of Iowa

August 2019

Thesis Supervisor: Professor Emerita Patricia M. Zebrowski
This dissertation is dedicated to my parents. I am endlessly grateful for your sacrifices and support. Because you said I could, I did.
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ABSTRACT

Purpose: As a group, adults who stutter (AWS) are vulnerable to experiencing distress and other negative psychological health outcomes. However, not all AWS experience elevated levels of distress, and little is known about why some people are resilient while others struggle to cope. In the current study, stuttering was conceptualized as a type of concealable stigmatized identity (CSI). The purpose of this study was to determine if stigma-identity constructs that contribute to variability in distress among groups of people with other types of CSIs also contribute to psychological health outcomes among AWS. The specific stigma-identity constructs that were examined include salience (the extent that a person thinks about stuttering), centrality (how much a person defines themselves by stuttering), concealment (the extent that a person attempts to keep stuttering a secret from others), and disclosure (the frequency in which a person tells others about stuttering).

Methods: A sample of 505 AWS completed an online survey that included measures of salience, centrality, concealment, disclosure, demographics, self-rated stuttering severity, psychological distress, and adverse impact of stuttering on quality of life. Correlational and hierarchical regression analyses were performed to (1) determine the extent that stigma-identity constructs explain variability in psychological health outcomes among AWS and (2) identify unique relationships between each of the stigma-identity constructs and psychological health outcomes. Additionally, self-rated stuttering severity was investigated as a potential moderator of the relationships between stigma-identity constructs and psychological health outcomes.

Results: Together, the stigma-identity constructs accounted for a significant proportion of the variability in distress (~25%) and adverse impact of stuttering on quality of life (~30%)
among AWS. Salience, centrality, and concealment were positively associated with and predictive of distress and adverse impact of stuttering on quality of life after controlling for demographics and neuroticism. Further, self-rated stuttering severity moderated the relationship between centrality and adverse impact of stuttering on quality of life. Specifically, high centrality was only associated with more adverse impact of stuttering on quality of life among people with moderate and high self-rated stuttering severity. Disclosure did not have a consistent reliable relationship with either psychological health outcome.

**Conclusions:** The results from this study provide evidence that it is both appropriate and useful to conceptualize stuttering as a type of CSI. That is, variability in psychological health outcomes among AWS can be explained to a large extent by individual differences in the ways people think about and behave in relation to their stuttering identity. Speech-language pathologists should be aware of the relationships that salience, centrality, and concealment have with psychological health outcomes among AWS and should consider the implications for stuttering intervention.
PUBLIC ABSTRACT

The stigma associated with stuttering can be toxic to psychological health outcomes among adults who stutter. Yet, there is variability in psychological distress between adults who stutter, and little is known about why some people are resilient while others struggle to cope. This same pattern of distress – characterized by both vulnerability and variability – has been observed in other groups of people with concealable stigmatized identities (CSIs), or people with socially devalued identities that are only sometimes perceptible to others. Research with other CSI groups has shown that stigma-identity constructs, or the ways people think about and behave in relation to their stigmatized identity, can predict and explain variability in psychological health outcomes.

The purpose of this study was to determine if stigma-identity constructs that contribute to variability in distress among groups of people with other types of CSIs also contribute to psychological health outcomes among AWS. The specific stigma-identity constructs that were examined include salience (the extent that a person thinks about stuttering), centrality (how much a person defines themselves by stuttering), concealment (the extent that a person attempts to keep stuttering a secret from others), and disclosure (the frequency in which a person tells others about stuttering). The results indicated that together, these four stigma-identity constructs accounted for significant variability in psychological distress and adverse impact of stuttering on quality of life among AWS. Additionally, greater salience, centrality, and concealment predicted poorer psychological health outcomes AWS, but there were not reliable relationships associated with disclosure.
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“Imagine this. I walk in the door. Tall, Blonde, Macho, Strappy, Rugby-playing Hennie. Next to me is the guy in the wheelchair. His problem is obvious. I look normal. I open my mouth to speak and ... NO. The game is not over yet. Not over till I stutter. Then [stuttering] happens. Out of the blue. It takes me by surprise because I don’t know exactly when it will pop up and until it does I am normal... So now a new struggle starts. I have to struggle from being a stutterer to get back to a normal. The only way I can do that is by not stuttering... Lean over to the normals, from the dark side. Lean back from the dark side to the normal... Through all this you just hope that you can make them understand that there is more to this person than just the stutter” (Kathard, 2003, p. 186).

Hennie’s personal attributes are the lens through which he views himself. His physical characteristics, masculinity, athletic ability, and stuttering are the anchors of his identity. Because Hennie plays rugby, he is a rugby player; because he stutters, he is a person who stutters or a “stutterer.” Hennie, like all of us, has many identities, and together these identities make up his self-concept, or what comes to mind when he thinks of himself (Tajfel, 1981).

Hennie and the man in the wheelchair are similar because they both possess an identity that deviates from societal norms, but there is one significant difference between the two. Because of the inherent contextual variability of stuttering, Hennie’s “deviant” identity is not always perceptible to others. As a person who stutters, Hennie intermittently produces certain types of “stuttering-like” disfluencies including sound and syllable repetitions (e.g. “m-m-my”), audible sound prolongations (e.g. “ttttthhhhhhis”), and inaudible sound prolongations or “blocks” (“___I”) (Johnson, 1959; Yairi & Ambrose, 1999). For Hennie and 70 million other
people who stutter around the world, the struggles of shifting between being perceived as “normal” and as a member of the “dark side” can give rise to distressing identity dilemmas.

For people who stutter, this specific predicament was captured by Joseph Sheehan (1970) in his Role-Conflict Theory, in which he described stuttering as a “conflict revolving around self and role, an identity problem” (p. 4). Sheehan proposed that a significant source of distress for people who stutter stems from occupying separate, incompatible, and simultaneous roles of being both a “stutterer” and a “normal speaker” (p. 7). The distress associated with this dilemma, along with the other more obvious challenges of living with stuttering, have been speculated to contribute to poor psychological health outcomes among people who stutter (Tran, Blumgart, & Craig, 2011). In particular, people who stutter often come to internalize the stigma attached to stuttering (Boyle, 2013), such that a host of negative emotions and feelings tied to stuttering become prominent aspects of their identity. Sheehan argued that in order to reduce distress, people who stutter must resolve role-conflict by changing the ways they think about and behave in relation to their identity as a person who stutters. Motivated by Sheehan’s Role-Conflict Theory, the aim of the current study was to investigate if and how stigma-identity constructs relate to psychological health outcomes among adults who stutter (AWS).

This chapter is organized in six sections. In the first section, I discuss how the perceptibility of stuttering influences the experiences that AWS have with stigma. Second, I describe how conceptualizing stuttering as a type of concealable stigmatized identity (CSI) may be useful in explaining variability in psychological health outcomes among AWS. In the third and fourth sections, I discuss how specific stigma-identity constructs (including identity-related thoughts and behaviors) contribute to psychological health outcomes among other stigmatized groups and how these constructs might relate to AWS. In the fifth section, I discuss how stigma-
identity constructs interact with other personal characteristics (e.g., symptom severity) to influence psychological health outcomes among people with CSIs. Finally, in the sixth section, I describe the purpose and research questions for the present study.

1.1. The Perceptibility of Stuttering and Stigma

People who live with stuttering also live with stigma, which has historically been defined as a “deeply discrediting” identity that reduces a person from “a whole and usual person to a tainted, discounted one” in the eyes of others (Goffman, 1963, p. 3). Contemporary stigma scholars have expanded on this definition and generally agree that the word “stigma” represents the devalued identity and the expressions of social power associated with it (Link & Phelan, 2001). Thus, the word “stigma” can be used to refer to stuttering itself or the related social devaluation.

Similar to other stigmatized groups, the stigma of stuttering includes immediate and long-term social penalties that negatively impact psychological health (Craig & Tran, 2014; Hatzenbuehler, Phelan, & Link, 2013). For example, research has shown that both during and outside of verbal interactions, some people who stutter report that they are mocked, imitated, laughed at, and socially excluded because they stutter (Corcoran & Stewart, 1998; Plexico, Manning, & Levitt, 2009a). There are additional reports that stuttering is met with unsolicited, unwelcome, or unhelpful advice such as, “Have you tried slowing down?” or hostile orders to “Just be quiet” (Constantino, Manning, & Nordstrom, 2017; Plexico et al., 2009a). Compared to adults who do not stutter (AWNS), AWS experience elevated levels of psychological distress (Tran et al., 2011) and heightened trait and social anxiety (see Craig & Tran, 2014 for review). Negative psychological health outcomes are not unique to AWS and, in fact, are common in other stigmatized groups (Hatzenbuehler et al., 2013). The social consequences of possessing a
socially devalued identity, such as stuttering, are toxic to health and have been identified as a “fundamental cause” of health inequities between stigmatized and non-stigmatized groups (Hatzenbuehler et al., 2013; Link, Phelan, & Hatzenbuehler, 2018).

The degree to which a stigmatized attribute can be perceived by others is important because it influences the stigmatized individual’s social experiences (Goffman, 1963). When people are perceived to possess a stigmatized identity, they are vulnerable to negative social consequences including stereotyping, prejudice, and discrimination (Corrigan, Larson, & Rüsch, 2009). In his seminal work on stigma, Goffman distinguished stigmatized individuals into those with discredited and discreditable identities based on the perceptibility of their stigma. Discredited individuals are those whose stigmatized identities are immediately perceptible to others and known to communicative partners in social interactions (e.g. people with facial disfigurement, physical disabilities). People with discredited identities cope with frequent stigmatization, but their social experiences are – to at least some extent – consistent and predictable.

In contrast, discreditable individuals are those whose stigma is not always immediately evident to listeners because it is episodic (e.g., epilepsy), invisible (e.g., diabetes), or ambiguous (e.g., biracial). Because their identities sometimes go unnoticed, discreditable individuals may not encounter stigmatization as frequently as those whose identities are consistently perceptible. Importantly, people with discreditable identities experience the added uncertainty related to if, when, and how social devaluation might occur (Goffman, 1963; Quinn & Chaudoir, 2009). In his writing on Role-Conflict theory, Sheehan illustrated the discreditable nature of stuttering, stating; “The to-be-or-not-to-be, to-speak-or-not-to-speak is always with the stutterer, and from this gnawing pervasive uncertainty springs the major portion of the handicap” (1970, p. 263 – 264).
1.2. Stuttering as a Concealable Stigmatized Identity (CSI)

In the contemporary social psychology literature, discreditable identities are often referred to as concealable stigmatized identities (CSIs). CSIs include any identities that are both (1) socially devalued and (2) able to be hidden from others (Crocker, Major, & Steele, 1998; Quinn & Chaudoir, 2009). In the current study, I contended that stuttering is a CSI. Considering stuttering as a CSI allowed for the use of a novel framework to examine variability in psychological health outcomes among AWS.

The rationale for considering stuttering as a CSI was threefold. First, people who stutter are not visually distinguishable from those who do not stutter – a person’s stuttering-status cannot be inferred just by looking at him (Goffman, 1963). Unless a person is speaking and producing stuttering-like disfluencies, his status as a person who stutters is likely to be unknown by others. The acoustic energy associated with the production of stuttering-like disfluencies reveals a person’s stuttering identity. Second, most AWS produce the majority of their words fluently (Ambrose & Yairi, 1999; Johnson, Brown, Curtis, Edney, & Keaster, 1967). Listeners expect to hear typically fluent speech and assume that a speaker does not stutter until there is reason to believe otherwise (Guntupalli, Everhart, Kalinowski, Nanjundeswaran, & Saltuklaroglu, 2007). When people who stutter speak fluently in a spontaneous or controlled manner, their “stuttering identity” can go unnoticed and they can “pass” as fluent speakers (Constantino et al., 2017). Finally, AWS are often skilled at intentionally concealing their stuttering-like disfluencies using a number of strategies to keep their identities as people who stutter a secret. Examples of these strategies include avoiding words and situations, manipulating speech (e.g. substituting words), and remaining silent (Butler, 2013; E. Douglass & Quarrington, 1952; Petrunik & Shearing, 1983).
Most AWS do not always know when they will be stigmatized because they are not always able to anticipate when they will stutter (Butler, 2013; E. S. Jackson, Yaruss, Quesal, Terranova, & Whalen, 2015; J. Sheehan, 1970; St. Pierre, 2013). When people who stutter speak fluently – at the moment, in that context – they may be perceived as fluent speakers; when they stutter, they may be perceived as people who stutter or “stutterers.” The intermittency of stuttering can thrust people who stutter into uncomfortable social predicaments and create identity dilemmas. The example below illustrates how production of stuttered speech can expose a person’s stuttering identity while simultaneously discrediting her from being perceived as “normal."

“You know, and I kinda liken [stuttering] to, you know, a woman wearing high heels, feeling confident, ‘I look good, I’m strutting down the road,’ and you’re walking along and all of a sudden ‘boom’ and you fall because you’re wearing high heels. And it’s like, it’s that jarring, you know. It’s like you look normal, you look normal, you look normal, and all of a sudden ‘boom’ you’re a fool” (J. E. Douglass, 2011, p. 72).

People with CSIs respond to unpredictable identity discrediting in unique ways that vary from person to person (Quinn & Chaudoir, 2009). Some people are preoccupied with thoughts related to their CSI, while others rarely think about the identity that makes them different. Some people try to hide their CSI, while others go out of their way to tell others. Importantly, the thoughts and behaviors that one entertains related to a CSI, or what can be referred to as “stigma-identity constructs,” have been shown to have significant associations with psychological health outcomes in people with a variety of CSIs (Quinn & Chaudoir, 2009; Quinn et al., 2014). Yet, the roles of stigma-identity constructs in psychological health outcomes have received little attention in research with AWS.
1.3. Stigma-Identity Related Thoughts Among People with CSIs: Salience and Centrality

*Salience* and *centrality* are two stigma-identity related thought constructs that are associated with significant negative psychological health outcomes among people with numerous types of CSIs, including people with medical conditions like epilepsy, histories of abortion, and eating disorders (Quinn & Chaudoir, 2009; Quinn et al., 2014). These constructs measure the magnitude, or relative size, of the CSI within a person’s self-concept. *Salience* refers to the frequency with which people with CSIs think about their stigmatized identity (Quinn & Chaudoir, 2009) and encompasses the mental burden of keeping a personal identity a secret (Smart & Wegner, 1999). Reports in the literature suggest that this construct has relevance for AWS; for example, some AWS describe their stuttering as a “huge” problem (J. E. Douglass, 2011, p. 188) that they constantly worry about (Plexico et al., 2009a). For these individuals, the stuttering identity would be highly salient compared to other AWS who report that they give little thought to their stuttering (Kathard, 2003). The construct of *centrality* refers to how self-definitional, or central, a stigmatized identity is to a person’s self-concept (Quinn & Chaudoir, 2009). People with high centrality believe that their CSI, above their other identities, largely defines who they are as a person (Quinn & Earnshaw, 2013). The quote below exemplifies how a person who stutters with high centrality of the stuttering identity might think or feel about their stuttering:

“The way I sounded just overshadowed everything else. It didn’t matter if I was attractive. It didn’t matter if I was an angel. It didn’t matter, all the other good qualities, as soon as I opened my mouth, I blew it” (Corcoran & Stewart, 1998, p. 255).

The majority of available evidence indicates that salience and centrality have significant negative impact on psychological health outcomes among people with CSIs (e.g., Helgeson, 2011; Park, Bharadwaj, & Blank, 2011; Quinn & Chaudoir, 2009; Quinn et al., 2014). In other
words, people who think about their CSI relatively frequently, and those who consider their CSI to be a relatively large part of their self-concept, tend to experience more distress than those whose CSI is of smaller magnitude. In addition, research has shown that these relationships are robust after controlling for relevant demographic characteristics and personality variables (e.g., neuroticism) that are known to co-vary with distress (Quinn & Chaudoir, 2009; Quinn et al., 2014).

1.4. Stigma-Identity Related Behaviors Among People with CSIs: Concealment and Disclosure

Concealment and disclosure are two stigma-identity related behaviors that also have significant associations with psychological health outcomes among people with CSIs. Both constructs are related to how people manage personal information and present themselves to others. When people actively attempt to prevent others from obtaining information about themselves, they are engaging in concealment (Larson & Chastain, 1990). Concealment is “often, but not always” associated with poor psychological health outcomes in people with many types of CSIs (Pasek, Filip-Crawford, & Cook, 2017), including minority sexual orientations (Frost, Parsons, & Nanín, 2007; S. D. Jackson & Mohr, 2016; Riggle, Rostosky, Black, & Rosenkrantz, 2017; Schrimshaw, Siegel, Downing Jr, & Parsons, 2013), HIV/AIDS (Zea, Reisen, Poppen, Bianchi, & Echeverry, 2005), and multiple sclerosis (Cook, Salter, & Stadler, 2017). Similar to other CSI groups, AWS report that they use a variety of behaviors to conceal stuttering. For example, some people conceal or avoid stuttering by substituting words, feigning forgetfulness, intentionally providing inaccurate information, or responding nonverbally (E. Douglass & Quarrington, 1952; Petrunik & Shearing, 1983). Although AWS have described distressing experiences with concealing stuttering in the qualitative literature (e.g., Butler, 2013),
the relationships between concealment and psychological health outcomes have received inadequate attention in research.

In contrast to concealment, disclosure refers to instances in which people share personal information with others, often through verbal communication (Chaudoir & Fisher, 2010). Disclosure has been shown to have positive associations with psychological outcomes among people with CSIs (e.g., Sheridan, 2017) and is advantageous to health in that it can increase social support and promote feelings of emotional wellbeing (Beals, Peplau, & Gable, 2009; Derlega, Metts, Petronio, & Margulis, 1993). Some AWS use disclosure statements to inform their conversational partners that they stutter. An example of a disclosure statement is “I sometimes stutter, so you might hear me repeat words or sounds, but if you have any questions or want me to say anything again, just let me know” (Byrd, Croft, Gkalitsiou, & Hampton, 2017). AWS report that disclosing stuttering can be beneficial because it relieves pressure to hide stuttering, elicits listener support, and reduces stigma. Although there have been studies investigating the effects of disclosure on listener perceptions of AWS (Byrd, McGill, Gkalitsiou, & Cappellini, 2017; Collins & Blood, 1990; Healey, Gabel, Daniels, & Kawai, 2007), research investigating the effects of disclosure on speakers who stutter is in its infancy.

1.5. The Complex Relationships Among Stigma-Identity Constructs and Psychological Health Outcomes

The extent that stigma-identity constructs have helpful or harmful relationships with psychological health outcomes among people with CSIs varies depending on individual differences in these constructs and in the ways that they interact (Brener, Callander, Slavin, & De Wit, 2013; Chaudoir & Fisher, 2010; Cole, Kemeny, & Taylor, 1997; Major & Gramzow, 1990; McGarrity & Huebner, 2014). That is, the extent that concealment and disclosure impact psychological health may change depending on individual differences in salience and centrality,
and vice versa (Pachankis, 2007; Quinn, 2018). For example, in a study of women with a history of abortion, Major and Gramzow (1990) found that disclosure was significantly associated with lower levels of distress, but only among women who reported that they thought about their abortion relatively frequently.

Symptom severity is another example of an individual difference that moderates the relationships between stigma-identity constructs and psychological health outcomes among people with CSIs (Brener et al., 2013; Cook et al., 2017). Symptom severity influences the extent to which an individual has personal control in managing stigma-identity related thoughts and behaviors, and in some cases, can alter the consequences to psychological health (Stutterheim et al., 2011). In a study of people with Multiple Sclerosis, the negative relationship between concealment and psychological health was stronger among people who reported higher levels of symptom severity than those with lower levels (Cook et al., 2017).

It could be that complex relationships between stigma-identity constructs and psychological health outcomes also exist among AWS. For example, similar to the experiences of women with a history of abortion, disclosure may be most beneficial to psychological health among AWS with highly salient stuttering-related thoughts. Additionally, it is possible that the effects of the stigma-identity constructs on distress among AWS change depending on symptom severity. It is possible that, as was observed among people with Multiple Sclerosis, concealment has the most harmful relationship with psychological health outcomes among AWS with higher levels of stuttering severity. In order to understand relationships between stigma-identity constructs and psychological health outcomes among AWS, it was important to consider both direct and complex relationships in the present study. Next, I describe the specific relationships
between stigma-identity constructs and psychological health outcomes that were explored in this study.

1.6. The Current Study

I propose that the intermittent perceptibility of stuttering engenders identity dilemmas among AWS that closely align with those described for other CSI groups, and that similar to these groups, stigma-identity constructs among AWS impact their psychological health. Although widely studied in other CSI groups, stigma-identity constructs and their relationships with psychological health have received little to no attention in the stuttering literature. Thus, the primary aim of the present study was to examine if and how salience and centrality (stigma-identity related thoughts) and concealment and disclosure (stigma-identity related behaviors) relate to psychological distress and adverse impact of stuttering on quality of life among AWS. Additionally, I aimed to investigate (1) if stuttering severity moderated these relationships, and (2) if there were interactions between the stigma-identity constructs in predicting psychological health outcomes. The following research questions guided this online survey study:

1. How do salience, centrality, concealment, and disclosure relate to distress and adverse impact of stuttering on quality of life among AWS?

2. To what extent are salience, centrality, concealment, and disclosure predictive of distress and adverse impact of stuttering on quality of life among AWS after controlling for demographic variables and neuroticism?
3. To what extent does self-rated stuttering severity moderate the relationships between stigma-identity constructs and both distress and adverse impact of stuttering on quality of life among AWS?

4. Do salience and disclosure interact to predict distress and adverse impact of stuttering on quality of life among AWS?
CHAPTER 2: REVIEW OF THE LITERATURE

This chapter is organized into six sections. In the first section, I discuss the multifaceted nature of stuttering, including its behavioral, cognitive, and affective components. Second, I draw from theoretical, clinical, and empirical work on stuttering to describe a threefold motivation for the current study. In the third section, I review the four stigma-identity constructs that will serve as predictor variables in the current study (salience, centrality, concealment, disclosure), describe their direct relationships with distress among people with CSIs, and discuss the potential relevance of each construct to AWS. In the fourth section, I summarize results from studies investigating (1) interactions between stigma-identity related thoughts and behaviors in predicting psychological health among people with CSIs, and (2) the moderating role of symptom severity. In the fifth section, I discuss the importance of ruling out alternative explanations in correlational studies and describe the rationale for investigating neuroticism as a factor that could potentially underly relationships observed between the stigma-identity constructs and psychological health outcomes. In the final section, I describe the significance of the current study and present hypotheses for the research questions.

