When my Anxiety Speaks to Me, What Does it Sound Like?

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including

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Abstract

Anxiety disorders are some of the most commonly diagnosed mental health difficulties in the world. However, no study has examined the phenomenological qualities of anxious thoughts. Literature on mental health difficulties that are frequently comorbid with anxiety disorders have found that people often experience an alien internal voice with which they engage in an internal dialogue. We were interested in whether anxiety disorders also present with an internal dialogue. If so, then it may be important to address the relationship between the two *speakers* in the anxious dialogue, particularly if the dominant speaker produces the anxiogenic thoughts. This thesis presents two chapters discussing how anxious thoughts may be part of an internal dialogue. The first chapter provides an extensive rationale for why anxiety disorders might present with an internal dialogue based on literature on the internal dialogue in psychosis and eating disorders. The second chapter reports on a study examining whether dispositional anxiety presents with an internal dialogue. In this study, 33 undergraduate students high and low in dispositional anxiety participated in a semi-structured interview about the nature of their anxious thoughts. Verbatim transcriptions were coded for form and content. The resultant findings were inconclusive about whether dispositional anxiety was characterized by an internal dialogue. However, we found that participants across levels of dispositional anxiety frequently experienced their anxious thoughts as dominant, cold, and critical, and that their anxious thoughts were often accompanied by other thoughts that were less dominant, warmer, and less critical. Both the anxious and other thoughts were often internal representations of family members. These characteristics parallel the phenomenological qualities of the internal voices in psychosis and eating disorders, which may suggest that similar phenomena are occurring.

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Table of Contents

List of Tables

Chapter 1: The Potential Role of Anxiety in Maintaining Auditory Verbal Hallucinations

Auditory verbal hallucinations are perhaps one of the most well-known symptoms of psychosis, yet there is still much that is unknown about their origin. Auditory verbal hallucinations (AVHs) are,

> A sensory experience which occurs in the absence of corresponding external stimulation of the relevant sensory organ, has a sufficient sense of reality to resemble a veridical perception, over which the subject does not feel like (they have) direct and voluntary control, and which occurs in the awake state. (David, 2004, p.110)

Although AVHs are heard externally, various authors have concluded that people with psychosis actually experience a voice internally that is being misattributed to an external source (Bentall, 1990; Morrison, 1998; Salvatore et al., 2020). There is reason to believe that voices heard externally are internally-generated thoughts. For example, some evidence suggests that language production areas of the brain might cause AVHs to occur. Previous literature has linked the musculature involved in the production of language to internal thoughts (Morrison et al., 1995). By suppressing the movements of the musculature involved in thought, researchers were able to also suppress the experience of hearing voices (Morrison et al., 1995), which suggests that AVHs originate from internal thoughts. Some researchers have taken this connection further by suggesting that people hear voices externally due to hyperconnectivity between language production areas and temporal auditory perception areas of the brain (Hoffman et al., 2011; Salvatore et al., 2020). Hyperconnectivity between these regions of the brain would make it more likely that activation in the language production areas would also activate the auditory regions of the brain. Interestingly, hyperconnectivity has also been proposed as a possible explanation for synesthesia (Rouw & Scholte, 2007), which is arguably a similar phenomenon to voice hearing:

Two relatively distinct sensory experiences activate each other, causing people to see sounds or hear colours. The difference in voice hearing might be that instead of two external sensory inputs interacting, an external sensory experience is interacting with an internal experience to produce an altered perception. Such an understanding provides a feasible account for why someone hears an internal thought externally. However, hyperconnectivity explains neither why the voices are distressing nor the phenomenological features of voice hearing. This review seeks to describe the literature on how distressing AVHs develop, the phenomenological features of voices, and a potential explanation for what causes AVHs to be distressing.