2.1. The Nature of Stuttering

Stuttering is a neurodevelopmental communication disorder that affects sensorimotor processes involved in speech production among approximately 70 million people worldwide (Leavitt, 1974; A. Smith & Weber, 2017; Yairi & Ambrose, 2013). Stuttering typically emerges when children are between two and four years-old. The onset and development of stuttering is epigenetic and dynamically influenced by motor, linguistic, and emotional factors (A. Smith & Weber, 2017). Approximately 5% to 8% of children exhibit stuttering at one point in time during the preschool years (Yairi & Ambrose, 1999). Of these children, approximately 80% recover, or
stop producing stuttering-like disfluencies without intervention (Yairi & Ambrose, 1999).

Because so many young children experience unassisted recovery, stuttering is less common in adulthood and is exhibited by 1% of adult speakers. For those who do not recover in early childhood, stuttering is a chronic multidimensional communication disorder with behavioral, cognitive, and affective components (Conture & Walden, 2012; A. Smith & Weber, 2017; Starkweather & Gottwald, 1990; Yaruss, 1998).

2.1.1. Behavioral Components of Stuttering

Stuttering-like disfluencies – which include sound/syllable repetitions (e.g. “m-m-my”), audible prolongations (e.g. “ttttthhhhhhhhis”), and inaudible sound prolongations or “blocks” (“___I”) – comprise the primary behavioral component of stuttering (Johnson, 1959; Yairi & Ambrose, 1999). Stuttering-like disfluencies are distinct from so-called typical disfluencies, which are produced by all speakers. Whereas stuttering-like disfluencies are produced within-words, typical disfluencies are produced between-words (Johnson, 1959; Williams, Franklin, & Kools, 1968). Examples of typical disfluencies include interjections (e.g. “um/uh,” “like”), phrase repetitions (e.g. “I have to go – I have to go to the store”), and revisions (e.g. “Do you want – will you give me a ride home?”) (Johnson, 1959; Yairi & Ambrose, 1999).

For some people who stutter, stuttering-like disfluencies are accompanied by associated behaviors, or other speech and non-speech behaviors such as visible muscle tension in the face and neck, eye blinking, and other jaw, mouth, and bodily movements. The mechanisms responsible for the development of associated behaviors are in need of empirical investigation, but it is widely accepted by clinicians that they are learned behaviors that originate from attempts to minimize, escape, or avoid moments of stuttering-like disfluencies (see Bloodstein & Bernstein Ratner, 2008 for discussion). The severity of the behavioral component of stuttering is
commonly determined by assessing the frequency, type, and duration of stuttering-like disfluencies, as well as the number and variety of associated behaviors in multiple communication contexts (Johnson, Darley, & Spriestersbach, 1963; Riley, 1972; Riley & Bakker, 2009).

2.1.1.1. Intermittency and Variability of Stuttering

The behaviors of stuttering are intermittent and variable. That is, both children and adults who stutter produce stuttered speech, but they produce fluent speech too. In fact, people who stutter tend to produce most of their words fluently (Ambrose & Yairi, 1999; Johnson, 1959). The majority of AWS report that they are not always able to anticipate when they will produce a moment of stuttering (E. S. Jackson et al., 2015). That said, stuttering-like disfluencies are somewhat predictable because they are more likely to be produced in certain linguistic and paralinguistic contexts. For example, stuttering-like disfluencies are commonly produced on the first sound of words and sentences, multisyllabic words, and meaningful content words such as nouns, verbs, and adjectives (Brown, 1937; Eisenson & Horowitz, 1945). AWS are also more likely to produce stuttering-like disfluencies when speaking under time pressure (Johnson & Rosen, 1937). Yet, these patterns of fluency and disfluency vary in idiosyncratic ways related to situation, conversational partner, language function and complexity, emotional state, and degree of autonomic nervous system arousal (Constantino, Leslie, Quesal, & Yaruss, 2016; Packman, Onslow, Richard, & Van Doom, 1996; Vanryckeghem, Hylebos, Brutten, & Peleman, 2001; Walden et al., 2012). For AWS, it is typical for the frequency of stuttering to vary from day-to-day and even from situation-to-situation within the same day (Constantino et al., 2016). The variability of stuttering makes it difficult for people who stutter to navigate social situations. One AWS described the struggles related to coping with the variability of stuttering, stating:
“I can’t get used to it. I wish I were blind of deaf or crippled. Then I’d always be that way and though it would be hard I could finally accept it. But the way it is, I talk all right for a bit and then get clobbered. I hope I can talk; I fear I can’t; sometimes I can; sometimes I can’t. I’m always torn” (Van Riper, 1982, p. 2).

2.1.2. Cognitive and Affective Components of Stuttering

The cognitive and affective components of stuttering include negative thoughts, attitudes, and feelings related to communication (J. Sheehan, 1970; Van Riper, 1982; Yaruss, 1998). For some people, stuttering is associated with feelings of shame, embarrassment, fear, anger, and reduced self-worth (Ginsberg, 2000; Plexico et al., 2009). The majority of existing evidence indicates that the negative cognitive and affective components develop over time as people live with stuttering and its associated stigma (Craig & Hancock, 1996; Van der Merwe, Robb, Lewis, & Ormond, 2011). In this section, I provide an overview of the stigma and social penalties associated with stuttering and summarize the evidence for disparities in psychological health outcomes associated with stuttering across the lifespan.

2.1.2.1. Stigma and Social Penalties Associated with Stuttering

People who stutter begin to incur social consequences for stuttering as early as the preschool years. At four years-old, typically fluent preschoolers show a preference toward playing with children who do not stutter (Ezrati-Vinacour, Platzky, & Yairi, 2001) and begin to interrupt, mock, and ignore their stuttering peers (Langevin, Packman, & Onslow, 2009). Compared to their typically fluent counterparts, school-age children who stutter are disproportionately vulnerable to bullying and peer rejection and are less likely to be perceived as popular (Blood & Blood, 2004, 2007; Davis, Howell, & Cooke, 2002). In adolescence and adulthood, the social consequences associated with stuttering continue to accumulate and spill
into other life domains. Adolescents and young adults report that they perceive AWS to be less attractive than AWNS and report that they are less likely to engage in romantic relationships with AWS (Van Borsel, Brepoels, & De Coene, 2011). Additionally, AWS encounter stuttering-related discrimination in the workplace that can jeopardize occupational success (Gerlach, Totty, Subramanian, & Zebrowski, 2018).

2.1.2.2. Psychological Health Outcomes Associated with Stuttering

Over the years, as people who stutter routinely encounter speaking situations that result in social penalties, the risk of developing negative psychological health outcomes increases. During the preschool years, children who stutter have significantly poorer attitudes toward speech compared to their non-stuttering peers (De Nil & Brutten, 1991; Vanryckeghem, Brutten, & Hernandez, 2005), but there are no meaningful difference in other psychological health outcomes such as social anxiety (van der Merwe et al., 2011) or health-related quality of life (de Sonneville-Koedoot, Stolk, Raat, Bouwmans-Frijters, & Franken, 2014). Studies examining anxiety in children and adolescents who do and do not stutter have yielded equivocal findings when comparing the two groups (see K. A. Smith, Iverach, O’Brian, Kefalianos, & Reilly, 2014 for a review), with several studies indicating that there are no significant differences in anxiety between youth who do and do not stutter (e.g., Andrews & Harris, 1964; Messenger, Packman, Onslow, Menzies, & O’Brian, 2015; Ortega & Ambrose, 2011), and a smaller number of studies finding that youth who stutter report higher levels of anxiety than their typically fluent peers (e.g., Blood & Blood, 2007; Mulcahy, Hennessey, Beilby, & Byrnes, 2008).

Although there are not clear differences in anxiety between youth who do and do not stutter, there is evidence that multiple forms of anxiety increase with both age and experience among young people who stutter (McAllister, 2015) and that attitudes toward communication
become more negative (Vanryckeghem & Brutten, 1997). Thus, while it seems that children who stutter become increasingly concerned about stuttering over time, this doesn’t result in clear discrepancies in psychological health outcomes until late adolescence or early adulthood. Results from a meta-analysis of studies assessing stuttering and anxiety indicate that, as a group, AWS have significantly higher levels of trait anxiety and social anxiety than AWNS (Craig & Tran, 2014). Other large-scale studies provide evidence that AWS are also more likely to report negative mood states including depression and somatization (Tran et al., 2011).

2.2. Motivation to Investigate the Role of Stigma-Identity Constructs in Distress Among AWS

Compared to AWNS, AWS are at risk for experiencing elevated levels of distress and other negative psychological health outcomes (Craig & Tran, 2014; Tran et al., 2011). That said, many AWS do not experience elevated levels of distress and little is known about why some AWS struggle to cope and others are resilient. Research with other stigmatized populations indicates that in order to understand who is vulnerable to distress within a stigmatized group, it is critical to consider not just if a person possesses a stigmatized attribute, but how they construct an identity around that attribute (Quinn & Chaudoir, 2009; Quinn et al., 2014). Although references to the role of identity-related factors in distress among AWS are ubiquitous in the stuttering literature (e.g., Butler, 2013; Daniels & Gabel, 2004; Daniels, Hagstrom, & Gabel, 2006; Kathard, Norman, & Pillay, 2010; Kathard, Pillay, Samuel, & Reddy, 2004; Petrunik & Shearing, 1983, 1988; Watermeyer & Kathard, 2016), there is scant empirical evidence in support of relationships between these factors and distress for AWS. As such, in the following sections, I describe theoretical, clinical, and empirical work from the stuttering literature that makes a case for the role of stigma-identity constructs in distress among AWS and the need to explore these relationships.
2.2.1. Theoretical Support for Examining Stigma-Identity Constructs and Distress Among AWS

In his *Role-Conflict Theory of Stuttering*, J. Sheehan (1970, 1975) – a pioneer in stuttering research and a person who stuttered himself – asserted that identity factors were critical in explaining variability in stuttering and its associated distress. Sheehan referred to stuttering as a “disorder of the social presentation of the self” and a “conflict revolving around self and role, an identity problem” (p. 4). Both the intermittency of stuttering and the notion of “roles,” or identities, are central to Sheehan’s Role-Conflict Theory. Specifically, Sheehan argued that people who stutter are “part-time normal speakers” because they stutter intermittently and produce fluent speech most of the time. He concluded that stuttering and its associated distress are exacerbated when speakers experience role-conflict, or moments of tension that stem from managing discordant identities as both a person who can speak fluently (fluent speaker) and a person who stutters (stuttering speaker).

When people who stutter speak fluently within a given interaction, others may assume that they are a fluent speaker. Sheehan asserted that because of their intermittent experiences with fluent speech, many, if not most, people who stutter attempt to conceal their stuttering identities and “pass” as fluent speakers at least sometimes. However, passing as fluent necessarily requires them to intentionally and actively conceal their stuttering (and thus, their stuttering identity) through the use of “false behaviors” in order to appear typically fluent to others. Examples of false behaviors include communicating nonverbally, choosing words selectively based on whether or not stuttering is anticipated, or pretending not to hear a question to avoid responding verbally (Butler, 2013; J. Sheehan, 1970).

Sheehan proposed that when people who stutter use false behaviors to conceal their stuttering identities, role-conflict can ensue in one of two ways, both of which lead to negative
emotions and feelings of distress. First, people who stutter may experience role-conflict and distress because they are misrepresenting themselves by concealing their stuttering identity. Sheehan wrote, “Misrepresentation of self to others is always productive of guilt, and the stutterer is no exception” (1970, p. 14). The second way role-conflict can lead to distress is through violation of role expectations. When people who stutter use false behaviors to appear as fluent speakers to others, they reinforce role-expectations for fluency in future social interactions. In other words, by reinforcing the listener’s expectations for fluent speech, the social penalties for future instances of stuttering may become harsher. Given that most speakers cannot always anticipate when they are about to produce a moment of stuttering (E. S. Jackson et al., 2015), it is likely that stuttering will inevitably be revealed to others, thus breaking the façade of fluency and exposing the speaker’s stuttering identity to public view. Sheehan believed that this violation of role expectations induces feelings of guilt, shame, and anxiety among people who stutter.

Sheehan asserted that the goal of therapy should be to resolve the dissonance between stuttering and fluent identities by either (1) entirely extinguishing or completely accepting the stuttering identity, or (2) learning to seamlessly move, in real time, between alternating identities as a person who stutters and a fluent speaker. Sheehan believed that, for AWS, eliminating the stuttering role was not possible because of its neurodevelopmental and chronic nature; thus, he advocated for therapy that emphasized self-acceptance through changing the ways in which AWS think about and behave in relation to their identity as a person who stutters.

Role-Conflict Theory provides a theoretical motivation for the current study through its implication of identity conflict as the source of distress among AWS. Further, Sheehan identified stigma-identity constructs as contributing factors to distress, including *concealment* of stuttering.
and the stuttering identity, and *suppression* of stuttering-related thoughts and behaviors (J. Sheehan, 1970, 1975). That said, one limitation of this theory is that it lacks the level of specificity required to explain the mechanisms whereby specific stigma-identity constructs contribute to distress among AWS. The current study is a necessary first step in providing empirical support for a coherent theory of how specific stigma-identity constructs contribute to distress among AWS.

2.2.2. Clinical Support for Examining Stigma-Identity Constructs and Distress Among AWS

In addition to its theoretical relevance, the current study provides an empirical foundation for beginning to demystify the mechanism of change in identity-based clinical approaches to working with AWS. Despite a lack of direct evidence supporting efficacy, identity-based approaches in contemporary stuttering therapy are both well-known and widely implemented. In particular, the clinical literature contains many descriptions of Avoidance-Reduction Therapy for stuttering (Sisskin, 2018).

Avoidance-Reduction Therapy is rooted in Sheehan’s work on Role-Conflict Theory (1970, 1975), and is based on the core principal that concealing and suppressing stuttering behavior and the stuttering identity both cause and perpetuate distress. Thus, an essential first step in Avoidance-Reduction Therapy is to increase the clients’ acceptance of stuttering and their identity as a person who stutters. This is achieved by systematically extinguishing tendencies to avoid or conceal stuttering/the stuttering identity while simultaneously increasing tendencies to approach stuttering/the stuttering identity (J. Sheehan, 1970, 1975; Sisskin, 2018). In Avoidance Reduction Therapy, avoidance and concealment behaviors (e.g., inhibiting speech because of stuttering in social situations) are thought to exacerbate distress because they trigger role-conflict (J. Sheehan, 1970, 1975). In contrast, approach behaviors (e.g., stuttering openly in social
situations) are thought to decrease distress over time because they are congruent with the stuttering identity, which is a part of the person’s authentic self.

There are several procedures that clinicians can use in Avoidance-Reduction Therapy to decrease avoidance and increase approach behaviors, only some of which are described here. For example, to decrease avoidance tendencies, the clinician helps clients to identify the specific false-role behaviors that they use to conceal their stuttering or identity as a person who stutters (e.g., substituting words, pretending not to hear someone who is speaking to them). Then the clients are instructed to monitor, track, and extinguish their use of false-role behaviors with assistance and support from the clinician (J. Sheehan, 1970, 1975; Sisskin, 2018).

Openly discussing stuttering, fear-seeking activities, and pseudostuttering are three examples of identity-based procedures used to increase approach tendencies in Avoidance-Reduction Therapy. Openly discussing stuttering with others is thought to be beneficial because it allows AWS to express previously suppressed thoughts and emotions, leading to reduced discomfort with publicly enacting the stuttering identity (J. Sheehan, 1970, 1975; Sisskin, 2018). Fear-seeking activities are another way to increase clients’ approach toward the stuttering identity. When engaging in fear-seeking activities, AWS are encouraged to openly stutter – or stutter without holding back or trying to conceal – in social situations that are self-identified as feared. Fear-seeking activities are thought to reduce distress because they dismantle habits related to concealing stuttering and abolish fears that others will “discover” their stuttering identities (J. Sheehan, 1970, 1975).

Pseudostuttering (also known as voluntary or purposeful stuttering) is a clinical procedure in which people who stutter simulate moments of stuttering-like disfluencies in a “purposeful, voluntary, and controlled” manner (Saltuklaroglu, Kalinowski, Dayalu, Stuart, &
This is an identity-based procedure because it requires AWS to purposefully display their stuttering identity to the public view. Pseudostuttering is associated with cognitive, affective, and behavioral benefits. In a mixed-methods investigation of pseudostuttering outcomes, AWS reported that pseudostuttering helped them to reduce communication-related frustration, fear, and anxiety (Grossman, 2008). In another qualitative study, AWS reported that pseudostuttering provided them with a feeling of freedom and “diminished the fear of the listener discovering the reality of their stuttering” (Plexico, Manning, & Dilollo, 2005, p. 5). Additionally, there is evidence that pseudostuttering is associated with a reduction in the frequency of stuttering-like disfluencies (Fishman, 1937; Grossman, 2008; Meissner, 1946; J. Sheehan & Voas, 1957).

Presently, there is qualitative evidence in the clinical literature that Avoidance Reduction Therapy is associated with positive changes in communication and psychological wellbeing among AWS (V. M. Sheehan & Sisskin, 2001; Sisskin, 2006, 2018). However, the active ingredients that underlie the mechanism of change in this and other identity-based clinical approaches are unclear.

2.2.3. Empirical Support for Examining Stigma-Identity Constructs and Distress Among AWS

Research investigating identity-related issues among AWS is scant, and the few existing studies related to this topic are qualitative (Butler, 2013; Daniels & Gabel, 2004; Kathard et al., 2010; Petrunik & Shearing, 1983). In this section, I provide an overview of the two studies that have the most relevance to the current investigation. Both studies explored how AWS manage possessing an intermittent and stigmatized identity.

Using data from observations, life histories, and interviews with more than 50 AWS, Petrunik and Shearing (1983) conducted a study to investigate how AWS “coordinate the
requirements of creating [socially] acceptable identities and orderly interaction” (p. 136). Aiming to extend the work of Goffman (1963) on discreditable identities, the authors were specifically interested in examining the strategies AWS use to manage their intermittent and stigmatized stuttering identity. The authors identified three strategies that AWS use to “manage the potential stigma” of stuttering, which they described as (1) concealment, (2) openness, and (3) disavowal. Concealment strategies included any behaviors that aimed to avoid, circumvent, or camouflage stuttering. In contrast, openness strategies included behaviors in which AWS spoke without suppressing stuttering-like disfluencies or thinking about the consequences of stuttering. The authors described negative “costs” of concealment including reduced social participation and increased self-consciousness. People who were more open about stuttering reported fewer negative costs and, according to the authors, “seemed to be less conscious of their stuttering.” Disavowal, the third strategy for managing the stuttering identity, included the behaviors the speakers used in order to “overlook” stuttering or pretend as though nothing unusual was happening. Looking away from the listener during a moment of stuttering, for example, was one type of disavowal behavior cited. The authors speculated that many AWS use disavowal behaviors to hide their vulnerability and protect themselves from embarrassment and other negative emotions.

Thirty years after the Petrunik and Shearing (1983) study was published, Butler (2013) conducted a similar study with 39 AWS using data from focus groups and semi-structured interviews. The purpose of Butler’s study was to investigate “how individuals who are subject to the intermittent emergence of a stigmatized characteristic [stuttering] manage this randomized personal discrediting in their identity work” (p. 1). Again, concealment was a main theme, and people who concealed stuttering described associated negative consequences including decreased
social participation and a loss of individuality. Butler also identified novel strategies that were not reported by Petrunik and Shearing. For example, a main theme was that some AWS cope by associating positive personal characteristics with stuttering or developing a positive identity around stuttering. For example, some participants said that managing an intermittent stigmatized identity (stuttering) made them more tolerant and kind toward others.

Together, the results from these two studies illustrate that identity management is a multifaceted construct that has complex relationships with psychological health outcomes among AWS. Additionally, the results provide clear evidence that AWS think about and behave in relation to their stuttering identities in a variety of ways. In both studies, concealment was associated with negative psychological consequences based on clinical observations and qualitative reports from AWS. The current study was a novel contribution to the literature because it quantitatively examined the link between psychological health outcomes and specific stigma-identity constructs, one of which was concealment.

2.2.4. Conceptualizing Stuttering as a CSI to Demystify Links between Identity and Distress among AWS

As a group, AWS are vulnerable to experiencing elevated levels of distress (Craig & Tran, 2014), but there is variability in distress between AWS and little is known about why only some AWS struggle to cope. In the current study, I aimed to fill this gap by investigating the extent that specific stigma-identity constructs explain variability in psychological health outcomes among AWS. The need for this study is supported by existing theoretical, clinical, and empirical work in the field of speech-language pathology.

The pattern of distress observed among AWS – characterized by both vulnerability and variability – is not unique to stuttering and is common among other groups of people with CSIs (Quinn & Chaudoir, 2009). Although the relationships between stigma-identity constructs and
psychological health outcomes have not received adequate attention in the stuttering literature, they have been widely investigated among other CSI groups (e.g., Quinn & Chaudoir, 2009; Quinn et al., 2014). This research has demonstrated that stigma-identity constructs are critical in explaining who is vulnerable to distress within CSI populations. In the current study, I argue that stuttering is a type of CSI, and as such, it is necessary to consider the role of stigma-identity constructs among AWS if one is to understand vulnerability to distress at the level of the individual.

2.3. Stigma-Identity Constructs

A primary aim of the current study was to examine whether stigma-identity constructs that explain variability in distress in other CSI populations also explain variability in distress among AWS. In this section, I provide an overview of the four stigma-identity constructs that were included in the current study, including two stigma-identity related thought constructs (salience, centrality) and two stigma-identity related behavior constructs (concealment, disclosure). These specific constructs were selected for two reasons. First, they are well researched among people with CSIs and have demonstrated evidence-based relationships with distress, an outcome variable in the current study. Second, there is either direct or indirect evidence from the stuttering literature suggesting that each of these variables is relevant to AWS.

2.3.1. Stigma-Identity Related Thoughts

2.3.1.1. Salience

Salience refers to the frequency that people think about their stigmatized identity and is thought to represent the cognitive burden of possessing a CSI (Quinn & Chaudoir, 2009). Measures of salience encompass any thoughts about the CSI, including positive, negative, and neutral thoughts. The salience of a CSI can be influenced by its associated symptoms and
relevant contexts (Quinn & Earnshaw, 2013). For example, a person’s stuttering identity may be highly salient during moments of stuttering or in contexts that require verbal communication.

Salience is positively associated with and predictive of distress among people with a variety of CSIs (Quinn & Chaudoir, 2009; Quinn et al., 2014). Quinn and Chaudoir (2009) were the first to investigate the role of stigma-identity related thoughts in distress among people with CSIs. In this study, the authors investigated the extent that salience and three other constructs (centrality, anticipated stigma, cultural stigma) predicted distress in two samples. The first sample consisted of 300 people who reported having one of 13 kinds of CSIs (e.g. medical conditions, sexual orientation, previous drug use, history of childhood sexual abuse), and the second sample consisted of 272 people who also reported having one of these CSIs.

The investigators assessed salience with a one-item scale that asked participants “to indicate the extent to which they generally think about their concealed identity” by selecting one of the following options: “almost never, several times a year, once a month, once a week, a few times a week, once a day”, and “many times each day” (Quinn & Chaudoir, 2009, p. 12). These categorical data were converted into a continuous variable using the following scale: “almost never” = 0 times per day; “several times a year” = 3/365; “once a month” = 12/365; “once a week” = 52/365; “a few times a week” = (4 × 52)/365; “once a day” = 1; “many times a day” = 5. In both samples, salience was positively associated with and predictive of distress (Quinn & Chaudoir, 2009).

In a follow-up examination, Quinn et al. (2014) re-examined the role of salience in distress among people with one of five different CSIs: mental illness, substance abuse, domestic violence, sexual assault, and childhood abuse. Overall salience scores were calculated by averaging participant responses across three items. Participants responded to the first item (“How
often do you think about your [CSI]?”) using a 7-point Likert Scale (1 = Almost Never, 7 = Many times each day). Participants used a different 7-point Likert Scale (1 = Strongly Disagree, 7 = Strongly Agree) to respond to the second and third items. These items were “I spend a lot of time thinking about my [CSI]” and “My [CSI] often crosses my mind for no reason.” Using the full sample, the investigators replicated the finding that salience was positively associated with and predictive of distress. Salience was also predictive of distress in 4 of the 5 unique CSI subgroups.

Although the construct of salience has not been explicitly studied in AWS, there is evidence that the frequency of stuttering-related thoughts may be associated with negative psychological health outcomes among AWS. For example, Plexico et al. (2009a) conducted interviews with nine AWS on the topic of coping with stuttering. Two themes that emerged from qualitative analysis of the interview transcripts were that participants spent a significant amount of effort (1) “thinking about stuttering,” and (2) “anticipating stuttering and pre-planning ways to manage it.” One interviewee described his struggles associated with highly salient stuttering-related thoughts, stating:

“It’s [thinking about stuttering] always going on when I talk. I just always feel like when I come to that, you know, the next word I’m going to stutter. The first [thought] that will come in is, How can I change that word? Second [thought], Do I have to say that word? Third [thought], Can I say it slowly, can I say it without stuttering? And these three thoughts come in the span of one second. One, two, three. And the next second, I have to choose one of the three and say the word out” (Plexico et al., 2009a, p. 95).

One reason highly salient thoughts about stuttering may lead to feelings of distress is because of the associated cognitive burden (Quinn & Chaudoir, 2009). The example above
illustrates the extent that stuttering-related thoughts can tax cognitive resources. In another qualitative study, an AWS recounted how cognitive preoccupation with stuttering-related thoughts negatively impacted his experiences in school:

“I feel like I wasn’t even listening to maybe 75 percent of what anyone was saying [in school] because I was thinking almost all the time about my speech and what would I do if they called [on me], and what should I do if this, like replaying scenarios in my mind”  
(Daniels, Gabel, & Hughes, 2012, p. 77)

In a different study, investigators took a direct approach to exploring the relationship between stuttering-related thoughts and psychological health among AWS (St. Clare et al., 2009). St. Clare et al. (2009) developed and used the Unhelpful Thoughts and Beliefs about Stuttering scale (UTBAS), which measures the frequency of unhelpful thoughts and beliefs about stuttering. This measure is different from the construct of salience, which measures the total frequency of positive, negative, and neutral stuttering-related thoughts. Results indicated that higher scores on the UTBAS (or relatively high frequencies of unhelpful stuttering-related thoughts) were associated with higher levels of anxiety for participants in the study. This finding provides evidence that identity-related thoughts are relevant to psychological health outcomes among AWS and worthy of further investigation.

2.3.1.2. Centrality

People vary in the extent that they think their CSI defines who they are as individuals. Centrality measures how important or self-definitional a stigmatized identity is to a person’s self-concept (Quinn & Chaudoir, 2009). Centrality has consistent positive correlations with distress among people with a variety of CSIs (Cruwys & Gunaseelan, 2016; Helgeson, 2011; Park et al.,
2011; Quinn & Chaudoir, 2009; Quinn et al., 2014). In other words, people who report that they largely define themselves by their CSI also tend to report higher levels of distress.

There are at least two potential explanations for the positive association between centrality and distress among people with CSIs. First, the inconspicuous nature of a CSI may make it more difficult for people with CSIs to find others who share their devalued identity and build positive group-level identities (Frable, Platt, & Hoey, 1998). If a person perceives that his CSI is an integral part of who he is but has limited social support and negative perceptions of his CSI, it is likely that he will be vulnerable to experiencing elevated levels of distress. Second, compared to people with low centrality, people with high centrality are more likely to perceive discrimination (Earnshaw, Lang, Lippitt, Jin, & Chaudoir, 2015; Sellers & Shelton, 2003) and have stronger negative reactions when they perceive that they are on the receiving end of discrimination (McCoy & Major, 2003).

Centrality is also predictive of distress in people with CSIs, but it appears to be a weaker and less consistent predictor in comparison to salience. In their seminal study, Quinn and Chaudoir (2009) found that centrality was predictive of distress in a sample of 300 people with a variety of CSIs and replicated this finding with an additional, separate sample of 272 people. In this study, the authors measured centrality using response to 4 survey items, which included; (1) “My concealed identity is an important reflection of who I am,” (2) “Overall my concealed identity has very little to do with how I feel about myself,” (3) “My concealed identity is unimportant to my sense of what kind of person I am,” and (4) “My concealed identity is an important part of my self-image.” Participants responded using a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). The authors used reverse coding for items two and three.
so that higher scores reflected greater centrality across items. Overall centrality scores were calculated by averaging each participant’s response across the four items.

In a separate follow-up investigation, Quinn et al. (2014) observed that centrality did not predict distress in a large sample of people with CSIs, and thus did not replicate their initial findings. In the follow-up study, centrality was assessed with a 6-item measure that included two of the four centrality items from Quinn and Chaudoir (2009). The authors replaced the two items that were reverse coded from the centrality measure in Quinn and Chaudoir (2009) with four new items (e.g. “My [CSI inserted] is an important reflection of who I am”). All items in the new measure were coded in the same direction on a 7-point Likert Scale (1 = Strongly Disagree, 7 = Strongly Agree). It is possible that there was no relationship between centrality and distress in this sample, or it could be that the null findings were an artifact of the new measurement tool.

In sum, research investigating the extent that centrality predicts distress among people with CSIs has yielded mixed results (Quinn & Chaudoir, 2009; Quinn et al., 2014). One potential explanation for equivocal findings is that the relationship between centrality and distress is complex, primarily because of its interdependence on a range of internal and external variables. That is, it is possible that centrality consistently predicts distress, but only under certain circumstances or in certain subgroups of people with CSIs. For example, there is evidence that centrality interacts with symptom severity to predict psychological health outcomes among people with CSIs (Brener et al., 2013). This complex relationship will be discussed in more detail in the following section.

Centrality is a term that has not been used in the stuttering literature. The underlying concept, however, has received a small amount of attention. For example, a sub-theme that emerged from a qualitative study on coping with stuttering among AWS was “With maturity and
accomplishment stuttering has become a less prominent characteristic of myself, which results in feelings of increased self-worth” (Plexico, Manning, & Levitt, 2009b, p. 113). Participants reported that, during their childhoods and young adulthoods, stuttering was a dominant part of their self-concept that negatively impacted their social and vocational experiences. However, they described that as they matured, learned about stuttering, and met other people who were coping with similar problems, they began to perceive stuttering as a less prominent personal characteristic. They added that, as the magnitude of their stuttering identity decreased, they developed increased feelings of self-worth, felt more comfortable with stuttering, and experienced less stuttering-related fear and anxiety (Plexico et al., 2009b). One participant described the relief associated with decreasing the centrality of his stuttering identity in this way:

“As you succeed in life, you know, as you discover that you’re good at your work and that people, you know, respect you for that ... it sometimes dawns on you that, you know, you’re a pretty good conversationalist and people enjoy talking to you and people think you’re funny and you know some things. I think slowly that begins to build up a consciousness that, hey, stuttering didn’t define me a certain way it’s just a part of who I am. It’s not “Slick” the stutterer. It’s “Slick” the librarian or the Sunday school teacher or the father or you know it’s just part of what you do but it’s not the main thing people think about you. That’s nice too. And it just becomes less of a defining part of you and more of just a part of you.” (Plexico et al., 2009b, p. 113).

2.3.2. Stigma-Identity Related Behaviors

2.3.2.1. Concealment

When people attempt to prevent others from discovering personal information, they are engaging in concealment (Larson & Chastain, 1990). Most people have thoughts, feelings,
experiences, or personal characteristics that they avoid sharing with others; thus, concealment is a “familiar human experience” (Larson & Chastain, 1990, p. 439). It is common for people to intentionally withhold personal information even from family members (Vangelisti, 1994), friends (DePaulo & Kashy, 1998), and romantic partners (Baxter & Wilmot, 1985). Concealment is a coping strategy that people sometimes use to manage the stigma associated with possessing a CSI (Meyer, 2013; Pachankis, 2007). Often people choose whether or not to conceal depending on the situation or individual with whom they are interacting (Pachankis, 2007). For example, some people conceal their CSI only in certain contexts or with certain people (King, Mohr, Peddie, Jones, & Kendra, 2017).

Concealment is associated with poor psychological health outcomes among people with many types of CSIs, including minority sexual orientations (Frost et al., 2007; S. D. Jackson & Mohr, 2016; Riggle et al., 2017; Schrimshaw et al., 2013), multiple sclerosis (Cook et al., 2017), and histories of intimate partner violence (Sylaska & Edwards, 2014) and substance abuse (Luoma, Guinther, Potter, & Cheslock, 2017). Larson, Chastain, Hoyt, and Ayzenberg (2015) conducted a meta-analysis of 137 studies that used the Self-Concealment scale to measure concealment with various populations (e.g. adolescents, sexual minorities, intimate partner violence, etc.). The authors derived correlations between concealment and psychological health outcomes and found significant relationships between concealment and depression \( (r = 0.4) \), anxiety \( (r = 0.38) \), distress \( (r = 0.38) \) and other indices of mental health \( (r = .42) \). Based on this analysis, the authors concluded that concealment is “strongly associated” with negative psychological health outcomes. Alternately, a handful of studies have shown that concealment does not always have negative relationships with psychological health outcomes among people with CSIs (Huebner & Davis, 2005; Molero, Fuster, Jetten, & Moriano, 2011). For example,
concealment can be beneficial to psychological health among people in hostile environments because it reduces the likelihood that they will encounter discrimination (Molero et al., 2011).

Presently, there is evidence that AWS attempt to conceal their stuttering. In a survey study with AWS, over 80% of participants reported that they respond to the feeling of anticipation by attempting to conceal their disfluencies at least some of the time (E. S. Jackson et al., 2015). In similar studies with adolescents, over 40% reported that they “often” or “always” keep stuttering a secret (Blood, Blood, Tellis, & Gabel, 2003; Erickson & Block, 2013). AWS report using a variety of behaviors to conceal stuttering, including word substitution, feigned forgetfulness, purposefully providing inaccurate information, coughing or blowing their nose (to cover their mouth while speaking), and responding nonverbally (Butler, 2013; E. Douglass & Quarrington, 1952; E. S. Jackson et al., 2015; Murphy, Quesal, & Gulker, 2007; Petrunik & Shearing, 1983).

Although concealment is typically conceptualized as a continuum of behavior in the CSI literature, it has been construed as a dichotomous behavioral category (“overt” and “covert” stuttering) in most of the stuttering literature. The distinction between overt and covert stuttering was first introduced in a report based on extended clinical observations of AWS. In this study, E. Douglass and Quarrington (1952) described people who covertly stutter as those who attempt to avoid producing audible disfluencies at all times. People who covertly stutter were also described as those who value fluency over authentic expression of their thoughts and feelings. The authors wrote that, although people who overtly stutter also fear stuttering and desire to appear “normal” to others, they ultimately privilege self-expression over fluency. Covert stuttering has also been referred to as “masked,” “hidden,” “interiorized,” and “secret” stuttering, and overt stuttering has
sometimes been called “exteriorized” stuttering (E. Douglass & Quarrington, 1952; Kroll, 1978; Petrunik & Shearing, 1983).

Most of the existing literature on covert stuttering consists of reports based on clinical observation (E. Douglass & Quarrington, 1952; Murphy et al., 2007; Petrunik & Shearing, 1983) and qualitative studies of AWS (Butler, 2013; Constantino et al., 2017). Much of this work has described unhealthy motivations and negative consequences related to concealing stuttering. For example, E. Douglass and Quarrington (1952) concluded that people who covertly stutter conceal their disfluencies because they are more anxious, submissive, conforming, and hyper-focused on the opinions of their superiors than people who stutter overtly. However, results from a recent qualitative study provide evidence that concealment can also be an expression of agentic behavior, rather than helplessness (Constantino et al., 2017).

There has been one quantitative study on the topic of covert stuttering. Kroll (1978) recruited 53 AWS and divided them into two groups based on his perceptions of whether they stuttered “overtly” or “covertly.” He investigated if the groups differed on eight variables including: stuttering severity, stuttering adaptation (the progressive reduction in stuttering frequency across successive oral readings of the same material), socio-economic status, level of concern about stuttering, communicative goals, level of stuttering awareness, group affiliation, and locus of control. The results indicated that compared to those whose stuttering was overt, people who covertly stuttered were more motivated to avoid communication because of stuttering (communicative goals), less aware of their stuttering (level of stuttering awareness), and more focused on pleasing superiors than same-age peers (group affiliation).
2.3.2.2. Disclosure

Whereas concealment involves withholding personal information from others, disclosure involves sharing personal information. People can disclose their CSI to others through verbal communication and/or actions (Goffman, 1963). A person can verbally disclose that they stutter by telling their conversational partner directly (e.g., “Just so you know I stutter, and it is no big deal to me”) (Byrd, Croft, et al., 2017). People who stutter can also disclose stuttering through intentional and unintentional actions. For example, a person could intentionally disclose stuttering through his actions by wearing a stuttering-related pin or shirt. The same person could also unintentionally disclose stuttering-status to others by producing overt stuttering-like disfluencies in conversation. For the purposes of the present study, disclosure was defined as the extent to which people use verbal statements to intentionally reveal their CSI – in this case, stuttering – to others. Some action-based disclosures – such as overtly producing a moment of stuttering while talking – are involuntary and, if included, would likely be conflated with stuttering severity.

Historically, the terms disclosure and concealment have been used interchangeably in much of the CSI literature (Larson & Chastain, 1990). Concealment and disclosure were initially assumed to represent opposite ends of a single construct related to managing personal information; however, growing evidence indicates that these constructs are distinct (S. D. Jackson & Mohr, 2016; Larson & Chastain, 1990; Schrimshaw et al., 2013). The authors of these studies argue that concealment is not the opposite of disclosure because it is more than the absence of disclosure – it is the desire or attempt to actively prevent disclosure (S. D. Jackson & Mohr, 2016; Schrimshaw et al., 2013). For example, a person who chooses not to disclose can do so with or without actively attempting to conceal.
S. D. Jackson and Mohr (2016) described three other important differences between concealment and disclosure. First, the consequences of disclosure are more permanent than the consequences of concealment; that is, when a person chooses to conceal their CSI in one interaction, they can “undo” the consequences of this behavior by disclosing their CSI in a future interaction with the same person. The consequences of disclosing a CSI cannot be “undone” with later acts of concealment. Thus, the number of people who know about a person’s CSI accumulates over time as the individual discloses to new people across his or her lifespan. For this reason, disclosure is often assessed by asking individuals to report the number and types of people that they have disclosed to over time. Second, there is theoretical support that concealment and disclosure are driven by different antecedent goals. Specifically, avoidance-focused goals (e.g. avoiding discrimination or embarrassment) are thought to drive concealment behaviors (Anderson, Croteau, Chung, & DiStefano, 2001; Pachankis, 2007) and approach-focused goals (e.g. desire to strengthen relationships or increase feelings of authenticity) are thought to drive disclosure (Bosson, Weaver, & Prewitt-Freilino, 2012; Chaudoir & Fisher, 2010). Finally, concealment and disclosure have unique, and not always opposite, relationships with psychological health outcomes (S. D. Jackson & Mohr, 2016; Meidlinger & Hope, 2014; Riggle et al., 2017; Schrimshaw et al., 2013).

Disclosure has significant relationships with psychological health outcomes among people with CSIs, but the relationships tend to be weaker and less consistent when compared to concealment-health relationships (S. D. Jackson & Mohr, 2016; Meidlinger & Hope, 2014; Quinn, Weisz, & Lawner, 2017; Schrimshaw et al., 2013). A number of studies have shown that disclosure has positive associations with psychological health outcomes (for a review, see Smyth, 1998). Sheridan (2017) conducted a meta-analysis of 157 studies investigating disclosure
among people with sexual minority statuses and found that disclosure was significantly associated with increased levels of social support, and mental/physical health, and work/school outcomes. However, disclosure is similar to concealment in that its effects on psychological health outcomes are not always uniform (Chaudoir & Fisher, 2010). Results from some studies provide evidence that disclosure is not always associated with significant benefits to psychological health (Major et al., 1990; Rodriguez & Kelly, 2006; Sylaska & Edwards, 2014) and can be harmful if the confidant displays negative reactions or is perceived as unsupportive (Major et al., 1990; Sylaska & Edwards, 2014; Ullman, 1996).

In contemporary stuttering intervention, it is common for speech-language pathologists to encourage their clients to verbally disclose their stuttering to others (McGill, Siegel, Nguyen, & Rodriguez, 2018), as doing so is believed to (1) decrease feelings of anxiety related to speaking (Bloodstein, 1995; Collins & Blood, 1990; Van Riper, 1982), and (2) reduce negative listener reactions to stuttering (Collins & Blood, 1990). There is some evidence from the qualitative literature that disclosing stuttering decreases speaking-related fears and anxiety, improves experiences with communication, and generally makes stuttering “less problematic” in social situations (Bricker-Katz, Lincoln, & McCabe, 2010; Crichton-Smith, 2002). Additionally, some AWS report that they tend to stutter less after disclosing their stuttering to others (Bricker-Katz et al., 2010; Klompas & Ross, 2004). It is notable that, while disclosure is generally viewed as helpful, over 60% of adolescents who stutter reported that they “never” or “rarely” talk about their stuttering in two separate studies (Blood et al., 2003; Erickson & Block, 2013).

Several groups of researchers have examined the effects of disclosure on listener reactions to stuttering (Byrd, Croft, et al., 2017; Byrd, McGill, et al., 2017; Collins & Blood, 1990; Healey et al., 2007; Lee & Manning, 2010). In these studies, participants watched videos
of AWS speaking with and without disclosure statements and then described their perceptions of various personal traits of the speaker. Results from these studies provide evidence that, compared to no-disclosure conditions, disclosure positively influences listener perceptions of AWS. For example, one group of investigators found that listeners were more likely to perceive people who disclosed their stuttering as more outgoing, confident, and friendly than people who did not disclose stuttering (Byrd, McGill, et al., 2017). Other research indicates that disclosure is associated with more positive listener perceptions when it occurs at the beginning (rather than the end) of a monologue (Byrd, Croft, et al., 2017; Healey et al., 2007) and when the person disclosing is male (Byrd, McGill, et al., 2017).

Although the effects of disclosure on listener reactions to AWS have been well researched, only two groups of investigators have researched the psychological effects of disclosing stuttering on speakers. In a survey study with 322 AWS, Boyle, Milewski, and Beita-Ell (2018) found that AWS who reported higher levels of disclosure also reported better quality of life. Mancinelli (2019) conducted an experiment investigating the effects of self-disclosure on cognitive and affective variables (e.g., comfort, anxiety, cognitive effort) among speakers who stutter. Twenty-five AWS engaged in a conversational task (a map description) with an AWNS and then completed cognitive and affective questionnaires in both a disclosure and non-disclosure condition. In the disclosure condition, the participants who stutter said an informative disclosure statement during their introduction (e.g., “Hi, my name is X and I am a person who stutters”) before engaging in the map task. In the non-disclosure condition, the participants were instructed to introduce themselves without mentioning stuttering. The author found that there were no significant differences in cognitive and affective factors among AWS between the two
conditions, indicating that disclosure was not associated with comfort, anxiety, or cognitive effort in this task.

The results from these two studies provide contrasting evidence, with one study suggesting that disclosing stuttering is associated with psychological benefits among AWS and the other finding no relationship between disclosure and positive or negative psychological states. It could be that disclosing stuttering is associated with certain, specific psychological health outcomes (e.g., quality of life, but not anxiety). Other potential explanations are that (1) disclosure is associated with idiosyncratic benefits that depend on the setting, timing, interactant, and other factors, (2) the effects of disclosure vary from person to person, and (3) the benefits of disclosure may change overtime or may be associated with a long-term benefit (Mancinelli, 2019). It is clear that more research is needed to understand if and how disclosure relates to psychological health outcomes among AWS.

2.4. Evidence for Complex Relationships between Stigma-Identity Constructs and Distress

Most of the available evidence indicates that, among people with CSIs, higher levels of salience, centrality, and concealment tend to be associated with increased distress. For disclosure, the opposite pattern tends to be observed, with higher levels of disclosure associated with decreased distress. However, a small handful of studies have demonstrated that these direct relationships do not always hold true. One potential explanation for the heterogeneous findings is that the relationships between stigma-identity constructs and distress vary depending on other intra- and inter-personal variables (Chaudoir & Fisher, 2010; Pachankis, 2007; Quinn, 2018). To obtain a rich understanding, it is important to consider not only the simple direct relationships between stigma-identity constructs and distress, but also more complex relationships that account for the influence of other relevant variables.
A primary aim of the current study was to examine if established relationships between stigma-identity constructs and distress among other CSI groups apply to a new population, AWS. To fulfill this aim, it was important to examine both the direct and complex relationships that have been observed in other CSI groups. In the current study, I investigated two types of complex relationships that were most relevant based on a review of the CSI literature, including (1) interactions between stigma-identity related thoughts and behaviors in predicting psychological health outcomes, and (2) symptom severity as a moderator of the relationships between stigma-identity constructs and psychological health outcomes. Next, I describe the results from studies investigating these complex relationships.

**2.4.1. Interactions between Stigma-Identity Related Thought and Behavior Constructs**

To date, there are two published studies that have examined interactions between stigma-identity related thought and behavior constructs in predicting distress among people with CSIs. In the first study, Major and Gramzow (1990) found that disclosure interacted with intrusive thoughts to predict distress among women who have had an abortion. Thought intrusion is not the same as salience (a construct used in the current study), but it is similar in that both constructs assess the frequency of CSI-related thoughts and are thought to represent the extent of cognitive burden associated with secrecy. Disclosure was associated with reduced distress, but only among women with highly intrusive abortion-related thoughts. To explain this finding, the authors used a borrowed analogy to compare the relationship between disclosure and distress to that of a fever and infection (Stiles, 1987, 1995). The authors proposed that – like a fever – disclosure both indicates and helps to resolve an underlying problem. They hypothesized that people who are distressed may be more likely to disclose to others and also more likely to benefit from their disclosures. For this reason, the psychological benefits of disclosing can vary
depending on the degree of difficulty with coping, which was indexed by thought intrusion in their study (Major & Gramzow, 1990).