Development of Distressing Internal Voices

Although hyperconnectivity may explain how people experience internally-generated thoughts as external, it does not explain why or how an internal voice becomes distressing. One possible explanation for the development of a distressing internal voice is that people experience intrusive thoughts that become understood as external events (Morrison et al., 1995). Intrusive thoughts are "repetitive thoughts, images, or impulses that are unacceptable and/or unwanted" (Rachman, 1981, p.89). Intrusive thoughts are experienced very commonly even in non-clinical populations (Fullana et al., 2009; Purdon & Clark, 1993; Radomsky et al., 2014). For example, Radomsky et al. (2014) administered a structured interview designed to assess intrusions to university students across 13 countries around the world. They found that roughly 94% of people experienced at least one intrusive thought over the past three months. The frequency of intrusive thoughts in the general population provides the backbone of Morrison and colleagues' (1995) theory of how an internal voice might develop. They argued that given how common intrusive thoughts are, it is likely that some people might attribute the thought to an external source because it presents a challenge to their positive self-image. For example, thinking about causing

harm to a family member might make someone think that they are a bad person for generating that thought. To maintain a positive self-image, people might attribute the thought to an external source and eliminate responsibility for those thoughts. By attributing thoughts to an external source, people might respond to or interact with the thoughts to suppress them or argue against them. Over time, people may start to believe the voices are external and perhaps even hear the thoughts as external. Similarities between psychosis and OCD provide some evidence that intrusive thoughts could lead to hearing distressing internal voices. Like intrusive thoughts, people who hear voices report that the content of voices are more repetitive than average thoughts (Hoffman, 2008). In addition, in both psychosis and OCD, people feel the need to control the thoughts and hold negative beliefs about the uncontrollability and danger of having those thoughts (Moritz et al., 2010). The similarities between these conditions suggest that people with psychosis may be experiencing similar thoughts as people with OCD, the difference being that people with psychosis also believe the thoughts are not internally-generated.

Another potential pathway to developing a distressing internal voice is through adverse childhood experiences. Various studies have found that adverse childhood experiences are tied to the experience of internal voices (e.g., Bentall et al., 2012; Morrison & Petersen, 2003; Read et al., 2003; Romme & Escher, 1989, Varese et al. 2012). For example, in a study of 450 participants who reported that they heard voices, 70% of the participants reported that the onset of the voices followed a traumatic event (Romme & Escher, 1989). Other studies have yielded similar findings (e.g., Honig et al., 1998). Although the research does not provide causal evidence, the finding that most people who hear voices started hearing voices after a traumatic event suggests that trauma may be involved in the development of an internal voice. Further evidence for role of trauma in hearing an internal voice is that the content of auditory

hallucinations may be tied to traumatic events. For example, in a qualitative study of outpatients who reported hearing auditory verbal hallucinations and childhood trauma, two-thirds of the participants had auditory hallucination content that could be conceptualized as similar to their experience of abuse in childhood (Reiff et al., 2012). In particular, the hallucination content often exhibited a variety of sensory perceptions that resembled the experience of childhood abuse, including hearing the voice of the abuser.

Although there is evidence suggesting that traumatic events may be important in the development of a distressing internal dialogue, it is unclear how trauma might cause an internal dialogue to occur. One study found that intrusive thoughts mediated the relationship between childhood trauma and hallucination-proneness (Bortolon & Raffard, 2019). When combined with the hypothesis that intrusive thoughts lead to voice hearing (Morrison et al., 1995), these findings suggest that trauma may relate to an increase in intrusive thoughts, which are then attributed to external origins. A few other explanations might explain how trauma may lead to an internal dialogue. For instance, trauma may cause difficulties with monitoring the source of thoughts, which could then lead to believing a thought comes from somewhere else, leading to an internal dialogue with that thought (Bentall et al., 2012). Alternatively, trauma might make people more predisposed to experiencing dissociation, which could lead to feeling separate from internal thoughts (Morrison & Petersen, 2003). Finally, it is possible that the critical internal voice is the internalized voice of a childhood aggressor (Reiff et al., 2012). Despite the lack of clear mechanisms underlying the relationship between trauma and voice hearing, there are clear connections between trauma and experiencing AVHs.