In the second study, Park et al. (2011) investigated the potential interaction between disclosure and centrality to predict wellbeing among cancer survivors. Contrary to their hypothesis, the data did not provide evidence for a significant interaction. This means that the extent disclosure predicted wellbeing was not influenced by levels of centrality, and the extent centrality predicted wellbeing was not influenced by disclosure. The authors speculated that poor construct validity of their disclosure measure may have contributed to the null findings. In this study, the measure of disclosure was largely based on participation in cancer-related activities (e.g. organizations, fundraisers, advocacy groups) as opposed to the extent that participants intentionally revealed their cancer diagnosis to others through verbal communication. Their measure of disclosure may have reflected a construct that has different underlying motivations compared to traditional measures of disclosure, thus resulting in unexpected null findings.

Research investigating the extent to which disclosure interacts with stigma-identity related thoughts to predict distress among people with CSIs is in its infancy. However, there is evidence suggesting that the cooperative effects of these constructs, particularly disclosure and salience, could play a significant role in predicting psychological health outcomes among people with CSIs, and perhaps AWS.

2.4.2. Symptom Severity as a Moderator of the Relationships Between Stigma-Identity Constructs and Psychological Health Outcomes

In a few recent studies, symptom severity has been shown to moderate the relationships between certain stigma-identity constructs and psychological health outcomes (Brener et al., 2013; Cook et al., 2017). In other words, the extent that stigma-identity constructs are helpful or harmful to psychological health are different for people with varying levels of symptom severity.
The findings from these studies suggest that, in order to understand the effects of stigma-identity constructs on psychological health outcomes at the level of the individual, it is important to account for the potential influence of symptom severity.

In a study with people living with HIV, Brener et al. (2013) investigated the roles of centrality and symptom severity in psychological outcomes. Participants responded ‘yes’ or ‘no’ to the question “Do you currently have any noticeable symptoms resulting from your HIV infection?” Compared to people living without visible symptoms, people living with visible symptoms reported significantly higher levels of centrality, as well as increased levels of distress. Importantly, the authors found that higher levels of centrality exacerbated the negative relationship between the presence of visible symptoms and psychological health outcomes. The results from this study indicate that, compared to people without visible symptoms, centrality has particularly strong negative associations with psychological health among people with visible symptoms of their CSI.

In a study with people with Multiple Sclerosis, Cook et al. (2017) found that concealment was associated with poor psychological outcomes, but only among people who reported having a more severe disability (as measured by degree of reported symptom severity). The investigators also found that concealment was negatively correlated with disability severity, indicating that efforts to conceal decrease as symptom severity increases and vice versa. The results from this study suggest that, although people with relatively severe symptoms may be less likely to try to conceal their CSI, their attempts to do so can be particularly harmful to their psychological health.

Collectively, the results from these studies indicate that the associations between stigma-identity constructs and psychological health outcomes differ between people who report high and
low levels of CSI-related symptom severity. For this reason, the potential role of symptom severity should be considered in a thorough analysis of the relationships between stigma-identity constructs and psychological health outcomes among AWS and other CSI groups.

### 2.5. The Importance of Ruling Out Alternative Explanations: Neuroticism

In addition to accounting for complex relationships, it is also important to attempt to identify spurious relationships in investigations of complex human phenomena. A spurious relationship is one in which there is a false correlation between two variables because both variables are jointly dependent on a third variable (Aneshensel, 2002). In other words, spuriousness occurs when the independent and dependent variable are not related to each other but are both related to a common cofounding variable. One way to increase the confidence of associations between two variables is to identify and test compelling alternative explanations that involve potentially spurious variables in order to rule them out as highly influential factors.

In the current study, neuroticism – a Big Five personality variable (Costa & McCrae, 1988) – was tested as a potentially confounding third variable that could have been causally related to both stigma-identity constructs and the psychological outcome variables. The rationale for investigating neuroticism as a potential confounder was threefold. First, neuroticism is a measure of emotional stability that is highly correlated with both depression and anxiety in the general population (Costa & McCrae, 1992). To increase confidence in the validity of any relationships between stigma-identity constructs and distress observed in the current study, it was important to rule out the influence of neuroticism as an underlying driver of these relationships. Second, neuroticism has been tested as a confounding variable in previous empirical research on stigma-identity constructs and distress among with CSIs (Quinn & Chaudoir, 2009; Quinn et al., 2014). Thus, including neuroticism as a control variable in the current study aided in
promoting consistency with previous research methods. Third, there is evidence from the stuttering literature that neuroticism is related to psychological health outcome among AWS, which supports the relevance for controlling for this specific variable. In a study with AWS, participants with high levels of neuroticism reported a greater negative impact of stuttering than AWS with lower levels of neuroticism (Bleek et al., 2012). For these reasons, it was important to control and account for the potential role of neuroticism in psychological health outcomes among AWS in the current study.

2.6. Significance of the Current Study and Research Hypotheses

Compared to their typically fluent counterparts, AWS are more vulnerable to experiencing negative psychological health outcomes, including elevated levels of distress (Craig & Tran, 2014). Further, there is variability in psychological outcomes within the population of AWS, and little is known about why some struggle to cope and others are resilient. In conceptualizing stuttering as a type of CSI, I proposed that the direct and complex relationships between stigma-identity constructs (salience, centrality, concealment, and disclosure) and psychological health outcomes that are documented in other CSI groups would also be observed among AWS.

Two psychological health outcomes were included in this study, psychological distress and adverse impact of stuttering on quality of life. Psychological distress, which measures symptoms of anxiety and depression, was selected as an outcome variable because it has been widely studied in other CSI groups (e.g., Quinn & Chaudoir, 2009; Quinn et al., 2014) and is relevant to AWS. Adverse impact of stuttering on quality of life was selected because it is a stuttering-specific measure that assesses the functional impact of stuttering on day-to-day life, which is a clinically relevant outcome in stuttering intervention.
The specific research questions and associated hypotheses for this online survey study were developed based on a synthesis of literature across two disciplines, Speech-Language Pathology and Social Psychology. They are:

1. **How do salience, centrality, concealment, and disclosure relate to distress and adverse impact of stuttering on quality of life among AWS?**

   *Hypothesis 1*: Salience, centrality, and concealment will have significant positive correlations with distress and adverse impact of stuttering on quality of life.

   *Hypothesis 2*: Disclosure will have a significant negative correlation with distress and adverse impact of stuttering on quality of life.

2. **To what extent are salience, centrality, concealment, and disclosure predictive of distress and adverse impact of stuttering on quality of life among AWS after controlling for demographic variables and neuroticism?**

   *Hypothesis 1*: Salience, centrality, concealment, and disclosure will each significantly predict distress and quality of life.

   *Hypothesis 2*: Salience will be a stronger predictor of distress than centrality.

   *Hypothesis 3*: Concealment will be a stronger predictor of distress than disclosure.

3. **To what extent does self-rated stuttering severity moderate the relationships between stigma-identity constructs and both distress and adverse impact of stuttering on quality of life among AWS?**

   *Hypothesis 1*: Self-rated stuttering severity will moderate the relationships between
(1) centrality and distress, and (2) centrality and adverse impact of stuttering on quality of life, such that the positive associations will be strongest among people with higher levels of self-rated stuttering severity.

Hypothesis 2: Self-rated stuttering severity will moderate the relationships between (1) concealment and distress, and (2) concealment and adverse impact of stuttering on quality of life, such that the positive associations will be strongest among people with higher levels of self-rated stuttering severity.

4. Do salience and disclosure interact to predict distress and adverse impact of stuttering on quality of life among AWS?

Hypothesis 1: Salience and disclosure will interact to predict distress. The negative association between disclosure and distress will be strongest among people with high salience.

Hypothesis 2: Salience and disclosure will interact to predict adverse impact of stuttering on quality of life. The negative association between disclosure and adverse impact of stuttering on quality of life will be strongest among people with high salience.
CHAPTER 3: METHODS

This chapter is organized into five sections describing participants, recruitment, procedures, survey components, and the pilot study.

3.1. Participants

The participants in this online survey study were 505 AWS. To be eligible, individuals must have self-reported that they (1) identified as a person who stutters after reading a description of stuttering, (2) were at least 18 years-old, and (3) were currently living in United States or Canada. The sample was restricted to people who were currently living in either the United States and Canada to reduce heterogeneity in stuttering-related attitudes and stigma that vary with geographic location (St. Louis et al., 2016). The eligibility screening process is described in detail in third section on procedures. The survey link was opened by 629 potential participants, but some participants were excluded because they did not report that they lived in the United States or Canada (N=23), reported that they were not older than 18 years old (N=4), indicated that they were not a person who stutters (N=2), did not fulfill the attention check criteria (N=7), or did not complete the survey (N=88).

An a priori power analysis was conducted to determine the minimum sample size required for the statistical analyses in the current study using G*Power Version 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). The multiple linear regression power analysis included the following parameters; (1) an α of 0.05, (2) a power level of 0.80, (3) up to 12 included variables, and (4) a medium effect size of \( f^2 = 0.08 \). This effect size was selected because it represents an estimation of the magnitude of the relationships between the predictor variables (salience, centrality, concealment) and the primary outcome variable, distress. Previous studies have found medium correlational effect sizes between salience and distress (Quinn & Chaudoir, 2009; Quinn
et al., 2014), centrality and distress (Quinn & Chaudoir, 2009), and concealment and a related variable – quality of life (Quinn et al., 2017). In one study, Quinn et al. (2014) found a small correlational effect size between centrality and distress. To account for a potentially smaller relationship in the current study, the typical medium effect size value of 0.15 from Cohen (1992) was adjusted to 0.08. To meet the assumptions described above, results from the power analysis determined that the minimum number of participants required was 228.

3.2. Recruitment

Individuals self-selected to participate in this survey study. Although random sampling is ideal, the low prevalence of stuttering makes it difficult to identify and access AWS without enlisting the help of stuttering organizations and professionals who work with AWS. For this reason, self-selection is common in survey studies with AWS (e.g., Boyle, 2015; Boyle, 2018). To maximize response rate, a lottery incentive was implemented. Participants who completed the survey were entered into a raffle to win one of twenty-five $30 Amazon gift cards.

To enhance heterogeneity within the sample of AWS in terms of demographics and experiences with stuttering therapy and involvement with self-help associations, participants were recruited from speech-language pathologists, stuttering organizations, and online communities. Recruitment emails were sent to speech-language pathologists with board certified specialty in fluency and to those whose contact information was available on the Stuttering Foundation of America referral list (https://www.stutteringhelp.org/therapy-referrals). Similar to the protocol reported by Boyle (2018), two reminder emails were sent within one month of the initial contact. A number of stuttering-related organizations (including self-help associations and stuttering therapy clinics) were also enlisted to share information about the study with their members including, The National Stuttering Association, The American Institute for Stuttering,
The Sisskin Stuttering Center, and The Stuttering Association for the Young. Finally, information about the study (including the survey link) was posted in online stuttering communities including Facebook groups (Stuttering Hangout, Stuttering Community, Women Who Stutter: Our Stories) and the r/stutter community on Reddit.

3.3. Procedures

This project was approved by the Institutional Review Boards at The University of Iowa. Data were collected using an online survey. There are several advantages to using online surveys compared to traditional mail surveys. For example, online surveys reach more potential respondents and are perceived as easier to complete than mailed surveys (Kiernan, Kiernan, Oyler, & Gilles, 2005). The online survey for the current study was developed using Qualtrics Survey Software.

When individuals opened the survey link, they were presented with a brief overview of the study, the exempt information form, and information related to data security and confidentiality. If the individual provided consent to participate, they then responded to three screening questions related to age, geographical location, and stuttering-status. The first question asked participants to indicate if they were over 18 years of age and the second question asked if they were from the United States or Canada. The final question related to stuttering-status was: “People who stutter repeat or prolong sounds, syllables or words, or may produce “blockages” or “stoppages” of air and voicing when trying to speak. Most people who stutter first start stuttering in early childhood. With this description in mind, do you consider yourself to be a person who stutters?” If individuals answered ‘no’ to any of these questions, the survey terminated and they were directed to a screen indicating that the survey was complete. Participants who answer ‘yes’ to all three screening questions were directed to a page to begin
the survey. The survey consisted of four components including, in order (1) self-generated research code and contact information, (2) demographics, stuttering-related information, and neuroticism, (3) psychological distress and adverse impact of stuttering on quality of life, and (4) stigma-identity constructs. Each of these components is explained in detail in the following section.

3.4. Survey Components

3.4.1. Self-Generated Research Code and Contact Information

In survey research, it is common practice to associate participants with research codes so that their information can be linked to data that they may choose to provide in future studies (Schnell, Bachteler, & Reiher, 2010). In the current study, participants were invited to generate their own research code. Self-generated research codes protect participant privacy, which results in more accurate reporting of sensitive information (Boruch & Cecil, 1979; Kearney, Hopkins, Mauss, & Weisheit, 1984). The self-generated research codes were comprised of information known to the participants, but not to the researchers. Specifically, participants generated their codes by responding to the following prompt: “Please enter the following without spaces: The first letter of your first name, your birth month, and the first letter of your middle name (if none, use X). For example, a person named Katherine Mary Edinburgh who was born in January would use the code KJANUARYM. This code will allow us to link your information with future surveys that you may choose to participate in.” Participants were also invited to provide their email address if they wished to participate in the raffle for compensation.

3.4.2. Demographic and Stuttering-Related Information

Demographic information questions included items related to age, gender, ethnicity, educational attainment, employment status, income, and sexual orientation. Stuttering-related
information included items related to number of years stuttering, personal importance of fluency, history with speech therapy and self-help organizations, and if participants were employed as speech-language pathologists. Additionally, a one-item measure of group identification (Postmes, Haslam, & Jans, 2013) was included to measure the extent that participants identified with the stuttering community. Demographic and stuttering-related survey items are displayed in Appendix A.

Data were also collected on self-rated speech disruption, or self-rated behavioral stuttering severity. Self-rated stuttering severity was assessed with a modified self-report measure that has demonstrated good reliability (O’Brian, Jones, Packman, Menzies, & Onslow, 2011; O’Brian, Packman, & Onslow, 2004) and been used in other studies with AWS (e.g., Boyle, 2015). First, participants read the following definition of stuttering severity: “When you think of your stuttering severity, think of the level of physical disruption in your speech that you think is noticeable to others for the majority of the day. Physical disruption may include repetitions, prolongations, and blocks, as well as bodily tension, effort, and physical movements. It does not refer to the effect that stuttering has on how you think and feel about yourself and your life in general.” Then participants rated their typical stuttering severity across eight different situations (e.g. “talking on the telephone”) using an established 9-point self-rating scale (1 = no stuttering and 9 = extremely severe stuttering; O’Brian et al., 2011). The definition of stuttering severity was slightly modified from the definition in the original measure based on participant feedback during piloting. Responses were averaged to derive an overall self-rated stuttering severity score that ranged from 1 to 9. The stuttering severity self-rating scale can be found in Appendix B.
3.4.3. Predictor Variables: Measures of Salience, Centrality, Concealment, and Disclosure

3.4.3.1. Salience

A three-item measure from Quinn et al. (2014) was used to measure salience. This scale was selected because it has demonstrated adequate reliability ($\alpha = 0.78$) and has been used to measure salience in people with a variety of CSIs. The first item, “How often do you think about your [stuttering]?” was answered using a 7-point Likert scale (1 = Almost Never, 7 = Many Times Each Day). Participants used a different 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree) to respond to the last two items, which were “I spend a lot of my time thinking about my [stuttering]” and “My [stuttering] often crosses my mind for no reason.” Overall salience scores were calculated by averaging participant responses to the three items.

3.4.3.2. Centrality

A six-item measure with adequate reliability ($\alpha = 0.81$) from Quinn et al. (2014) was used to measure centrality. The items include: (1) “My [stuttering] is an important reflection of who I am,” (2) “In general, my [stuttering] is an important part of the way I see myself,” (3) “My [stuttering] defines who I am,” (4) “It is impossible to understand me without knowing about my [stuttering],” (5) “I would be a different person without my [stuttering],” and (6) “My [stuttering] is a central part of my self-definition” (Quinn et al., 2014). Responses were measured with a 1 (Strongly Disagree) to 7 (Strongly Agree) Likert scale. Overall centrality scores were calculated by averaging participant responses to the six items.

3.4.3.3. Concealment

A modified version of the Self-Concealment Scale (Larson & Chastain, 1990) was used to measure concealment of stuttering. The original Self-Concealment Scale consists of 10 items that measure concealment in general (e.g. “I have an important secret that I haven’t shared with
“anyone”) based on responses to a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Other investigators have modified the Self-Concealment Scale to investigate population-specific concealment behaviors, including concealment of same-sex sexual behaviors (Schrimshaw et al., 2013) and concealment of chronic pain (Uysal & Lu, 2011). Similar to protocol used in Schrimshaw et al. (2013), the scale was modified to focus specifically on concealment of the behavioral phenomenon of interest which, in this case, was stuttering. Each question in the original Self-Concealment Scale (e.g. “I have a secret that is so private I would lie if somebody asked me about it”) was re-worded to focus specifically on concealment of stuttering (e.g. “My stuttering is so private I would lie if somebody asked me about it”). Responses were averaged to obtain an overall measure of concealment. Appendix C shows the wording of each item on the original Self-concealment scale, the modified wording used to study concealment of same-sex sexual behaviors in Schrimshaw et al. (2013), and the wording for concealment of stuttering in the current study.

3.4.3.4. Disclosure

An existing disclosure scale was adapted for use in the current study. Brener et al. (2013) developed a 7-item scale to assess the extent that people had disclosed their HIV status to others. Participants were asked “To what extent have you told the following people about your illness?” followed by seven categories of social referents including (1) friends, (2) family, (3) sexual partners, (4) health care providers, (5) people in the workplace, (6) neighbors, and (7) others in the community. Participants responded using a 5-point Likert scale (ranging from 1 = None of them to 5 = All of them). For the current study, the wording of the initial question was changed to “To what extent have you told the following people about your [stuttering]?” Additionally, the social referent of “sexual partners” was changed to “romantic partners.” Although sexual
partners may be an appropriate social referent group for people living with HIV because of the nature of its sexual transmission, a broader group was thought to be more appropriate for AWS. Responses were averaged to obtain an overall measure of disclosure.

The full scales for all four predictor variables (salience, centrality, concealment, disclosure) can be found in Appendix D.

3.4.4. Outcome Variables: Measures of Psychological Distress and Adverse Impact of Stuttering on Quality of Life

3.4.4.1. Psychological Distress

Consistent with the methods from Quinn and Chaudoir (2009) and Quinn et al. (2014), a composite measure of anxiety and depression was used to measure distress. The Spielberger Trait Anxiety Scale (STAI-T) was used to assess anxiety (Spielberger, Vagg, Barker, Donham, & Westberry, 1980). The STAI-T requires participants to indicate how they “generally feel” about 20 statements (e.g. “I lack self-confidence”) on a 4-point scale (1 = Almost never, 4 = All the time). The STAI-T has been used to assess anxiety among AWS in several previous studies (e.g., Blood, Blood, Bennett, Simpson, & Susman, 1994; Craig, 1990; Ezrati-Vinacour & Levin, 2004). The Center for Epidemiological Studies – Depression Scale (CES-D) was used to measure depression (Radloff, 1977). Participants estimated the frequency of 20 symptoms over the last week using a 0 (Rarely or None of the Time [Less than 1 Day]) to 3 (Most or all of the Time [5–7 Days]) scale. Although this measure is well-validated and widely-used (Shafer, 2006), it has not been used to assess depression among AWS. Most of the existing studies that have investigated depression in AWS (e.g., Manning & Beck, 2013; Miller & Watson, 1992) have used the Beck Depression Inventory (Beck, Steer, & Brown, 1987). However, results from a meta-analyses of the factor structures of four depression measures, including the CES-D and the Beck Depression Inventory, indicate that there are overlapping factors between the two measures (Shafer, 2006).
Consistent with methods from previous investigations (e.g., Quinn & Chaudoir, 2009), items from both scales were standardized and aggregated to create the composite measure.

### 3.4.4.2. Adverse Impact of Stuttering on Quality of Life

The Quality of Life subsection of the Overall Assessment of the Speaker’s Experience with Stuttering (OASES) was used to assess the adverse impact of stuttering on quality of life (Yaruss & Quesal, 2010). This subsection of the OASES consists of 25 items that measure adverse impact of stuttering on quality of life across multiple areas including (1) reactions to stuttering, (2) the extent stuttering interferes with communication across contexts (e.g., work, home) and relationships (e.g., friends, family), and (3) the extent that stuttering interferes with educational and career goals and overall self-worth and self-confidence (Yaruss & Quesal, 2010). Participants rate items on the OASES using a Likert-scale ranging from 1 to 5, with 5 being the most severe negative impact of stuttering on quality of life. All completed items are averaged to obtain the subscale score. Subscale scores can range from 1 (which corresponds to “little or no negative impact” on quality of life) to 5 (which corresponds to “pervasive negative impact” on quality of life).

### 3.4.5. Other Survey Items: Neuroticism and Careless Responses

#### 3.4.5.1. Neuroticism

Consistent with the methods used in Quinn and Chaudoir (2009) and Quinn et al. (2014), a measure of neuroticism was used to rule out the alternative explanation that variability in distress and adverse impact of stuttering on quality of life could be explained by individual differences in general emotional stability. Neuroticism was measured with a 4-item scale, the Mini International Personality Item Pool - Five Factor Model (Mini-IPIP; Goldberg, 1999). Participants were asked to rate the accuracy of four statements on a Likert scale (1 = Very
inaccurate to 5 = Very accurate). A sample item is “I have frequent mood swings.” Two items were reverse coded. Appendix E contains all 4 items. Responses were averaged to obtain a total measure of neuroticism.

3.4.5.2. Careless Responses

A threat to the validity of survey research is that participants can respond carelessly to survey items, which can have serious negative implications for data analysis (Buchanan, 2000). In the current study, a method from Meade and Craig (2012) was adopted to identify careless responders. The survey included two items with instructed responses (e.g. “People have different hobbies and interests. However, please select 2 for this item to show that you are paying attention”). If respondents do not respond appropriately to attention check questions, it can be assumed that they were not attending to the content of the items and therefore may be responding carelessly. In the current study, an a priori decision was made to exclude only participants who did not respond appropriately to both instructed response items.

3.5. Pilot Study

Pilot studies are commonly conducted in early stages of survey research in order to “identify potential problem areas and deficiencies in the research instruments and protocol prior to implementation during the full study” (Hassan, Schattner, & Mazza, 2006). Twenty-one AWS (14 males, 7 females) participated in a pilot study for the current research project. Participants in the pilot study were between 19 and 75 years-old (M = 36, SD = 18). Two participants did not report their age. On average, participants had 8 years of experience with stuttering therapy (range = 0-18, SD = 5.6) and 4.7 years of self-help experience (range = 0-18, SD = 5.19). Information about other demographic characteristics (e.g., ethnicity, education levels) can be found in
Appendix F. Pilot study participants were recruited via emails sent by two speech-language pathologists who specialize in stuttering.

There were three primary reasons for conducting the pilot study. The first was to assess the reliability of scale items for use with this new population, AWS. This was important because, although many of the scales used in the current study have been used with other CSI groups, they have not been used with AWS. For each scale in the survey (salience, centrality, concealment, disclosure, CES-D, STAI-T, Distress, neuroticism, self-rated stuttering severity), Cronbach’s coefficient alphas were calculated to assess the internal reliability of the items for each scale. All coefficient values exceeded 0.7, indicating acceptable reliability (Nunally, 1978). The coefficient values for each scale are located in Appendix G.

The second purpose of piloting was to obtain participant feedback about the comprehensibility, relevance, and formatting of the survey items. Three participants were randomly selected to provide verbal feedback about the survey items either in-person or via video chat. Two of the participants expressed that the prompt for indicating self-rated stuttering severity was unclear and one provided input for re-wording demographic questions to make them more inclusive. In addition to these wording changes, three additional items related to demographics, strength of group identity, and openness were included. After making these changes, I consulted with a researcher with expertise in survey development and psychological health outcomes associated with stuttering to make final revisions to the survey items. The consultation resulted in a few minor wording changes focused on increasing item clarity and specificity.

The final reasons for conducting a pilot study were to identify practical problems with survey access and completion and to assess the probability that a larger sample of AWS would
complete the survey. The average time it took participants to complete the survey was 17.1 minutes (range = 10.9-33.85, SD = 6.3). All participants provided the correct response to at least one of the attention check items, indicating that the participants were responding with care based on the a priori criteria.
CHAPTER 4: RESULTS

This chapter is organized into five sections. The first section describes results from exploratory analyses of participant characteristics, psychometric properties and distribution of responses for stigma-identity scales, and bivariate relationships between the constructs of interest in the current study. The subsequent sections provide the results of analyses related to research questions one, two, three, and four, respectively.

4.1. Exploratory Analyses

4.1.1. Participant Characteristics

The survey was completed by 505 AWS, including 465 participants who lived in the United States (92%) and 40 participants who lived in Canada (8%). The sample was comprised of 290 people who identified as male (57%), 210 who identified as female (42%), and 5 who identified as non-binary (1%). The age of participants ranged from 18 to 83 years (M = 37.1, SD = 15); 35 participants did not report their age. The sample was primarily white (76.8%) and heterosexual (90.9%), and the majority of participants had completed at least some college. Self-rated stuttering severity scores were approximately normally distributed and are displayed in Figure 4.1. All 505 participants provided the instructed response for at least one of the two attention check items; thus, no cases were excluded for careless responding. Additional information related to ethnicity, education, employment status, income, sexual orientation, participation in speech therapy and self-help is listed in Table 4.1.
Figure 4.1 Distribution of Overall Self-rated Stuttering Severity Scores

*Note: Scores are arranged from lowest (1) to highest (9) stuttering severity. The self-rated stuttering severity score of (1) includes values from 1.00 to 1.99, and the same is true for scores two through eight. The (9) score only includes participants with an exact score of 9.00.
Table 4.1 Participant Demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country of Residence</td>
<td>US</td>
<td>465</td>
<td>92.1</td>
</tr>
<tr>
<td></td>
<td>Canada</td>
<td>40</td>
<td>7.9</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>290</td>
<td>57.4</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>210</td>
<td>41.6</td>
</tr>
<tr>
<td></td>
<td>Non-binary</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>American Indian or Alaska Native</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>31</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>Black or African American</td>
<td>34</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>Hispanic, Latino, or Spanish</td>
<td>33</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Multiracial</td>
<td>17</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Native Hawaiian or Pacific Islander</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>388</td>
<td>76.8</td>
</tr>
<tr>
<td>Highest Level of Education</td>
<td>Did not complete high school</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Completed high school</td>
<td>34</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>Some college or technical program</td>
<td>50</td>
<td>9.9</td>
</tr>
<tr>
<td></td>
<td>Completed 2 year or technical program</td>
<td>34</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>Completed undergraduate degree</td>
<td>186</td>
<td>36.8</td>
</tr>
<tr>
<td></td>
<td>Completed graduate or professional degree</td>
<td>199</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Employment Status</td>
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<td>77.2</td>
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<tr>
<td></td>
<td>Unemployed</td>
<td>114</td>
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<tr>
<td></td>
<td>No Response</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Personal Annual Income</td>
<td>&lt; $10,000</td>
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<td>9.1</td>
</tr>
<tr>
<td></td>
<td>$10,000 to $20,000</td>
<td>42</td>
<td>8.3</td>
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<td></td>
<td>$20,000 to $50,000</td>
<td>116</td>
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<td></td>
<td>&gt; $50,000</td>
<td>245</td>
<td>48.5</td>
</tr>
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<td></td>
<td>No response</td>
<td>56</td>
<td>11.1</td>
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<td>Sexual orientation</td>
<td>Heterosexual</td>
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<td>90.9</td>
</tr>
<tr>
<td></td>
<td>Gay or lesbian</td>
<td>21</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>Bisexual</td>
<td>19</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>Another sexual orientation not listed</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>Current Participation in Speech Therapy</td>
<td>Yes</td>
<td>88</td>
<td>17.4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>414</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Current Participation in Self-Help</td>
<td>Yes</td>
<td>242</td>
<td>47.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>258</td>
<td>51.1</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>
4.1.2. Psychometric Properties of Stigma-Identity Scales

The psychometric properties of the salience, centrality, concealment, and disclosure scales were examined to assess the reliability and validity of using these scales with a new population, AWS. Cronbach’s alpha coefficients were calculated to investigate the reliability of each scale. Additionally, a maximum likelihood factor analysis (a type of exploratory factor analysis) was conducted to examine each scale’s validity and dimensionality. For each analysis, individual participants’ data were included only if they responded to at least 90% of the items in the corresponding scales (Schlomer, Bauman, & Card, 2010). The following sections provide the results of the reliability and validity analyses for each of the four stigma-identity scales.

4.1.2.1. Salience

Data from 500 participants were used to calculate the psychometric properties of the salience scale. Five participants were excluded because they did not respond to 90% of the items on the scale. The Cronbach’s alpha for the 3-item scale was 0.89, which is an acceptable value based on criteria from Nunally (1978). The Kaiser-Meyer-Olkin (KMO) was 0.70, which is considered a “middling” value that does not warrant remediation (Kaiser, 1974). Bartlett’s Test of Sphericity was significant (p < 0.001), indicating that factor analysis was appropriate. Finally, maximum likelihood factor analysis with Oblimin rotation revealed that only one factor had an eigenvalue greater than one, with 81.4% of the total variance accounted for. Overall results indicated that the salience scale was unidimensional, so all items were retained.

4.1.2.2. Centrality

The Cronbach’s alpha value for the 6-item centrality scale was 0.85, which included data from 504 participants. Factor analysis was suitable based on inspection of correlation coefficients, the KMO measure (0.85), and Bartlett’s Test of Sphericity (p < 0.001). Maximum
likelihood factor analysis with Oblimin rotation revealed one factor with an eigenvalue above one, explaining 57.9% of the total variance; thus, all items were retained.

4.1.2.3. Concealment

All 505 participants completed 90% or more of the items on the concealment scale, and thus were included in the analyses. The Cronbach’s alpha value for the 10-item centrality scale was 0.89. Factor analysis was suitable based on inspection of correlation coefficients (greater than 0.3), the KMO measure (0.91), and Bartlett’s Test of Sphericity (p < 0.001). Maximum likelihood factor analysis with Oblimin rotation revealed two factors with eigenvalues of 5.00 and 1.16, explaining 50% and 11.6% of the variance, respectively. Because the two factors were highly correlated (r = 0.63), all items had reasonable loadings on both factors (ranging from 0.40 to 0.83), and the eigenvalue of the second factor was just above the minimum cutoff of 1 (Kaiser, 1960), the scale was treated as unidimensional and all items were retained.

4.1.2.4. Disclosure

The Cronbach’s alpha value for the 7-item disclosure scale was 0.86, which included data from 496 participants. Factor analysis was suitable based on inspection of correlation coefficients, the KMO measure (0.83), and Bartlett’s Test of Sphericity (p < 0.001). Maximum likelihood factor analysis with Oblimin rotation revealed two factors with eigenvalues of 3.90 and 1.11, explaining 55.7% and 15.8% of the variance, respectively. Because the two factors were highly correlated (r = 0.58), all items had reasonable loadings on both factors (ranging from 0.47 to 0.91), and the eigenvalue of the second factor was just above the minimum cutoff of 1, the scale was treated as unidimensional and all items were retained.
4.1.3. Distribution of Responses to Stigma-Identity Scale Items

In order to explore both the range and variability of endorsements of salience, centrality, concealment, and disclosure among AWS, descriptive analyses were conducted on the items within each of the four scales using the same samples that were used for psychometric analyses. Specifically, the percentage of participants who selected each response option (e.g., extent of agreement or disagreement) were calculated and are displayed in Tables 4.2 through 4.5.

The majority of AWS reported that stuttering was at least somewhat salient in their lives, with only 3.8% of people reporting that they “almost never” think about stuttering and just under 25% indicating “many times each day.” For some AWS, stuttering contributed highly to their overall sense of self. For example, more than one-third of participants “strongly agreed” that they would be a different person without their stuttering. Additionally, just over 25% of participants “strongly disagreed” that stuttering defined who they were.

In terms of concealment, 49.9% of participants “agreed” or “strongly agreed” that there were “lots of things” about stuttering that they kept to themselves, and 36.2% “agreed” or “strongly agreed” that they had negative thoughts about stuttering that they do not share with others. However, 86.5% of AWS in the sample “disagreed” or “strongly disagreed” with the statement “I haven’t shared that I stutter with anyone.” Together, these results suggest that most AWS do not entirely conceal their stuttering identities, but there are parts of stuttering that they choose not to share with others. The responses to the disclosure scale illustrate that the disclosure habits of AWS vary based on whom they are disclosing to. More than 60% of the sample reported that they had disclosed their stuttering to “all” of their friends and family, but more than 15% indicated that they had told “none” of their healthcare providers or co-workers.
### Table 4.2 Distribution of Responses to Salience Items (%)

<table>
<thead>
<tr>
<th>Question</th>
<th>Almost never</th>
<th>Many times each day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>1. How often do you think about your stuttering?</td>
<td>3.8</td>
<td>12.9</td>
</tr>
<tr>
<td>2. I spend a lot of time thinking about my stuttering.</td>
<td>11.7</td>
<td>13.7</td>
</tr>
<tr>
<td>3. My stuttering often crosses my mind for no reason.</td>
<td>12.7</td>
<td>19.1</td>
</tr>
</tbody>
</table>

### Table 4.3 Distribution of Responses to Centrality Items (%)

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td>(7)</td>
</tr>
<tr>
<td>1. My stuttering is an important reflection of who I am.</td>
<td>13.7</td>
<td>11.1</td>
<td>8.3</td>
<td>13.7</td>
<td>22.4</td>
<td>19.0</td>
<td>11.7</td>
</tr>
<tr>
<td>2. In general, my stuttering is an important part of the way I see myself.</td>
<td>8.7</td>
<td>12.1</td>
<td>7.1</td>
<td>9.7</td>
<td>27.3</td>
<td>19.4</td>
<td>15.6</td>
</tr>
<tr>
<td>3. My stuttering defines who I am.</td>
<td>26.3</td>
<td>20.6</td>
<td>10.3</td>
<td>13.5</td>
<td>16.8</td>
<td>5.5</td>
<td>6.9</td>
</tr>
<tr>
<td>4. It is impossible to understand me without knowing about my stuttering.</td>
<td>17.2</td>
<td>13.7</td>
<td>8.3</td>
<td>13.3</td>
<td>21.0</td>
<td>13.9</td>
<td>12.7</td>
</tr>
<tr>
<td>5. I would be a different person without my stuttering.</td>
<td>4.4</td>
<td>5.3</td>
<td>6.3</td>
<td>8.5</td>
<td>20.6</td>
<td>19.4</td>
<td>35.4</td>
</tr>
<tr>
<td>6. My stuttering is a central part of my self-definition.</td>
<td>12.7</td>
<td>11.9</td>
<td>9.3</td>
<td>16.2</td>
<td>23.8</td>
<td>15.2</td>
<td>10.9</td>
</tr>
</tbody>
</table>
Table 4.4 Distribution of Responses to Concealment Items (%)

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I haven’t shared that I stutter with anyone.</td>
<td>71.6</td>
<td>14.9</td>
<td>3.0</td>
<td>8.1</td>
<td>2.4</td>
</tr>
<tr>
<td>2. If I shared that I stutter with my friends, they'd like me less.</td>
<td>75.6</td>
<td>10.7</td>
<td>7.7</td>
<td>4.6</td>
<td>1.4</td>
</tr>
<tr>
<td>3. There are lots of things about my stuttering that I keep to myself.</td>
<td>24.2</td>
<td>17.6</td>
<td>8.3</td>
<td>29.1</td>
<td>20.8</td>
</tr>
<tr>
<td>4. Some of my secrets about my stuttering have really tormented me.</td>
<td>43.8</td>
<td>13.3</td>
<td>12.9</td>
<td>18.3</td>
<td>11.7</td>
</tr>
<tr>
<td>5. When something bad related to my stuttering happens, I tend to keep it to myself.</td>
<td>19.2</td>
<td>16.8</td>
<td>11.1</td>
<td>31.1</td>
<td>21.8</td>
</tr>
<tr>
<td>6. I’m often afraid I’ll reveal that I stutter even though I don’t want to.</td>
<td>34.5</td>
<td>14.7</td>
<td>11.7</td>
<td>24.6</td>
<td>14.7</td>
</tr>
<tr>
<td>7. Telling someone that I stutter often backfires and I wish I hadn’t told them.</td>
<td>57.1</td>
<td>19.0</td>
<td>12.1</td>
<td>8.9</td>
<td>2.9</td>
</tr>
<tr>
<td>8. My stuttering is so private I would lie if anybody asked me about it.</td>
<td>79.3</td>
<td>10.9</td>
<td>4.8</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>9. The fact that I stutter is too embarrassing to share with others.</td>
<td>55.7</td>
<td>16.5</td>
<td>10.9</td>
<td>11.5</td>
<td>5.4</td>
</tr>
<tr>
<td>10. I have negative thoughts about my stuttering that I never share with anyone.</td>
<td>35</td>
<td>19.7</td>
<td>9.1</td>
<td>20.5</td>
<td>15.7</td>
</tr>
</tbody>
</table>

Table 4.5 Distribution of Responses to Disclosure Items (%)

<table>
<thead>
<tr>
<th></th>
<th>None of them</th>
<th>All of them</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>To what extent have you told the following people about your stuttering?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends</td>
<td>5.8</td>
<td>10.1</td>
</tr>
<tr>
<td>Family</td>
<td>4.4</td>
<td>4.8</td>
</tr>
<tr>
<td>Romantic partners</td>
<td>9.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Healthcare providers</td>
<td>16.8</td>
<td>16.6</td>
</tr>
<tr>
<td>People in the workplace</td>
<td>15.7</td>
<td>19.4</td>
</tr>
<tr>
<td>Neighbors</td>
<td>45.5</td>
<td>20.6</td>
</tr>
<tr>
<td>Others in the community</td>
<td>37.3</td>
<td>23.9</td>
</tr>
</tbody>
</table>
4.1.4. Correlations Between Demographic/Stuttering-Related Variables, Stigma-Identity Constructs, and Psychological Health Outcomes

Exploratory analyses were conducted to investigate bivariate relationships between the demographic/stuttering-related variables, stigma-identity constructs, psychological health outcomes, and neuroticism with data from 481 participants. Participants were included only if they responded to 90% of the items on each of the scales included in the current study, including scales for predictor variables, scaled covariates (self-rated stuttering severity, neuroticism), and primary outcome variables. The OASES – Quality of Life scale is comprised of 25 items, with 4 work-related items that are optional for people who are unemployed. Thus, participants were excluded if they did not respond to at least 90% of the minimum number of required 21 items. Based on this criteria, 24 participants were excluded for having missing data for one or more of the survey scales.

Bivariate correlations were conducted to identify potential relationships between the demographic variables (age, gender, education, income, employment status, race/ethnicity, sexual orientation), stuttering-related variables (self-rated stuttering severity, years of speech therapy, years of self-help), stigma-identity constructs (salience, centrality, concealment, disclosure), psychological health outcomes (distress, adverse impact of stuttering on quality of life), and neuroticism. Depending on the type of variables tested, Pearson and Spearman correlations were used. Spearman correlations were used when calculating correlations containing ordinal variables (e.g., income, education, stigma-identity constructs, neuroticism). Three variables were dichotomized, with the indicator variables representing the majority within the sample for each construct. The dichotomized variables included gender (coded as male or not male), race/ethnicity (coded as Caucasian, not Caucasian), and sexual orientation (coded as heterosexual or not heterosexual). The results are displayed in Table 4.6.
People with marginalized racial, gender, and sexual identities are underrepresented in stuttering research, which results in a literature that disproportionately reflect the experiences of white males. In an effort to represent the experiences of people with multiple marginalized identities, exploratory analyses were conducted to investigate possible associations between demographic characteristics and the variables of interest in this study. AWS with other stigmatized identities related to race and sexual orientation tended to report poorer psychological health outcomes than people without those stigmatized identities. For example, AWS who self-identified as a race other than white reported higher levels of distress and greater adverse impact of stuttering on quality of life than white AWS (both p’s < 0.01). AWS who were not white also reported higher levels of salience and concealment and lower levels of disclosure (all p’s < 0.01). Compared to AWS who identified as heterosexual, AWS who identified as gay, lesbian, bisexual, or another sexual orientation reported higher levels of distress (p < 0.01), but there was not a significant correlation with adverse impact of stuttering on quality of life. Based on criteria outlined by Cohen (1988), all effect sizes were small. Gender was not correlated with any of the stigma-identity constructs or psychological health outcomes. However, it was correlated with neuroticism, with males who stutter reporting lower levels (p < 0.01).

It was also of interest to examine basic relationships between self-rated stuttering severity and the stigma-identity constructs and psychological health variables. Previous studies investigating relationships between stuttering severity and psychological health outcomes have yielded mixed findings, with some demonstrating that stuttering severity is not associated with psychological health outcomes (Craig, Hancock, Tran, & Craig, 2003; Manning & Beck, 2013) and others showing that severity is associated with increased risk for mental health disorders (e.g., Iverach et al., 2009) and poorer quality of life (Koedoot, Bouwmans, Franken, & Stolk,
In the current study, self-rated stuttering severity had significant positive correlations with distress (medium effect size) and adverse impact of stuttering on quality of life (large effect size). The measure of severity was also positively correlated with concealment (small effect size), as well as salience and centrality (medium effect sizes). All p-values were less than 0.01. There was no relationship between self-rated stuttering severity and disclosure. In the next section, I discuss the correlations between stigma-identity constructs and psychological health outcomes.
Table 4.6 Bivariate Correlations Between Demographic/Stuttering-Related Variables, Stigma-Identity Constructs, and Psychological Health Outcomes

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Male</td>
<td>.09</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Education</td>
<td>.39**</td>
<td>-.07</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Income</td>
<td>.34**</td>
<td>.11*</td>
<td>.36**</td>
<td></td>
<td></td>
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<tr>
<td>5. Employed</td>
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<td>-.02</td>
<td>.19**</td>
<td>.18**</td>
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</tr>
<tr>
<td>6. Caucasian</td>
<td>.11*</td>
<td>.08</td>
<td>.03</td>
<td>.08</td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>7. Heterosexual</td>
<td>.05</td>
<td>.12*</td>
<td>.03</td>
<td>.10*</td>
<td>-.01</td>
<td>-.06</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Severity</td>
<td>-.25**</td>
<td>-.03</td>
<td>-.20**</td>
<td>-.23**</td>
<td>-.04</td>
<td>.15**</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Speech Tx</td>
<td>.06</td>
<td>.06</td>
<td>-.02</td>
<td>.05</td>
<td>.05</td>
<td>.14**</td>
<td>.00</td>
<td>.09</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>10. Self-help</td>
<td>.40**</td>
<td>.02</td>
<td>.18**</td>
<td>.12</td>
<td>-.03</td>
<td>.13**</td>
<td>.04</td>
<td>-.12*</td>
<td>.27**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Salience</td>
<td>-.22**</td>
<td>.01</td>
<td>-.18**</td>
<td>-.18**</td>
<td>-.01</td>
<td>-.12**</td>
<td>-.02</td>
<td>.42**</td>
<td>-.20</td>
<td>-.17**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Centrality</td>
<td>-.06</td>
<td>.01</td>
<td>-.05</td>
<td>-.15**</td>
<td>.03</td>
<td>-.05</td>
<td>.01</td>
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<td>.11*</td>
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<td>.53**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Concealment</td>
<td>-.05</td>
<td>.01</td>
<td>-.18**</td>
<td>-.16**</td>
<td>-.06</td>
<td>-.21**</td>
<td>.02</td>
<td>.27**</td>
<td>-.13**</td>
<td>-.26**</td>
<td>.50**</td>
<td>.33**</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Disclosure</td>
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<td>.00</td>
<td>.07</td>
<td>.04</td>
<td>.05</td>
<td>.18**</td>
<td>-.02</td>
<td>.02</td>
<td>.24**</td>
<td>.22**</td>
<td>-.17**</td>
<td>-.09*</td>
<td>-.54**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Distress</td>
<td>-.20**</td>
<td>-.06</td>
<td>-.22**</td>
<td>-.26**</td>
<td>-.08</td>
<td>-.13**</td>
<td>-.16**</td>
<td>.33**</td>
<td>-.02</td>
<td>-.15**</td>
<td>.49**</td>
<td>.40**</td>
<td>.49**</td>
<td>-.17**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Adverse impact on QOL</td>
<td>-.18**</td>
<td>.04</td>
<td>-.25**</td>
<td>-.24**</td>
<td>-.07</td>
<td>-.20**</td>
<td>-.06</td>
<td>.55**</td>
<td>.03</td>
<td>-.21**</td>
<td>.66**</td>
<td>.47**</td>
<td>.60**</td>
<td>-.20**</td>
<td>.68**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Neuroticism</td>
<td>-.08</td>
<td>-.13**</td>
<td>-.12**</td>
<td>-.17**</td>
<td>-.09</td>
<td>-.06</td>
<td>-.11*</td>
<td>.23**</td>
<td>.01</td>
<td>-.01</td>
<td>.35**</td>
<td>.32**</td>
<td>.31**</td>
<td>-.05</td>
<td>.69**</td>
<td>.42**</td>
<td></td>
</tr>
</tbody>
</table>

Note: Self-rated stuttering severity is abbreviated as “Severity.” Speech Therapy (Tx) and Self-help were measured based on years of participation.
*p < .05, **p < 0.01.
4.2. Research Question One

How do salience, centrality, concealment, and disclosure relate to distress and adverse impact of stuttering on quality of life among AWS?