Phenomenological Features of Voice Hearing

Considering that the content of AVHs often relates to traumatic experiences (Reiff et al., 2012), it is unsurprising that people with problematic AVHs often report hearing hostile, critical, repetitive, second- or third-person voices which may comment on what the person is doing or command them to do something (McCarthy-Jones et al., 2014). Although the voices are often second- or third-person, people still report occasionally experiencing the thoughts in the first-person perspective (McCarthy-Jones et al., 2014). The voices can vary in loudness, with louder voices causing more distress (Birchwood et al. 2000). People with AVHs also distinguish these voices from their thoughts in a perhaps surprising way. Although the voices are often heard externally, people with psychosis most often differentiate voices from their own thoughts by the verbal content (i.e., what the voices are saying; Hoffman et al., 2008). People who hear voices can also differentiate the voices from their thoughts because the voices are separate from the self (Daalman et al., 2013; Daalman et al., 2011; Morrison, 1998; Morrison et al., 1995), the voices are uncontrollable (Hoffman, 2008; Rooke & Birchwood, 1998), and because the voices are sometimes heard in someone else's voice (Hoffman, 2008). This distinction between voices allows for a particularly striking feature of AVHs: people who hear AVHs will respond to the voices in the form of a dialogue. Within this dialogue, power dynamics exist between the voices, where the hostile or critical voice is usually in power (Birchwood et al., 2000; Gilbert et al., 2001). The hostile voice can also take on certain personality features, such as being benevolent, malevolent, or omnipotent (Birchwood et al., 2000; Chadwick & Birchwood, 1995; Robson & Mason, 2015; Thomas et al., 2015). People with psychosis will also interact with the internal voices similar to how they interact with real others (Birchwood et al., 2000, 2004; Gilbert et al., 2001; Hayward, 2003). In particular, power dynamics that exist between the self and the internal

voices mirror power dynamics that people perceive to have with others. For example, a study by Birchwood et al. (2000) used questionnaires to examine voice power differentials between the self and internal voices and between the self and real others. Participants who reported a higher difference in social rank between the voice and the self also reported a higher difference in social rank between the self and real others. What is interesting about this finding is that it suggests that characteristics of people's relationships with real others might also be present in their interactions with AVHs. Therefore, it may be important to consider other characteristics that explain relationships with other people, such as attachment styles.

Recent studies have found that attachment styles relate to certain relational aspects of the voice, such as voice intrusiveness, voice dominance, dependence on the voice, and distress experienced from the voice (Pilton et al., 2016; Robson & Mason, 2015). For example, Robson and Mason (2015) recruited 44 participants who heard voices to complete questionnaires that asked about the relationship between the participants and their voices. Participants who reported anxious attachment styles with their internal voices reported higher voice dominance, voice intrusiveness, voice malevolence, voice omnipotence, dependence on the voice, resistance to the voice, and distress from the voice than people who reported secure attachments with their voices. Robson and Mason also conducted further exploratory mediational analyses, finding that voice dominance, intrusiveness, omnipotence, and malevolence mediated the relationship between attachment style and distress experienced from the voice. These findings suggest that the personalities of the voices in AVHs may be explained partially by attachment style, which leads to distress. In a separate study, Cole et al. (2017) recruited 180 people who heard voices, 90% of whom self-reported mental illness, to complete an online questionnaire. Participants in this study completed a measure of adult attachment in close relationships, a measure of core schemas, and a