The sample of 481 participants who responded to at least 90% of items on all scales was used to investigate research question one, and results are displayed with the other bivariate correlations in the above Table 4.6 As hypothesized, salience, centrality, and concealment were all positively correlated with both distress and adverse impact of stuttering on quality of life, and disclosure was negatively correlated (all p’s < 0.01). This means that people who reported higher levels of salience, centrality, and concealment also reported higher levels of distress and greater adverse impact of stuttering on quality of life. The opposite pattern was observed with disclosure; people who reported that they had disclosed to more people also reported lower levels of distress and less adverse impact of stuttering on quality of life. The effect sizes for the relationships between the stigma-identity constructs and distress ranged from small (disclosure) to medium (salience, centrality, concealment). For adverse impact of stuttering on quality of life, the effect sizes were larger, with one small (disclosure), one medium (centrality) and two large effect sizes (salience, concealment). The absolute values of correlations between the stigma-identity constructs ranged from 0.09 to 0.54, which indicated adequate construct and discriminant validity.

4.3. Research Question Two

To what extent are salience, centrality, concealment, and disclosure predictive of distress and adverse impact of stuttering on quality of life among AWS after controlling for demographic variables and neuroticism?
Data from 476 participants were used to answer research questions two, three, and four. The same 24 participants excluded in the analysis for research question one due to missing data on at least one scale were also excluded in the analyses for research questions two through four. Additionally, five participants who reported a non-binary gender identification were excluded so that gender could be coded dichotomously using dummy coding (0 = female, 1 = male). A series of hierarchical linear regressions were conducted to determine the extent that the stigma-identity constructs predicted distress and adverse impact of stuttering on quality of life in this sample of AWS.

For the analyses predicting each psychological health outcome variables, Step 1 in the regressions included the demographic factors of age, gender, income, education, and self-rated stuttering severity. These variables were included in the model because they are theoretically relevant and have been implicated as related to distress in research with AWS and other types of CSI groups (Craig, Blumgart, & Tran, 2011; Quinn et al., 2014). The predictor variables, salience, centrality, concealment, and disclosure were entered simultaneously at Step 2 because there was no theoretically sound rationale for stepwise inclusion in any particular order. Finally, to rule out the alternative explanation that general levels of emotional stability could be an underlying factor explaining variability in distress, neuroticism was added to the models in Step 3.

The assumptions for multiple linear regression were carefully examined. For each separate analysis, outliers were identified as cases in which the standardized residuals exceeded ±3 standard deviations from the mean (Howell, Rogier, Yzerbyt, & Bestgen, 1998). It is important to identify outliers because the results of regression analysis can be highly sensitive to extreme cases (Bollen & Jackman, 1985). After identifying outliers, researchers must decide
whether to remove, correct, or leave outliers, and often do so by examining outliers on a case by case basis in attempt to understand why the values were unusual. In the current study, participants were asked to report their subjective experiences with stuttering. It was difficult – if not impossible – to objectively determine why participants may have responded in an extreme way and if their responses were valid. A challenge in survey-based research is that participants can respond carelessly, which can reduce data quality and result in outlier cases (Meade & Craig, 2012). Although attention check items were included as an attempt to filter out data from careless responders in the current study, it is possible that the few outlier cases identified in the following analyses were responses from careless responders. I made the a priori decision to exclude outliers in the primary statistical analyses. That said, there were no more than six outliers in a given analysis, which was relatively few in a sample of hundreds. However, as has been recommended by Weisberg (2014) and others, I also report the results for each primary analyses using the full sample with outliers included as an additional robustness check.

4.3.1. Psychological Distress

A hierarchical multiple regression was conducted with psychological distress as the outcome variable. The assumptions for regression were met. There was linearity as assessed by examining a plot of studentized residuals against the predicted values, along with partial regression plots. A Durbin-Watson statistic of 1.94 indicated there was independence of residuals. There were no issues with multicollinearity as all tolerance values were greater than 0.1. The assumption of normality was met, as assessed from visual inspection of a Q-Q Plot. Four outliers with standardized residuals exceeding ±3 standard deviations from the mean were identified and subsequently removed.
Table 4.7 shows the Step 1 results with distress regressed on age, gender, income, education, and self-rated stuttering severity. The model was statistically significant, $F(5, 384) = 17.40, p < .001$, adj. $R^2 = .17$. This model accounted for an adjusted 17% of the variance in distress, with people with lower income ($\beta = -.16, p < 0.01$) and higher self-rated stuttering severity ($\beta = .28, p < 0.001$) reporting higher levels of distress. In Step 2, the stigma-identity constructs (salience, centrality, concealment, disclosure) were entered in the model in addition to the demographic variables entered in Step 1. This model was also significant, $F(9, 380) = 32.45, p < .001$, adj. $R^2 = .42$, and explained an additional 25% of the variability in distress. With the stigma-identity constructs added, income continued to reliably predict distress ($\beta = -.12, p < 0.01$), but the relationship with self-rated stuttering severity became non-significant. As hypothesized, salience ($\beta = .20, p < 0.001$), centrality ($\beta = .17, p < 0.001$), concealment ($\beta = .38$, $p < 0.001$), and disclosure ($\beta = .12, p < 0.05$) each accounted for unique and significant amounts of variance in distress. The relationships between distress and salience, centrality, and concealment, were in the hypothesized direction. Specifically, people with higher degrees of salience, centrality, and concealment reported higher levels of distress. In contrast to my hypothesis, disclosure also had a positive relationship with distress. In other words, as participants reported disclosing to more people, they also reported higher levels of distress when demographics, self-rated stuttering severity, and the other stigma-identity constructs were accounted for.

To rule out the alternative hypothesis that neuroticism – or general emotional stability – could be an underlying factor contributing to the relationships between the stigma-identity constructs and distress, neuroticism was added as a covariate in Step 3. The model with neuroticism was significant, $F(10, 379) = 68.14, p < .001$, adj. $R^2 = .63$, and explained an
additional 21% of the variability in distress. Income maintained a significant relationship with distress ($\beta = -.09, p < 0.05$), and a significant relationship between age and distress emerged with older adults reporting less distress ($\beta = -.11, p < .01$). Salience ($\beta = .12, p < 0.01$), centrality ($\beta = .08, p < 0.05$), and concealment ($\beta = .26, p < 0.001$) also maintained significant relationships with distress, but the relationship between disclosure and distress was no longer significant. Neuroticism significantly predicted distress, with people with higher levels of neuroticism reporting greater levels of distress ($\beta = .51, p < 0.001$).

As an additional robustness check, the same three-step model was examined with the full sample, including the four outlier cases. The full model was significant, $F(10, 383) = 58.45, p < .001$, adj. $R^2 = .59$. Additionally, the unique relationships between the predictor and outcome variables were replicated with salience ($\beta = .13, p < 0.01$), centrality ($\beta = .08, p < 0.05$), and concealment ($\beta = .23, p < 0.001$) each significantly predicting distress after accounting for neuroticism.
Table 4.7 Predicting Distress with Neuroticism as an Added Control Variable

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
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<th>Step 2</th>
<th></th>
<th>Step 3</th>
<th></th>
</tr>
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<td>β</td>
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<td>-.06</td>
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<td>.04</td>
</tr>
<tr>
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<td>-.11**</td>
<td>-.12</td>
<td>-.08*</td>
<td>-.09</td>
</tr>
<tr>
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<td>-.07</td>
<td>-.08</td>
<td>-.05</td>
<td>-.06</td>
</tr>
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<td>.04</td>
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<td>.03</td>
</tr>
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<td>.05*</td>
<td>.08</td>
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<td></td>
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<td>.27***</td>
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</tr>
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<td>.12</td>
<td>.06</td>
<td>.06</td>
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<td>.51</td>
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</tr>
<tr>
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<td>.25***</td>
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<td>.21***</td>
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<tr>
<td>Total Adjusted R² (and full model significance)</td>
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<td></td>
<td>.42***</td>
<td></td>
<td>.63***</td>
<td></td>
</tr>
</tbody>
</table>

Note: *p < .05, **p < 0.01, *** p < 0.001.
In Table 4.7, the coefficients for each stigma-identity construct (e.g., disclosure) estimate the effects on distress when the other stigma-identity constructs (e.g., salience, centrality, concealment) were held constant. Thus, the coefficient for disclosure represents the effect of disclosure on distress after levels of salience, centrality, and concealment were accounted for. When predictor variables are correlated (as is the case with the stigma-identity constructs in the current study, particularly concealment and disclosure), coefficients can change – sometimes drastically – depending on the other variables that are included in the model (Waller, 2008). In order to fully understand how each of the stigma-identity constructs relates to distress, it is also useful to examine the individual effects when the stigma-identity variables are entered one at a time in separate, simplified models.

Four separate models (one for each stigma-identity construct) were analyzed to examine the independent effects of salience, centrality, concealment, and disclosure on distress. For each model, Step 1 included the demographic and stuttering-related factors (age, gender, income, education, and self-rated stuttering severity). Step 2 included one (rather than all four) of the stigma-identity constructs, and Step 3 included neuroticism. In their respective analysis, salience ($\beta = .26, p < 0.001$), centrality ($\beta = .17, p < 0.001$), concealment ($\beta = .30, p < 0.001$), and disclosure ($\beta = -.10, p < 0.01$) each significantly predicted distress. The coefficients were nearly identical in models with and without outliers.

When comparing the coefficients for each stigma-identity construct between these simplified analyses and the full analysis displayed in Table 4.7, there are two noticeable discrepancies. First, the respective coefficient for each stigma-identity construct in the simplified analyses (e.g., $\beta = .26$ for salience) was larger than the coefficient in the full analysis (e.g., $\beta = .06$ for salience). This is because the coefficient for salience in the simplified analysis
represents the overall effect of salience on distress, and the coefficient for salience in the full analysis represents the effect of salience on distress above and beyond what is accounted for by centrality, concealment, and disclosure. Both estimates are important in understanding how each stigma-identity construct relates to distress.

The second outstanding observation when comparing the coefficients in the simplified and full models is that there was a sign reversal associated with disclosure. In the full model, which estimated the effect of disclosure on distress after controlling for salience, centrality, concealment, and neuroticism, the coefficient for disclosure was positive ($\beta = .06$, n.s.). However, in the simplified analysis estimating the overall effect of disclosure on distress without controlling for the other stigma-identity constructs, the coefficient was negative, as hypothesized ($\beta = -.10$, $p < 0.01$). This indicates that, without controlling for the roles of salience, centrality, and concealment, higher levels of disclosure were associated with reduced distress after accounting for demographic variables and neuroticism. However, when the other stigma-identity constructs (i.e., salience, centrality, concealment) were accounted for, there was no significant relationship between disclosure and distress.

4.3.1.1. Exploring a Potential Suppressive Effect

The direction of the relationship between disclosure and distress observed in the full regression model (displayed in Table 4.7) was opposite of the direction observed in the bivariate correlations and in the simplified model examining the effect of disclosure on distress independent of the other stigma-identity constructs. The sign of the disclosure coefficient was negative in the simplified regression model, indicating that more disclosure was associated with less distress. Yet, the sign of the disclosure coefficient was positive in the full regression model that included the other stigma-identity constructs, indicating the opposite finding (although not
significant after accounting for neuroticism). This type of sign reversal can occur when there is a “suppressive effect” or “suppression” within a statistical model (Conger, 1974; Darlington, 1968; Lubin, 1957). There is reason to believe suppression may be occurring in a model when the association between two variables (in this case disclosure and distress) is “reversed, diminished, or enhanced” after controlling for other variable(s) (Tu, Gunnell, & Gilthorpe, 2008). In observational studies within the social sciences, it is not uncommon for evidence of suppression to be found unexpectedly during data analyses (Ludlow & Klein, 2014), as appeared to be the case in the full regression model predicting distress.

Researchers often conduct additional analyses of simplified models to explore potential suppressive effects (Ludlow & Klein, 2014). The purpose of examining simplified models is to determine which variable(s) must be included in the model in order for the coefficient reversal (or suppression) to occur. There is “no simple way” to identify which variables cause suppressive effects within a model (Tzelgov & Henik, 1991). Thus, variables associated with suppressive effects are commonly identified by examining multiple iterations of simplified models.

To explore potential suppression associated with the disclosure variable in the present study, simplified models were examined. The sign reversal associated with disclosure was not observed in the simplified model that excluded the other stigma-identity constructs to estimate the overall effect of disclosure on distress. Thus, it was clear that one or more of the other stigma-identity constructs (i.e., salience, centrality, concealment) were connected to suppression of the disclosure variable.

Suppressive effects commonly occur between correlated predictor variables (Darlington, 1968). Because concealment had the highest correlation with disclosure and is the most
theoretically similar to disclosure, a simplified model with concealment and disclosure as the only stigma-identity constructs was examined first. The model, which included age, gender, income, education, and self-rated stuttering severity in Step 1, and only disclosure and concealment in Step 2, was significant, $F(7, 381) = 33.20, p < .001$, adj. $R^2 = .38$. The results indicated that disclosure reliably predicted distress ($\beta = .12, p < 0.05$), and provided evidence that concealment was a contributing variable to the suppressive effect (as indicated by the coefficient for disclosure reversing from negative to positive).

This finding could be interpreted to support the small body of literature that concealment and disclosure are related, but distinct constructs. It could be that there are aspects of disclosure that overlap with concealment, and these specific aspects are negatively associated with distress. The aspects of disclosure that are independent of concealment, then, are positively associated with distress. Another potential interpretation is that disclosure only has a helpful relationship with distress to the extent that it is associated with a reduction in concealment. Further examination of other possible variable combinations revealed that none of the other variables were associated with the suppressive effect associated with disclosure.

### 4.3.1.2. Synthesis of Results for Distress

To summarize, the full model (which included demographics, all four stigma-identity constructs, and neuroticism) explained a substantial amount of the variability in distress (63%) among AWS. Salience, centrality, and concealment were each unique and reliable predictors of distress after accounting for the role of all stigma-identity constructs and neuroticism in models with and without outliers. As AWS reported increasing levels of salience, centrality, and concealment, they also reported increasing levels of distress. Concealment had the largest standardized coefficient, which indicates that – of these three stigma-identity constructs – it was
the strongest predictor of distress. The relationship between disclosure and distress changed depending on which variables were included in the model. Finally, age, income, and neuroticism were significant predictors of distress in the full model, with older people and people with higher income reporting less distress and people with higher levels of neuroticism reporting more distress. With the stigma-identity constructs in the model, self-rated stuttering severity did not have a significant relationship with distress.

4.3.2. Adverse Impact of Stuttering on Quality of Life

A separate hierarchical multiple regression model was conducted to examine the extent that the stigma-identity constructs explain variability in adverse impact of stuttering on quality of life. The assumptions for regression were met, including linearity, independence of residuals (Durbin-Watson of 1.87), homoscedasticity, and normality. Additionally, there was no evidence of multicollinearity. Four outliers with standardized residuals greater than ±3 standard deviations were identified and subsequently removed. The full details for the regression models are displayed in Table 4.8.

As shown in Table 4.8, the Step 1 model that regressed adverse impact of stuttering on quality of life on age, gender, income, education, and self-rated stuttering severity was significant, $F(5, 384) = 42.74, p < .001$, adj. $R^2 = .35$. People with less education ($\beta = -.10, p < .05$) and higher self-rated stuttering severity ($\beta = .53, p < .001$) reported greater adverse impact of stuttering on quality of life. In Step 2, salience, centrality, concealment, and disclosure were entered in the model, $F(9, 380) = 81.83, p < .001$, adj. $R^2 = .65$. Together, the stigma-identity constructs accounted for an additional 30% of the variability in adverse impact of stuttering on quality of life. With the stigma-identity constructs added, education ($\beta = -.07, p = 0.050$) and self-rated stuttering severity ($\beta = .28, p < 0.001$) maintained significance in predicting adverse
impact of stuttering on quality of life. As hypothesized, salience ($\beta = .27, p < .001$), centrality ($\beta = .09, p < .05$), concealment ($\beta = .42, p < .001$), and disclosure ($\beta = .08, p < .05$), each accounted for unique, significant amounts of variance in adverse impact of stuttering on quality of life. Specifically, people with higher degrees of salience, centrality, concealment, and disclosure reported more adverse impact of stuttering on quality of life. Mirroring the unexpected direction of the relationship between disclosure and distress, the positive relationship between disclosure and adverse impact of stuttering on quality of life was not consistent with the initial hypothesis.

Finally, neuroticism was entered into the model in Step 3. Again, the model was significant, $F(10, 379) = 77.47, p < .001$, and accounted for an adjusted 66% of the variance in adverse impact of stuttering on quality of life. In this final model, gender emerged as a reliable predictor, with males reporting a greater adverse impact of stuttering quality of life ($\beta = .06, p < .05$). Additionally, self-rated stuttering severity maintained significance ($\beta = .28, p < .001$). Salience ($\beta = .25, p < .001$), and concealment ($\beta = .39, p < .001$), also maintained significant relationships with adverse impact of stuttering on quality of life, but the roles of centrality and disclosure became non-significant with neuroticism in the model. Neuroticism reliably predicted adverse impact of stuttering on quality of life ($\beta = .12, p < .001$), with people with higher levels of neuroticism reporting more adverse impact.

As an additional robustness check, the same three-step model was examined with the four outliers included. The full model was significant, $F(10, 383) = 68.60, p < .001$, adj. $R^2 = .63$. This model revealed a partial replication. Consistent with the model that excluded outliers, salience ($\beta = .27, p < 0.001$) and concealment ($\beta = .36, p < 0.001$) reliably predicted adverse impact of stuttering on quality of life after accounting for neuroticism, and disclosure was not a reliable predictor ($\beta = .07, p = .06$). However, with the outliers included, centrality maintained a
reliable relationship with adverse impact of stuttering on quality of life with neuroticism in the model ($\beta = .08$, $p < 0.05$). The relationship between centrality and adverse impact of stuttering on quality of life was not significant in the full model that excluded outliers.
Table 4.8 Hierarchical Multiple Regression Predicting Adverse Impact of Stuttering on Quality of Life

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>β</td>
<td>B</td>
</tr>
<tr>
<td>Constant</td>
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<td>.08</td>
</tr>
<tr>
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</tr>
<tr>
<td>Education</td>
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<td>-.06*</td>
</tr>
<tr>
<td>Self-rated Stuttering Severity</td>
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<td>.17***</td>
</tr>
<tr>
<td>Salience</td>
<td></td>
<td></td>
<td>.14***</td>
</tr>
<tr>
<td>Centrality</td>
<td></td>
<td></td>
<td>.06*</td>
</tr>
<tr>
<td>Concealment</td>
<td></td>
<td></td>
<td>.42***</td>
</tr>
<tr>
<td>Disclosure</td>
<td></td>
<td></td>
<td>.08*</td>
</tr>
<tr>
<td>Neuroticism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in R²</td>
<td>.36***</td>
<td></td>
<td>.30***</td>
</tr>
<tr>
<td>Total Adjusted R² (and full model significance)</td>
<td>.35***</td>
<td></td>
<td>.65***</td>
</tr>
</tbody>
</table>

Notes: *p<0.05, **p<0.01, ***p<0.001.
The coefficient for each stigma-identity construct displayed in Table 4.8 represents its effect on adverse impact of stuttering on quality of life after controlling for the other stigma-identity constructs. Four separate models (one for each stigma-identity construct) were examined to provide an additional estimate of the independent effects of salience, centrality, concealment, and disclosure on adverse impact of stuttering on quality of life. In Step 1, the demographic and stuttering-related factors were added (age, gender, income, education, and self-rated stuttering severity). Step 2 included one (rather than all four) of the stigma-identity constructs, and Step 3 included neuroticism. In their respective analysis, salience ($\beta = .47$, $p < 0.001$), centrality ($\beta = .26$, $p < 0.001$), concealment ($\beta = .47$, $p < 0.001$), and disclosure ($\beta = -.17$, $p < 0.001$) each significantly predicted adverse impact of stuttering on quality of life. The coefficients were nearly identical in models with and without outliers.

4.3.2.1. Exploring a Potential Suppressive Effect

As was observed in the full analysis predicting distress, the direction of the relationship between disclosure and adverse impact of stuttering on quality of life in the full regression model was opposite of the direction observed in bivariate correlations and the simplified regression model for disclosure. The sign of the coefficient was negative in the Spearman’s correlation and the simplified regression model, indicating that more disclosure was associated with less adverse impact of stuttering on quality of life. Yet, the sign of the coefficient for disclosure was positive in the full regression model, indicating that more disclosure was associated with greater adverse impact of stuttering on quality of life after controlling for the other stigma-identity constructs. Again, additional analyses examining multiple simplified models were conducted to explore the potential suppressive effect associated with disclosure. The same steps were taken to explore
potential suppressive effects for disclosure in predicting adverse impact of stuttering on quality of life that were used to explore the suppressive effects in the model predicting distress.

First, a model with concealment and disclosure included as the only stigma-identity constructs was examined. The model, which included age, gender, income, education, and self-rated stuttering severity in Step 1, and only disclosure and concealment in Step 2, was significant, $F(7, 381) = 83.98, p < .001$, adj. $R^2 = .60$. The results indicated that disclosure significantly predicted adverse impact of stuttering on quality of life ($\beta = .09, p < 0.05$). Again, there was evidence that concealment was associated with the suppressive effect because the Beta coefficient for disclosure reversed from negative (in the model with disclosure as the only included stigma-identity construct) to positive (in the model that included concealment). Further examination of other simplified models revealed that none of the other stigma-identity constructs were associated with the suppressive effect observed with disclosure.

4.3.2.2. Synthesis of Results

The full model explained 67% of the variance in adverse impact of stuttering on quality of life, which is approximately 3% more variance than the model for distress. Similar to the full model for distress, salience and concealment were significant predictors of adverse impact of stuttering on quality of life, and disclosure was not a significant predictor when neuroticism was included in the model. Whether or not there was a significant relationship between centrality and adverse impact of stuttering on quality of life after accounting for neuroticism changed depending on if outliers were included or excluded. Thus, it appears that the relationship between centrality and adverse impact of stuttering on quality of life may be more fragile than the relationship between centrality and distress.
Neuroticism, gender, and self-rated stuttering severity were also unique and reliable predictors of adverse impact of stuttering on quality of life. Similar to the relationship observed with distress, people who reported higher levels of neuroticism also reported that their quality of life was more adversely impacted by stuttering. In the full model, gender also significantly contributed to adverse impact of stuttering on quality of life, with males who stutter reporting more adverse impact than females after accounting for all other variables. This is different from the findings for distress, in which there was no effect for gender, but were effects for both income and age. Finally, whereas self-rated stuttering severity did not reliably predict distress in the full model, it did reliably predict adverse impact of stuttering on quality of life, with people with higher self-rated stuttering severity scores reporting more adverse impact of stuttering on quality of life.