measure of persecutory beliefs about the voices. Cole et al. found that voice distress most strongly correlated with anxious attachment, and that anxious attachment style moderately correlated with negative self-view and negative other-views. They also found that attachment anxiety predicted more negative self and other schemas, which in turn predicted higher beliefs that the voice was persecutory, leading to higher distress resulting from the voice. Their model explained 36% of the variance in distress experienced due to the voice. Together, these studies suggest that attachment relationships, particularly anxious attachment styles, may explain the relationships people have with their AVHs, as well as why they experience distress from those voices. However, it is worth noting that some research has not found the same connection. In particular, a study by Dudley et al., (2018) found an initial negative relationship between secure attachment and the severity of the voices, but this relationship did not withstand post hoc corrections. Given that the initial relationship was in line with findings from other research but disappeared after post hoc corrections, it is possible that there was not enough statistical power in their study to draw conclusions. Overall, findings in the literature suggest that attachment relationships help to explain the relationship between people and the voices they hear.

Although the literature reviewed so far suggests that people interact with AVHs, there is little research examining why people interact with the voices. It is possible that people interact with the voices because the voices are hostile and critical, and people want to defend themselves against such slander. However, the voices would need to mean something in order to require a response. Otherwise, someone who heard voices could simply dismiss them as irrelevant or untrue. Then, given that the voices are internally-generated, dismissing the thoughts as irrelevant would likely cause those thoughts – and therefore the critical voices – to decrease in frequency or

to cease to exist. Literature on AVHs shows that the voices are persistent and continue to exist without treatment, which suggests that there must be a reason the thoughts or voices persist.

The Role of Safety in Voices

The persistence of AVHs may be explained through attachment theory. Before linking attachment to AVHs, it is important to describe how attachment styles might develop. Attachment theory posits that as children, people form attachment relationships with caregivers based on their experiences of reassurance-seeking (Bowlby, 1969). In a recent addition to the literature, Bosmans et al. (2020) amalgamated Learning Theory and Attachment Theory to describe how secure attachment relationships form in a Learning Theory of Attachment. Specifically, Bosmans et al. (2020) suggested that parents act as safety cues such that children will believe that a negative expected event will not occur when their parents are around. Bosmans et al. likened this process to how a light can act as a safety cue that a shock will not occur, despite the presence of another stimulus that was previously paired with a shock. Through the use of safety cues, Bosmans et al. suggested how secure, avoidant, and anxious-ambivalent attachment styles could form: First, children who will develop secure attachments learn that parents will act to prevent negative outcomes from occurring, thereby reducing the stress that the children experience. This acts as a reinforcer for future help-seeking, giving the children confidence to interact with their world because they have less fear of negative outcomes. Next, avoidant attachment develops when parents are not responsive to children's attempts to seek reassurance and do not act to increase feelings of safety. The lack of reward for reassurance-seeking causes the frequency of support-seeking to decline, leading to lower expectations of receiving reassurance from others. Over time, this would lead to stable avoidant attachment. Finally, anxious-ambivalent attachment might develop when children seek support and safety

from their parents but receive a mixture of support or punishment depending on the situation. As a result, intermittent reinforcement of support-seeking behaviour leads to insecurity in seeking reassurance from others. Children learn to expect positive responses from their parents only some of the time. However, the intermittent reinforcement maintains support-seeking behaviour, which leads to a relationship where the child seeks support from their caregiver, but sometimes receives criticism instead of support. Overall, the Learning Theory of Attachment provides logical pathways in which feelings of safety guide relationships with caregivers.

By connecting the Learning Theory of Attachment and literature finding that relationships with voices might be governed by attachment style, a mechanism emerges that might explain why people with AVHs continue to interact with voices. First, people with psychosis who hear voices are often able to relate the development of the voices to a specific time in childhood, usually after family conflict, abuse, or severe criticism (Corstens & Longden, 2013). The voices often can be identified as representing specific people, with one study reporting that of people diagnosed with psychosis who heard voices, 45% identified the voices as representing abusive parents, and 30% identified the voices as representing non-abusive parents (Corstens & Longden, 2013). These findings suggest that the voices may serve a function that is similar to caregivers. Next, as mentioned earlier, people who hear voices and who reported anxious attachment reported higher voice dominance, voice intrusiveness, voice malevolence, voice omnipotence, dependence on the voice, resistance to the voice, and distress from the voice than people who reported secure attachments with their voices (Robson & Mason, 2015). Of particular importance is the finding that people with anxious attachment experienced both *higher dependence on* and *greater distress from* the voices. Under the Learning Theory of Attachment framework, people with anxious attachment are more likely to continue to seek reassurance from