It is worth mentioning that, when a simplified model with demographics (age, gender, income, education, self-rated stuttering severity) and only disclosure was examined, disclosure had the hypothesized significant negative relationship with adverse impact of stuttering on quality of life, and the relationship was robust after accounting for neuroticism. However, the direction of the relationship between disclosure and adverse impact of stuttering on quality of life reversed and was not significant with concealment in the model.

4.4. Research Question Three

To what extent does self-rated stuttering severity moderate the relationships between stigma-identity constructs and both distress and adverse impact of stuttering on quality of life among AWS?

In this research question, I examined if the relationships between the stigma-identity constructs and psychological health outcomes differed depending on self-rated stuttering
severity. In order to test for interactions between the stigma-identity constructs and self-rated stuttering severity, salience, centrality, concealment, disclosure, and self-rated stuttering severity were first centered to reduce potential multicollinearity (Aiken, West, & Reno, 1991). Then, product terms were created for each of the two-way interactions (e.g., salience X severity). Separate regression analyses were conducted for each outcome variable (distress, adverse impact of stuttering on quality of life) using the same protocol outlined in the full models for research question two, but with the new centered variables. Specifically, demographics were entered in Step 1 (age, gender, income, education, centered self-rated stuttering severity), the centered stigma-identity constructs in Step 2, and neuroticism in Step 3. To investigate the potential interactions of interest, all two-way interactions between stigma-identity constructs and self-rated stuttering severity (i.e., salience x severity, centrality x severity, concealment x severity, disclosure x severity) were entered in Step 4.

4.4.1. Psychological Distress

First, a hierarchical multiple regression was conducted with the primary outcome variable of interest, distress. The assumptions for regression were met, including linearity, independence of residuals (Durbin-Watson of 2.01), homoscedasticity, normality, and no evidence of multicollinearity. Five outliers with standardized residuals exceeding ± 3 standard deviations were identified and removed. At each of the four steps, the model was significant (all p’s < 0.001), but the addition of the interaction terms in Step 4 did not significantly increase the proportion of variance in distress that could be explained, \( \Delta R^2 = 0.00, F(4, 374) = 1.08, p = 0.37 \). Further, none of the interaction terms reliably predicted distress, indicating that self-rated stuttering severity did not moderate the relationship between the stigma-identity constructs and
distress. These null findings were replicated in a separate model with the full sample including outliers.

4.4.2. Adverse Impact of Stuttering on Quality of Life

A separate set of hierarchical multiple regressions were conducted to investigate the secondary outcome variable, adverse impact of stuttering on quality of life. The assumptions for regression were met. Five outliers with standardized residuals exceeding ± 3 standard deviations were identified and excluded. Table 4.9 contains the results from each step of the regression.

As shown in Table 4.9, Step 1 regressed adverse impact of stuttering on quality of life on age, gender, income, education, and the centered self-rated stuttering severity variable. The model was statistically significant, $F(5, 383) = 44.01, p < .001$, and accounted for an adjusted 36% of the variability in adverse impact of stuttering on quality of life. In Step 2, the centered stigma-identity variables (salience, centrality, concealment, disclosure) were entered, $F(9, 379) = 84.01, p < .001$, explaining an additional 30% of variance. Neuroticism was added in Step 3, increasing the total adjusted amount of variability explained to 67%. The model was significant, $F(10, 381) = 79.99, p < .001$. The addition of interaction terms in Step 4 significantly increased the proportion of variance explained, $\Delta R^2 = 0.01, F(4, 374) = 2.81, p < .05$, and the full model was significant, $F(14, 374) = 58.30, p < .001$. It was hypothesized that both centrality and concealment would interact with self-rated stuttering severity to predict adverse impact of stuttering on quality of life. The results indicated that there was only one significant interaction: Centrality by Self-rated Stuttering Severity ($\beta = .07, p < .05$). However, it is worth mentioning that the interaction between concealment and self-rated stuttering severity approached the threshold for significance ($\beta = .07, p = .09$).
Table 4.9 Moderated Multiple Regression Predicting Adverse Impact of Stuttering on Quality of Life

<table>
<thead>
<tr>
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<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
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<td></td>
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<td></td>
<td>.66***</td>
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Notes: *p<0.05, **p<0.01, ***p<0.001. Self-rated Stuttering Severity and the stigma-identity constructs were centered in this analysis to reduce potential multicollinearity in higher order terms.
As an additional robustness test, a separate but identical model that included the five outliers was examined. In this model, the addition of interaction terms in Step 4 did not significantly increase the proportion of variance explained, $\Delta R^2 = 0.01$, $F(4, 379) = 1.59$, $p = .18$. Additionally, the interaction term for Centrality X Self-Rated Stuttering Severity was not significant, but just above the $p < 0.05$ threshold ($\beta = .09$, $p = 0.057$).

4.4.2.1. Exploring the Interaction Between Centrality and Self-Rated Stuttering Severity

PROCESS (Hayes, 2012), a macro in SPSS, was used to explore the significant interaction between centrality and self-rated stuttering severity that was observed with the primary sample excluding outliers. Self-rated stuttering severity was entered as a moderator of the effect of centrality on adverse impact of stuttering on quality of life. Age, gender, income, education, salience, concealment, disclosure, and neuroticism were entered as covariates. Figure 4.2 shows that, consistent with the hypothesis, the positive association between centrality and adverse impact of stuttering on quality of life was strongest among people who reported higher levels of self-rated stuttering severity. When self-rated stuttering severity was low (defined as one standard deviation below the mean), levels of centrality did not predict distress ($t = .01$, $p = .996$). However, as levels of self-rated stuttering severity increased, the positive relationship between centrality and adverse impact of stuttering on quality of life strengthened. In other words, the positive relationship between centrality and adverse impact of stuttering on quality of life was only significant among people who reported average ($t = 2.21$, $p < .05$) and high levels ($t = 3.30$, $p < 0.01$) of stuttering severity within the sample. Figure 4.2 contains a visual representation of the results.
4.5. Research Question Four

Do salience and disclosure interact to predict distress and adverse impact of stuttering on quality of life among AWS?

New regression analyses were conducted for each outcome variable (distress, adverse impact of stuttering on quality of life) using a protocol that was similar to the full model in research question two, but with the centered stigma-identity variables and the addition of the interaction term in Step 4. Specifically, demographic variables (age, gender, income, education, self-rated stuttering severity) were entered in Step 1, the centered stigma-identity constructs in Step 2 (salience, centrality, concealment, disclosure), neuroticism in Step 3, and the Salience X Disclosure interaction term in Step 4.

For the analysis predicting distress, three outliers with standardized residuals exceeding ± 3 standard deviations were excluded. The addition of the interaction terms in Step 4 did not significantly increase the proportion of variance in distress that could be explained, $\Delta R^2 = 0.00$, $F(1, 379) = .31$, $p = 0.58$. The interaction term with salience and disclosure did not reliably
predict distress ($\beta = -.02, p = .58$). The results were similar with adverse impact of stuttering on quality of life as the outcome variable. Four outliers were removed from the analysis, and adding the interaction term did not significantly increase the proportion of variance in distress that could be explained, $\Delta R^2 = 0.00, F(1, 378) = .00, p = .99$. The interaction term with salience and disclosure did not reliably predict distress ($\beta = .00, p = .99$). Additional analyses of models that included outliers also revealed null findings. Together, these results indicate that the effect of disclosure on the psychological health outcomes was similar for people with varying degrees of salience.

Because there was evidence of a suppressive effect between concealment and disclosure in previous models, additional simplified models with only the two stigma-identity constructs of interest (disclosure and salience) were analyzed. The new models regressed the outcome variables (distress and adverse impact of stuttering on quality of life) on demographics (age, gender, income, education, self-rated stuttering severity) in Step 1, the centered salience and disclosure variables in Step 2, neuroticism in Step 3, and the Salience X Disclosure interaction term in Step 4. The null findings were replicated in the simplified models. The interaction term did not predict distress or adverse impact of stuttering on quality of life in models with and without outliers, and there was no significant change in $R^2$ values when the interaction terms were added.
CHAPTER 5: DISCUSSION

In this study, stuttering was conceptualized as a type of concealable stigmatized identity – or CSI. Considering stuttering as a CSI provided a novel framework for investigating factors that contribute to variability in psychological health outcomes among adults who stutter (AWS). The purpose of this study was to determine if and how specific stigma-identity constructs – salience, centrality, concealment, and disclosure – relate to psychological distress and adverse impact of stuttering on quality of life among AWS, a population vulnerable to experiencing inequitable psychological health outcomes. Additionally, self-rated stuttering severity was explored as a potential moderator of the effects of stigma-identity constructs on psychological health outcomes and interactions between stigma-identity constructs were examined.

Overall, results from this study provide evidence that it is both appropriate and useful to conceptualize stuttering as a type of CSI. That is, variability in psychological health outcomes among AWS can be explained to a large extent by individual differences in the ways people think about and behave in relation to their CSI – which in this case, was stuttering. After accounting for demographic characteristics and self-rated stuttering severity, the stigma-identity constructs explained 25% of the variability in distress and 30% of the variability in adverse impact of stuttering on quality of life among this sample of AWS. These findings provide support for Sheehan’s (1970, 1975) Role-Conflict Theory of Stuttering, which implicated identity constructs as relevant to distress among AWS.

The role of stigma-identity constructs in psychological health outcomes among AWS is further supported by two main findings in the current study. First, as hypothesized, all four stigma-identity constructs were significantly correlated with distress and adverse impact of stuttering on quality of life. However, only three of the constructs – salience, centrality, and
concealment, but not disclosure – were consistently predictive of psychological health outcomes after controlling for demographics, self-rated stuttering severity, and neuroticism. The strength, significance, and direction of the relationships between disclosure and the psychological health outcomes varied depending on which specific variables were included in the models.

Second, self-rated stuttering severity moderated the relationship between centrality and adverse impact of stuttering on quality of life. Specifically, higher levels of centrality were associated with more adverse impact of stuttering on quality of life, but only among people with moderate and high self-rated stuttering severity. For people with low self-rated stuttering severity, there was no relationship between centrality and adverse impact of stuttering on quality of life. Self-rated stuttering severity did not interact with any of the other stigma-identity constructs to predict either distress or adverse impact of stuttering on quality of life.

This chapter is divided into five sections. In sections one and two, I discuss the two main findings in greater detail. In the third section, I describe other notable findings from the present study pertaining to self-rated stuttering severity and neuroticism. The fourth section contains a discussion of the limitations of the current study and future directions. The fifth and final section is the conclusion.

5.1. There are Unique Relationships Between Individual Stigma-Identity Constructs and Psychological Health Outcomes Among AWS

5.1.1. Salience

Salience has been shown to be associated with elevated levels of distress among people with a variety of CSIs (Quinn & Chaudoir, 2009; Quinn et al., 2014). The current study provides evidence indicating that this finding also extends to AWS. Specifically, salience was both positively correlated with and predictive of distress and adverse impact of stuttering on quality of life. These relationships were robust after accounting for the role of neuroticism in models with
and without outliers. This is an important finding because it shows that decreasing the salience of stuttering-related thoughts (or how often one entertains thoughts about stuttering) may be an important factor in reducing depression and anxiety and in improving the day-to-day experiences of AWS.

Research on rumination, cognitive preoccupation, and repetitive thinking offers a window into understanding why frequent thoughts about stuttering are associated with poor psychological health outcomes for AWS. As has been suggested by researchers who study other CSI groups, excessive self-focused attention exacerbates distress because it (1) deteriorates social connection and support, and (2) impairs problem solving abilities (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). When AWS are thinking about stuttering, they are expending cognitive resources that could be devoted elsewhere (Plexico et al., 2009a; St. Clare et al., 2009). Specifically, they may be missing out on important information in their social environments, such as the content of what a conversational partner is saying and other subtle social cues (Plexico et al., 2009a). In educational and work contexts, missing out on information because of an over-focus on stuttering likely interferes with short- and long-term performance and success. Obsessive thoughts about stuttering may also compromise the cognitive resources that are required to engage in healthier, problem-focused coping strategies, such as clearly defining the problems associated with stuttering and generating and enacting potential solutions (Plexico et al., 2009b).

The relationships between salience and psychological health outcomes observed in the present study provide preliminary support for existing therapy approaches in stuttering intervention that aim to change patterns of attention paid to stuttering-related thoughts. There is a small but growing literature on the use of cognitive-behavioral therapy and mindfulness
approaches with AWS, both of which target reducing intrusiveness and negative reactions associated with stuttering-related thoughts. While much of the clinical literature on these therapy approaches are position papers (e.g., Boyle, 2011; Menzies, Onslow, Packman, & O’Brian, 2009; Plexico & Sandage, 2011), this line of work is timely, and the results of the existing empirical studies are promising (e.g., Gupta, Yashodharakumar, & Vasudha, 2016; Helgadóttir, Menzies, Onslow, Packman, & O’Brian, 2014; Menzies et al., 2008).

5.1.2. Centrality

Consistent with the initial hypothesis, centrality was positively associated with and predictive of distress after accounting for the role of neuroticism in models with and without outliers. Although centrality had a weaker relationship with distress compared to salience, it was clear that the more that AWS defined themselves by their stuttering, the more distress they reported. This is consistent with research findings with other CSI groups, including people who live with HIV, cancer survivors, and a number of other populations (Brener et al., 2013; Helgeson, 2011; Park et al., 2011; Quinn & Chaudoir, 2009).

The relationship between centrality and adverse impact of stuttering on quality of life was less clear. Whether or not centrality directly predicted adverse impact of stuttering on quality of life after accounting for the role of neuroticism varied depending on whether outlier cases were included in the model. Specifically, centrality was a significant predictor of adverse impact of stuttering on quality of life in the model with outliers included, but was not a significant predictor in the model that excluded outliers. These results indicate that, compared to its relationship with distress, the relationship between centrality and adverse impact of stuttering on quality of life is more tenuous.
There are a number of possible explanations as to why centrality was positively associated with distress. For example, for some AWS, the stuttering identity is entangled with negative feelings and thought processes (Butler, 2013). These individuals may internalize the stigma associated with stuttering (Boyle, 2013) and develop feelings of shame associated with being a person who stutters (Ginsberg, 2000; J. Sheehan, Cortese, & Hadley, 1962). People for whom stuttering is highly central to their overall sense of self are possibly more prone to experiencing and attending to such feelings of shame, which is a key factor in distress – particularly depression (Wright, O'leary, & Balkin, 1989).

Another potential explanation for the link between centrality and distress may be related to feelings of inauthenticity that AWS may experience when they produce fluent speech either spontaneously or through learned or self-taught speech modification strategies. Spontaneous fluency occurs when fluent speech is produced automatically and effortlessly. Controlled fluency, on the other hand, occurs when a person uses a learned or self-taught technique to modify or prevent a moment of stuttered speech altogether. People whose stuttering identity is highly central and important may feel inauthentic when they produce fluent speech (whether spontaneous or controlled), and thus, experience feelings of guilt and shame. Authenticity has not been studied among AWS, but research with other groups has shown that feelings of inauthenticity are associated with increased distress and decreased life satisfaction (Boyraz & Kuhl, 2015).

The association between centrality and distress in the current study provides support for continued use and exploration of narrative therapy in speech-language pathology. In their clinical tutorial, DiLollo, Neimeyer, and Manning (2002) discuss techniques for “deconstructing the stuttering-dominated personal narrative” and “reconstructing alternative narratives.” More
research is needed to understand if and how changing the magnitude of the stuttering identity may relate to psychological health and wellbeing among AWS.

5.1.3. Concealment

Consistent with the hypothesis for the current study as well as with research findings from other CSI groups (Larson et al., 2015), concealment was significantly and positively correlated with and predictive of distress and adverse impact of stuttering on quality of life among AWS. A useful framework for understanding how concealment might negatively impact psychological health is to conceptualize concealment as a form of “safety behavior” that AWS use to minimize the probability of negative social outcomes related to stuttering. Safety behaviors refer to cognitive and behavioral strategies that individuals use in order to minimize social devaluation in anxiety-provoking situations (Clark, 1999; Salkovskis, 1991). Examples of stuttering-related concealment or safety behaviors include keeping answers short, pointing to things instead of talking, trying to take deep breaths, rehearsing sentences mentally before saying them, and avoiding sounds, words, and situations (Helgadottir, Menzies, Onslow, Packman, & O'Brian, 2014; Lowe et al., 2017).

A small number of earlier studies (three to be exact) have shown that the use of stuttering-related safety behaviors is linked to poor psychological health outcomes among AWS, specifically increased fear of negative evaluation and unhelpful thoughts about stuttering (Lowe et al., 2017). Yet, there is ambiguity across these investigations as to what stuttering-related safety behaviors do and do not include. Perhaps as, if not more important than quantifying the use of safety behaviors, is examining the intention behind safety behavior use. Some AWS may use safety behaviors to conceal stuttering and their identity as a person who stutters, while others may use them for different reasons. For example, an AWS may use the strategy of taking a deep
breath to avoid social devaluation with the intent to conceal stuttering or with a variety of other intents (e.g., to stutter more easily, to reduce physical tension). Thus, the intention for safety behavior use, and specifically the intention to conceal, may be particularly threatening to psychological health outcomes of AWS. More research is needed to untangle if (or to what extent) it is attempting to avoid social devaluation or attempting to conceal overt stuttering that is linked to negative psychological health outcomes.

Findings in the literature on safety behavior use can be extended to conceptualize ways that concealing stuttering might negatively impact psychological health among AWS. First, concealing stuttering interferes with opportunities to disconfirm fears and negative beliefs related to how social interactions involving overt stuttering could unfold (Lowe et al., 2017; Salkovskis, 1991). To illustrate, consider the following situation. It is not unusual for people who stutter to expect that their listeners will penalize them for stuttering overtly. Thus, some people who stutter may try to prevent negative listener reactions by concealing stuttering via word switching (e.g. saying “puppy” instead of “d-d-dog”). In this situation, switching words to conceal overt stuttering might prevent a negative listener reaction, but it also prevents people who stutter from learning that the social world can be a safe place to stutter. When people who stutter do not allow themselves to stutter overtly, they miss opportunities to receive social information that may disconfirm their fears related to social devaluation and are not able to reappraise their perceptions of social threats (Helbig-Lang & Petermann, 2010; Lowe et al., 2017).

In their working model of self-concealment, Larson and colleagues (2015) implicate other mechanisms through which concealment might negatively affect psychological health, two of which may be particularly relevant to AWS. First, concealment is thought to negatively impact psychological health because it reduces social support. This may be particularly true for
AWS because the aspect of themselves that they are trying to conceal specifically occurs in the context of communication. Concealing stuttering may interfere with building relationships with people in everyday life (e.g., friends, co-workers) and with other people who stutter. Second, concealment may negatively impact psychological health through maladaptive help-seeking attitudes and behaviors. Self-concealment is associated with negative attitudes toward seeking professional help (Nam et al., 2013), lower quality therapeutic alliance, and keeping secrets that are relevant to the therapeutic process during sessions (Fedde, 2009).

In sum, there may be several potential mechanisms through which concealment negatively impacts psychological health outcomes. Specifically, concealment may interfere with opportunities to reappraise perceptions of social threats related to stuttering, reduce access to and engagement with social support, and contribute to unhealthy help-seeking behaviors and attitudes. More research is needed to illuminate how and why concealment is associated with poor psychological health outcomes among AWS.

Finally, it is important to note that, of all the constructs included in this study, concealment was the strongest predictor of both distress and adverse impact of stuttering on quality of life. That is, concealment was more strongly related to psychological health outcomes than self-rated stuttering severity, demographic characteristics, neuroticism, and the three other stigma-identity constructs included in this study (i.e., salience, centrality, disclosure). This finding has important implications. First and foremost, speech-language pathologists should reflect upon and examine their own practices to ensure that they are not intentionally or unintentionally teaching concealment to their clients who stutter. In a study of speech-language pathologists practicing in Australia, more than 20% reported that they sometimes, often, or always encourage their clients to keep their answers short or avoid difficult words, syllables, and
topics when feeling anxious about stuttering (Cuming et al., 2009). This type of advice may lead people who stutter to internalize the idea that stuttering is something that needs to be concealed, which could contribute to increased distress and more adverse impact of stuttering on quality of life.

Second, the strong relationships between concealment and psychological health outcomes observed in this study provide support for Sheehan’s (1970, 1975) Role-Conflict Theory of Stuttering. Specifically, the results confirm Sheehan’s hypothesis that concealment is an important factor in psychological distress among AWS. Finally, the results provide preliminary support for the use of therapy approaches that target reduction of concealment and avoidance behaviors. Avoidance-reduction and exposure therapy for stuttering have received limited, but increasing attention in the stuttering literature over the last decade (e.g., Scheurich, Beidel, & Vanryckeghem, 2019; Sisskin, 2018; Walkom). Both therapy approaches include procedures that encourage AWS to approach, rather than avoid or conceal moments of stuttering. The results of this study support the need for further research on the efficacy of these approaches with AWS.

5.1.4. Disclosure

In the current study, it was hypothesized that disclosure would be negatively correlated with and predictive of distress and adverse impact of stuttering quality of life. Without accounting for the other stigma-identity constructs (i.e. salience, centrality, concealment), disclosure did have a significant negative relationship with distress and adverse impact of stuttering on quality of life. However, when other variables were accounted for (specifically, concealment and neuroticism) disclosure did not have a significant and consistent relationship with the psychological health outcomes.
The mixed findings in this study mirror the limited extant literature on disclosure outcomes among AWS. Specifically, one survey study showed that higher levels of disclosure (which was measured as participants’ overall openness related to stuttering) was associated with better quality of life (Boyle et al., 2018). The other study involved an experimental task and demonstrated that disclosing stuttering to an unfamiliar listener had no relationship with the speaker’s reports of anxiety, comfort, or cognitive effort. (Mancinelli, 2019).

There are at least two potential explanations for why disclosure had inconsistent relationships with the psychological outcomes in the current study. First, the data could be illustrating the messy reality that a simple, direct relationship between disclosure and psychological health outcomes does not exist among AWS. In their Disclosure Process Model, Chaudoir and Fisher (2010) present a strong case that the psychological consequences of disclosing a CSI differ depending on why and how people disclose. The reason why a person may choose to disclose can vary from one situation to the next and can be approach-focused or avoidance-focused. Goals to pursue positive social outcomes (e.g., building a stronger relationship) or generate positive affect (e.g., hopefulness) are examples of approach-focused goals for disclosure. In contrast, goals to prevent negative social outcomes (e.g., social rejection) or negative affect (e.g., shame) are examples of avoidance-focused goals for disclosure. Chaudoir and Fisher (2010) suggest that individuals with approach-focused goals are more likely to benefit from disclosure, while individuals with avoidance-focused goals are less likely to experience positive outcomes.