9

caregivers, despite the frequent experience of criticism or negative responses. In a similar vein, Gilbert and colleagues (2001) suggested that people develop internal voices when they internalize interactions with caregivers where there is high expressed emotion (i.e., high use of shaming or derogating in response to failure). It is possible that people would develop anxious attachment styles when there is both high shaming mixed with support. This combination could create the belief that the caregivers are both supportive and have high expectations. If the voices are internal representations of caregiver relationships, then feelings of safety may explain why people who hear AVHs continue to interact with and experience those voices. The internalization of inconsistent support in response to reassurance-seeking might manifest as critical, hostile voices that make people feel safe despite causing distress. People seek reassurance from the voices to seek safety and comfort in response to external threat, while often receiving criticism and hostility from those voices. Indeed, research on AVHs has found that while people frequently find the voices to be persecutory, abusive/insulting, accusatory, threatening, or critical, the voices are also frequently experienced as helpful, guiding, or affirming, and that 47% people with voices would miss the voices often or a lot if the voices stopped (McCarthy-Jones et al., 2014). Overall, examining AVHs as relationships with attachment figures might provide a fruitful understanding of why the voices persist, despite the voices' cold and critical words.

The Voice Hearing Continuum

If auditory verbal hallucinations represent thoughts that are externalized through processes that do not impact the content of voices, and if relationships with the voices are governed by attachment relationships, it is likely that people without mental illness could present with positive voices that do not cause distress. Indeed, various researchers have concluded that people without mental illness can hear voices similar to auditory verbal hallucinations seen in

psychosis. A systematic review by Baumeister et al. (2017) examined the results of over 36 studies comparing people from clinical populations who heard voices, and people who were otherwise healthy but heard voices. They found that healthy voice-hearers had more control over voices, responded less to voices, and heard the voices as less clear than clinical voice-hearers. These findings occurred despite the finding that healthy voice-hearers were *more* likely to believe that the voices originated externally. Of particular importance, however, was that healthy voice-hearers were less likely to have negative content in the voices. This finding is important to the hypothesis that negative thought content relates to reassurance- or safety-seeking behaviours in response to threat in the context of an attachment relationship. If attachment style relates to voice content, then it is likely that some people would experience positive voices that offer support and encouragement because the voices would reflect secure attachment. Indeed, people without mental illness who hear voices frequently hear positive voices uttering words of support and encouragement. A study comparing the content of the voice hearing between people with a diagnosis of schizophrenia or a dissociative disorder and people without mental illness found that 67% of the patient group said that the voice content was predominantly negative, compared to 93% of the non-patient group reporting that the voice content was predominantly positive (Honig et al., 1998). In the latter group, participants often reported that the voices provided words of support or encouragement, such as "you will manage" or "it is not your fault" (Honig et al., 1998, p. 648). These findings support the possibility that people who hear voices may hear voices that represent early caregivers with whom they have a secure attachment style. Although future research is needed to determine the extent to which attachment style might relate to the content of voices, these findings suggest that positive voices related to secure attachment could exist, and that attachment style may predict distress experienced because of the voice. However,

considering that many people experience anxious attachment without experiencing clinically-significant distress, attachment relationships alone may not be enough to describe the level of distress experienced from voices. It is important to determine where distress originates because the origin of the distress may be the best target for treatment of problematic AVHs.