*How* disclosure events unfold can also vary from person to person and situation to situation. Chaudoir and Fisher (2010) describe the ways in which the content of the disclosure statement (e.g., duration, valence, depth), as well as the reaction of the disclosure confidant (e.g.,
supportive/unsupportive) influence disclosure outcomes among people with CSIs. Research with AWS has shown that disclosing stuttering most positively influences listener perceptions when the speaker discloses at the beginning of the sentence (Healey et al., 2007) with an informative (rather than apologetic) statement (Byrd, Croft, et al., 2017). In order to fully understand the psychological consequences of disclosing stuttering among AWS, more research investigating disclosure goals, duration and depth of disclosure statements, and reactions of disclosure confidants is needed.

The second explanation for the inconsistent relationships between disclosure and psychological health outcomes observed in this study may be related to the measure of disclosure that was used. Recall that in the current study, the measure of disclosure was limited to verbal-based disclosures. Specifically, participants reported the frequency with which they had verbally told others about their stuttering. Importantly, AWS can disclose that they stutter or are a person who stutters in a variety of ways; for example, disclosures can be action-based and could include wearing a T-shirt with a stuttering support organization logo or stuttering openly and overtly in conversation. To avoid conflation with stuttering severity, action-based disclosures were not included in the disclosure measure in the present study. It is possible that, if defined and measured in other ways, disclosure could have reliable relationships with psychological health outcomes among AWS.

In additional to potential direct relationships, complex associations between disclosure and the psychological health outcomes of AWS were also investigated. Results indicated that, contrary to the hypothesis, disclosure did not interact with salience to predict distress or adverse impact of stuttering on quality of life. This potential relationship was examined because previous research with another CSI population showed that the psychological benefits of disclosure are
strongest among people who have highly intrusive thoughts related to their CSI (Major & Gramzow, 1990). For this reason, I hypothesized that there would be a negative relationship between disclosure and distress, and that this relationship would be strongest among people with high salience. In other words, I expected that disclosure might be particularly beneficial to psychological health outcomes among participants who thought about their stuttering frequently.

In the current study, there was not a significant interaction between salience and disclosure to predict either psychological health outcome. This means that the effects of disclosure on psychological health outcomes did not depend on salience, and the effects of salience did not depend on disclosure. Again, the null relationship could be an artifact of the disclosure measure (which was limited to only verbal disclosures). It may be worthwhile to examine a potential interaction between disclosure and salience in predicting psychological health outcomes in future research using a broader measure of disclosure.

5.2. Stuttering Severity Moderated the Effect of Centrality on Adverse Impact of Stuttering on Quality of Life

In addition to examining the direct relationships between the stigma-identity constructs and psychological health outcomes, it was also of interest to investigate the role of self-rated stuttering severity as a potential moderating variable. In other words, I sought to understand if the relationships between the stigma-identity constructs and psychological health outcomes were different for people with varying levels of self-rated stuttering severity. I hypothesized that, consistent with research findings with other CSI groups (Brener et al., 2013; Cook et al., 2017), symptom severity (which in this case, was self-rated stuttering severity) would interact with centrality and concealment to predict distress and adverse impact of stuttering on quality of life. Further, I hypothesized that centrality and concealment would have the most harmful
relationships with psychological health outcomes among people with higher self-rated stuttering severity.

The results indicated that there was only one significant interaction; self-rated stuttering severity moderated the relationship between centrality and adverse impact of stuttering on quality of life. That is, for AWS with low self-rated stuttering severity, there was no relationship between centrality and adverse impact of stuttering on quality of life. In other words, for people who stuttered mildly, the extent that they defined themselves by stuttering did not influence the adverse impact that stuttering had on their quality of life. However, for AWS with moderate and high self-rated stuttering severity, higher levels of centrality predicted more adverse impact of stuttering on quality of life. Additionally, the relationship between centrality and adverse impact of stuttering on quality of life grew stronger as stuttering severity increased, such that centrality had the strongest relationship with adverse impact of stuttering on quality of life among AWS with the highest stuttering severity. In sum, these results indicate that high levels of centrality were only associated with adverse impact of stuttering on quality of life among people with moderate and high self-rated stuttering severity. It is likely that this finding helps to explain why the direct relationship between centrality and adverse impact of stuttering on quality of life was tenuous – because it was only applicable to a subgroup of AWS in the sample.

There are a few potential explanations for why the relationship between centrality and adverse impact of stuttering on quality of life intensified as self-rated stuttering severity increased. One explanation may be related to perceptions of discrimination among AWS. The broader CSI literature has shown that, compared to people with low levels of centrality, people with high levels of centrality are more likely to perceive discrimination (Earnshaw et al., 2015; Sellers & Shelton, 2003) and have stronger negative reactions to it (McCoy & Major, 2003).
Thus, people who reported that their stuttering was more “severe” or noticeable to others and also reported high levels of centrality may more frequently encounter, perceive, and negatively react to discrimination, which could lead to an intensified adverse impact of stuttering on quality of life.

Another potential explanation could be related to the extent that feelings of centrality are both relevant and pervasive in day-to-day life. Although some participants who stutter mildly endorsed that they largely define themselves by stuttering, they may be less likely to consider the significance of their stuttering identity in everyday life compared to those who stutter moderately and severely. It is possible that the act of stuttering itself triggers thoughts about the centrality of a person’s stuttering identity. For people who stutter moderately and severely, frequent and reoccurring moments of stuttering may serve as reminders that they are “different” from others, which could interfere with social participation and adversely impact quality of life.

Finally, it is worth mentioning self-rated stuttering severity did not moderate the relationships between the other stigma-identity constructs and psychological health outcomes. The relationships that salience and concealment had with psychological health outcomes were similar at all levels of stuttering severity. This finding indicates that, regardless of stuttering severity, thinking about stuttering and attempting to hide stuttering may be risk factors for negative psychological health outcomes.

### 5.3. Other Notable Findings

There were two additional findings in the present study that were notable, but not directly related to the specific research questions. These two findings, described in the following sections, pertain to the roles of self-rated stuttering severity and neuroticism in psychological health outcomes among the AWS in this sample.
5.3.1. Self-Rated Stuttering Severity Predicted Adverse Impact of Stuttering on Quality of Life, but not Distress

Previous studies investigating the relationships between stuttering severity and psychological health outcomes have yielded mixed findings (Craig et al., 2003; Iverach et al., 2009; Koedoot et al., 2011; Manning & Beck, 2013). In the current study, self-rated stuttering severity was positively correlated with both distress and adverse impact of stuttering on quality of life. Importantly, however, when the stigma-identity constructs were accounted for in regression analyses, the strength of the relationship between self-rated stuttering severity and distress decreased and the relationship was no longer significant. This means that, when salience, centrality, concealment, and disclosure were accounted for, there was no significant relationship between self-rated stuttering severity and distress. This is an important and clinically relevant finding because it indicates that the ways people manage their stuttering identity are more closely related to psychological distress then the behavioral components of stuttering that are readily observed by listeners, such as sound/syllable repetitions, sound prolongations, and associated behaviors. The present findings suggest that for AWS with elevated levels of depression and anxiety, changing identity-related thoughts and behaviors could be more beneficial to their psychological health than reducing the frequency or duration of their overt moments of stuttering.

Unlike the relationship with distress, the positive relationship between self-rated stuttering severity and adverse impact of stuttering on quality of life was robust even after accounting for the stigma-identity constructs and neuroticism. Next to concealment, self-rated stuttering severity was the strongest predictor of adverse impact of stuttering on quality of life in the full model. This indicates that, although stuttering severity was not related to levels of anxiety and depression after accounting for the stigma-identity constructs, it was related to the
amount of difficulty that participants had communicating across contexts, achieving educational and career goals, and maintaining a sense of self-confidence.

5.3.2. Neuroticism is Highly Related to Distress Among AWS

Recall that neuroticism, which refers to a person’s general level of emotional stability, was included as a control variable in the study to examine the alternative explanation that this dimension of personality could be underlying the observed relationships between stigma-identity constructs and psychological health outcomes. Most, but not all, of the observed relationships were robust after accounting for individual differences in neuroticism.

The strength of the relationships between neuroticism and the psychological health outcomes, specifically distress, were notable findings. Neuroticism has been shown to be negatively associated with quality of life among AWS (Bleek et al., 2012). This finding was replicated in the current study. However, the relationship neuroticism had with adverse impact of stuttering on quality of life was weaker than the relationship it had with distress. In the model predicting adverse impact of stuttering on quality of life, neuroticism accounted for just 1% of the total variability beyond that covered by demographics and the stigma-identity constructs; in the model for distress, it accounted for 21%.

As hypothesized by Bleek, Montag, Faber, and Reuter (2011), neuroticism may be predictive of poor psychological outcomes because it is associated with the use of emotion-focused coping strategies (Connor-Smith & Flachsbart, 2007). According to the contextual model of coping (Lazarus, 1993; Lazarus & Folkman, 1984), there are two broad categories of coping strategies, problem-focused and emotion-focused strategies. Problem-focused coping strategies involve attempts to remove or reduce the threatening event or problem (e.g., defining and generating solutions for the problem). Emotion-focused coping strategies, on the other hand,
involve attempts to reduce negative emotions associated with the problem or stressful event (e.g., avoidance, distancing). In their qualitative studies on coping among AWS, Plexico et al. (2009a, 2009b) illustrate and discuss how emotion-focused coping strategies can have maladaptive long-term consequences on psychological health.

The findings from the current study provide evidence that it is important to further investigate the role of neuroticism in distress among AWS. Since early research in stuttering demonstrated that there are not between-group differences in personality between AWS and AWNS (e.g., Johnson, 1932; McDowell, 1928), the potential role of personality factors in stuttering have received relatively little attention in the literature. The results from this study and others (e.g., Bleek et al., 2011; Bleek et al., 2012) provide evidence that personality dimensions, specifically neuroticism, are important in understanding individual differences in distress within the population of AWS.

5.4. Limitations and Future Directions

Given its correlational nature, the results from the current study should be interpreted with caution. However, controlling for a number of other variables relevant to psychological health outcomes (e.g., age, gender, income, education, self-rated stuttering severity, neuroticism) reduces the likelihood that the significant relationships observed in this study were driven by differences in other unobserved characteristics. In the future, additional experimental research is needed to determine if there are causal relationships between the stigma-identity constructs and psychological health outcomes.

An additional limitation of the present study is that cases were excluded from the regression analyses due to missing data. Although 476 of the 505 participants completed 90% of the items on each of the survey scales used in this study, some of the 476 participants did not
report their age, income, or education levels. Because these demographic variables were included in the models as covariates, the participants with missing data were not included. Fortunately, the large sample size was a strength of this study, and even with many cases excluded due to missing data, each analysis had more than enough participants required for adequate power.

A third limitation of the study, as in all survey research, is that the measures were based on self-report. It is possible that some typically fluent speakers misidentified as having a problem with stuttering and took the survey. Thus, the results may be best representative of people with perceived problematic disfluency. Additionally, the measure of stuttering severity was also based on self-report. Although this measure has been shown to be consistent with stuttering severity ratings made by speech-language pathologists (O'Brian et al., 2004), it is possible that AWS in this sample over or under-estimated the behavioral severity of their stuttering. Future research could include more objective measures of stuttering severity in addition to using a self-rated scale.

There are several future research directions that might elucidate relationships between stigma-identity constructs and psychological health outcomes among AWS. First, it is important that motivations for concealment and disclosure (and how these motivations relate to psychological health outcomes) are examined in future studies. Research with other CSI groups has demonstrated that the decision-making processes that underly concealment and disclosure influence psychological consequences (Chaudoir & Fisher, 2010). This line of work could help tease apart why some AWS perceive concealing stuttering as an expression of agency that bolsters psychological health (Constantino et al., 2017), while others view concealing stuttering as a maladaptive coping mechanism that leads to feelings of distress (Plexico et al., 2009b).
Second, as has been developed with other populations (e.g., Meidlinger & Hope, 2014 with sexual minorities) researchers should consider developing stuttering-specific concealment and disclosure scales. People who stutter can conceal and disclose their stuttering in highly nuanced ways, and stuttering-specific scales may better capture variability in the extent that people engage in these behaviors. Boyle et al. (2018) created a 10-item stuttering-specific scale based on a review of the literature, but the scale treats concealment and disclosure as a unidimensional construct. The current study provides evidence that there may be utility in investigating stuttering-specific concealment and disclosure behaviors separately.

Finally, the relationships between stigma-identity constructs and psychological health outcomes should be studied longitudinally. It could be that the relationships between these constructs and psychological health outcomes change over time or differ depending on how ready a client is to “do something” about stuttering or make changes related to communication (Floyd, Zebrowski, & Flamme, 2007).

5.5. Conclusion

Compared to typically fluent speakers, AWS are vulnerable to experiencing elevated levels of distress and other negative psychological health outcomes. Yet, not all AWS experience negative psychological health outcomes, and little is known about why some AWS are more resilient to distress than others. The results of the current study indicate that variability in psychological health outcomes among AWS is not entirely idiosyncratic, and that stigma-identity related thoughts and behaviors are reliable predictors of distress and adverse impact of stuttering on quality of life among AWS.
REFERENCES


and between-country comparisons. *Journal of Communication Disorders*, 62, 115-130. doi:10.1016/j.jcomdis.2016.05.010


Stiles, W. B. (1987). I have to talk to somebody *Self-disclosure* (pp. 257-282): Springer.


APPENDIX A: Demographic and Stuttering-Related Items

1. How old are you? _____

2. What is your gender? – Male, Female, Non-binary, Another gender identity not listed above

3. What is your race or ethnicity? – White, Hispanic/Latino/Spanish, Black/African American, Asian, American Indian/Alaskan Native, Native Hawaiian/other Pacific Islander, Multiracial

4. What is your sexual orientation? - Heterosexual, homosexual, bisexual, another sexual identity not listed

5. What is your highest level of education? – Did not complete high school, completed high school, some college or technical program (did not complete), completed 2 year or technical program, completed undergraduate degree, completed graduate or professional degree

6. Do you currently earn money through employment? Yes, No

7. If so, please indicate your personal income level – N/A or less than $10,000 per year, between $10,000 and $20,000 per year, between $20,000 and $50,000 per year, More than $50,000 per year.

8. Approximately how many years have you been stuttering? ___

9. How important is it to you that you speak fluently? – not important at all, somewhat important, moderately important, extremely important

10. To what extent do you agree with the following statement: I identify with people who stutter. (I = Fully disagree to 7 = Fully agree)

11. Have you ever or do you currently participate in speech therapy? – Yes, No

12. How many years have you participated in speech therapy? _______

13. Have you ever or do you currently participate in stuttering self-help groups or support organizations? – Yes, No

14. How many years have you participated in stuttering self-help groups or support organizations? ___
APPENDIX B: Self-Rated Stuttering Severity Scale

Instructions: Next you will rate your typical stuttering severity across eight different situations. When you think of stuttering severity, think of the level of physical disruption in your speech that you think is noticeable to others for the majority of the day. Physical disruption may include repetitions, prolongations, and blocks, as well as bodily tension, effort, and physical movements. It does not refer to the effect that stuttering has on how you think and feel about yourself and your life in general.

With this in mind, how would you rate your stuttering severity when…

1. Talking with a family member
2. Talking with a familiar person, not a family member
3. Talking in a group of people
4. Talking with a stranger
5. Talking with an authority figure such as a work manager or teacher
6. Talking on the telephone
7. Ordering food or drink
8. Giving your name and address

Response Key:
1 = Not at all
9 = Extremely severe stuttering
## APPENDIX C: Modified Concealment Scale

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have an important secret that I haven't shared with anyone.</td>
<td>I haven’t shared with anyone that I have sex with men.</td>
<td>I haven’t shared that I stutter with anyone.</td>
</tr>
<tr>
<td>2</td>
<td>If I shared all my secrets with my friends, they would like me less.</td>
<td>If I shared with my friends that I have sex with men, they would like me less.</td>
<td>If I shared that I stutter with my friends, they would like me less.</td>
</tr>
<tr>
<td>3</td>
<td>There are lots of things about me that I keep to myself.</td>
<td>There are lots of things about my sex with men that I keep to myself.</td>
<td>There are lots of things about my stuttering that I keep to myself.</td>
</tr>
<tr>
<td>4</td>
<td>Some of my secrets have really tormented me.</td>
<td>Hiding the fact that I have sex with men have been really stressful.</td>
<td>Some of my secrets about my stuttering have really tormented me.</td>
</tr>
<tr>
<td>5</td>
<td>When something bad happens to me, I tend to keep it to myself.</td>
<td>When I have sex with men, I keep it to myself.</td>
<td>When something bad related to my stuttering happens, I tend to keep it to myself.</td>
</tr>
<tr>
<td>6</td>
<td>I’m often afraid I’ll reveal something I don’t want to.</td>
<td>I often worry I’ll accidentally say or do something that might reveal to others that I have sex with men.</td>
<td>I’m often afraid I’ll reveal that I stutter even though I don’t want to.</td>
</tr>
<tr>
<td>7</td>
<td>Telling a secret often backfires and I wish I hadn’t told it.</td>
<td>I have told others that I have sex with men and later wished that I hadn’t told them</td>
<td>Telling someone that I stutter often backfires and I wish I hadn’t told them.</td>
</tr>
<tr>
<td>8</td>
<td>I have a secret that is so private I would lie if anybody asked me about it.</td>
<td>I would like if anyone asked me if I have sex with men.</td>
<td>My stuttering is so private I would lie if anybody asked me about it.</td>
</tr>
<tr>
<td>9</td>
<td>My secrets are too embarrassing to share with others.</td>
<td>The fact that I have sex with men is too embarrassing to share with others.</td>
<td>The fact that I stutter is too embarrassing to share with others.</td>
</tr>
<tr>
<td>10</td>
<td>I have negative thoughts about myself that I never share with anyone.</td>
<td>I have thoughts about my sex with men that I never share with anyone.</td>
<td>I have negative thoughts about my stuttering that I never share with anyone.</td>
</tr>
</tbody>
</table>
APPENDIX D: Scales for Predictor Variables

Salience
1. How often do you think about your stuttering? (1 = Almost Never, 7 = Many Times Each Day)
2. I spend a lot of time thinking about my stuttering. (1 = Strongly Disagree, 7 = Strongly Agree)
3. My stuttering often crosses my mind for no reason. (1 = Strongly Disagree, 7 = Strongly Agree)

Centrality
Please answer the next 6 items using the following scale: (1 = Strongly Disagree, 7 = Strongly Agree)
1. My stuttering is an important reflection of who I am.
2. In general, my stuttering is an important part of the way I see myself.
3. My stuttering defines who I am.
4. It is impossible to understand me without knowing about my stuttering.
5. I would be a different person without my stuttering.
6. My stuttering is a central part of my self-definition.

Concealment
Please indicate that extent that you agree with each of the following statements using the scale: (1 = Strongly Disagree to 5 = Strongly Agree)
1. I haven’t shared that I stutter with anyone.
2. If I shared that I stutter with my friends, they’d like me less.
3. There are lots of things about my stuttering that I keep to myself.
4. Some of my secrets about my stuttering have really tormented me.
5. When something bad related to my stuttering happens, I tend to keep it to myself.
6. I’m often afraid I’ll reveal that I stutter even though I don’t want to.
7. Telling someone that I stutter often backfires and I wish I hadn’t told them.
8. My stuttering is so private I would lie if anybody asked me about it.
9. The fact that I stutter is too embarrassing to share with others.
10. I have negative thoughts about my stuttering that I never share with anyone.

Disclosure
To what extent have you told the following people about your stuttering? Use the following scale for the next 7 items: (1 = None of them) to (5 = All of them).
1. Friends
2. Family
3. Romantic partners
4. Health care providers
5. People in the workplace
6. Neighbors
7. Others in the Community
APPENDIX E: Neuroticism Measure

Mini IPIP (Goldsberg, 1999)

Instructions: For each statement, rate the extent that you agree or disagree.

1. I have frequent mood swings.
2. I get upset easily.
3. I am relaxed most of the time.
4. I seldom feel blue.

Response Key
1 = Very inaccurate
2 = Moderately inaccurate
3 = Neither accurate nor inaccurate
4 = Moderately accurate
5 = Very accurate

*The following items are reverse coded; 3, 4. Higher scores indicate greater neuroticism.
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<thead>
<tr>
<th>Variable</th>
<th>Category</th>
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<th>%</th>
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<td>Female</td>
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<td></td>
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<td>81</td>
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<td>Hispanic American</td>
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<td></td>
<td>Other</td>
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<td>Highest Level of Education</td>
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<td>Completed high school</td>
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<td></td>
<td>Some college or technical</td>
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<td>14.3</td>
</tr>
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<td></td>
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<td></td>
<td>Completed 2 year or</td>
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<td></td>
<td>Completed undergraduate degree</td>
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<td></td>
<td>$10,000 to $20,000</td>
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<tr>
<td></td>
<td>$20,000 to $50,000</td>
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<td></td>
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<tr>
<td>Current Participation in</td>
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<tr>
<td>Self-Help</td>
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## APPENDIX G: Pilot Study Scale Reliability

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<th>Measure</th>
<th>Variable type</th>
<th>Source</th>
<th># of items</th>
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<td>Predictor</td>
<td>(Quinn et al., 2014)</td>
<td>3</td>
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<td>Centrality</td>
<td>Predictor</td>
<td>Quinn et al., 2014</td>
<td>6</td>
<td>0.79</td>
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<tr>
<td>Concealment</td>
<td>Predictor</td>
<td>(Larson &amp; Chastain, 1990; Schrimshaw et al., 2013)</td>
<td>10</td>
<td>0.93</td>
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<tr>
<td>Disclosure</td>
<td>Predictor</td>
<td>(Brener et al., 2013)</td>
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<tr>
<td>Depression (CES-D)</td>
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<td>(Radloff, 1977)</td>
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<td>0.79</td>
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<td>Anxiety (STAI-T)</td>
<td>Outcome</td>
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<td>0.94</td>
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<td>Psychological Distress (Depression and Anxiety)</td>
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<td>(Quinn &amp; Chaudoir, 2009)</td>
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<td>OASES: Quality of Life section</td>
<td>Outcome</td>
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<tr>
<td>Neuroticism</td>
<td>Control</td>
<td>(Goldsberg, 1999)</td>
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<td>0.84</td>
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<td>Self-rated Stuttering Severity</td>
<td>Control</td>
<td>(O’Brian, Menzies, &amp; Onslow, 2004)</td>
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<td>0.83</td>
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