Internal Voices as Anxiety

One reason people might experience distress from voices is because the voices could be a product of anxiety. Some evidence backing this possibility is that schizophrenia has a high comorbidity with anxiety disorders (Braga et al., 2013). Anxiety and threatening AVHs also share a number of features that are similar: they are both related to physical, social, or psychological threat (Scott et al., 2020). These similarities have led some authors to suggest that anxiety induces AVHs through the anxious anticipation of thoughts (Ratcliffe & Wilkinson, 2016). In their analysis, Ratcliffe & Wilkinson (2016) suggested that anxiety alienates people from their thought content, and the anxious response to thought content can make the thoughts feel like they were produced by someone else. Their model suggests that anxiety creates both the content of AVHs and the feeling that the thoughts are coming from something external. For the former, there is some evidence to suggest that anxiety triggers the experience of voice hearing. Previous literature found that the experience of auditory verbal hallucinations in psychosis fluctuates with anxiety during an individual episode (Delespaul et al., 2002; Lysaker & Salyers, 2007). In an exploratory study by Delespaul et al. (2002), 133 participants self-reported their experiences related to auditory hallucinations at 10 random points during the day for 6 days. Based on the participants' self-reports, anxiety was significantly increased directly prior to the beginning of auditory hallucinations, peaked during the hallucination, and was absent once the hallucinations ceased. Anxiety also predicted the intensity of the hallucinations during the

experience of AVHs. Although exploratory, these findings suggest a strong connection between anxiety and voice hearing. Other subjective accounts of AVHs also suggest that anxiety triggers AVHs, and that the voices often confirm people's negative self-evaluations through harsh criticism (Ratcliffe & Wilkinson, 2016). These findings are consistent with a study finding that anxiety was moderately correlated to the critical content, threatening content, and self-harm instructions of AVHs (Scott et al., 2020). Further evidence for the role of anxiety in AVHs is that people experience AVHs less frequently when the AVHs are less distressing. The literature comparing clinical and healthy voice-hearers has consistently found that healthy voice-hearers experience lower frequency and duration of hallucinations than clinical voice-hearers (Baumeister et al., 2017). In the clinical population, there is some evidence suggesting that cognitive-behavioural therapy for AVHs that challenges thought content can reduce the frequency of hallucinations (Kuipers, Fowler, et al., 1997; Kuipers, Garety, et al., 2006). These findings seem analogous to the results of challenging anxious thoughts. When people challenge the content of anxious thoughts through cognitive-behavioural therapy, the frequency and intensity of anxious thoughts decrease (Querstret & Cropley, 2013). The finding that the frequency of AVHs decrease when the content is challenged would be consistent with the supposition that AVHs are anxious thoughts that are being attributed to an external source.

If anxiety is responsible for creating the content of AVHs, then it could explain why AVHs are distressing. Anxious thoughts are distressing because they reflect negative core beliefs about the self, others, or the world. In the form of AVHs, people would experience the thoughts as especially distressing because they would have frequent instances where perceived others are confirming their biggest fears about themselves. Having other people saying such hurtful things would in itself be a major threat. In this way, anxiety would become both the cause and product

13

of AVHs, leading to a cycle of increasing and incessant threat. In addition, if people also internalized high expressed emotion from caregivers, the experience of threat would be even more magnified because the voice would be signalling disappointment from a displeased attachment figure. The disappointment of an attachment figure would be a cue that they were going to receive hostility and shame imminently. Together, these experiences would create significant threat, which could conceivably explain why AVHs are so distressing.

Returning to potential causes of voice hearing outlined before, anxiety might help to connect adverse childhood experiences and intrusive thoughts to distressing AVHs. Like AVHs, anxiety is also linked to the experience of adverse childhood experiences (Bifulco et al., 2006). It is possible that anxiety mediates the relationship between adverse childhood experiences and the development of distressing AVHs, such that anxious thoughts become misattributed to external sources following a traumatic experience. It is possible that something about the experience of trauma could be conducive to hyperconnectivity, considering that healthy and clinical voice-hearers do not differ significantly in the experience of childhood traumas (Baumeister et al., 2017). The difference in distress caused by the voices between clinical and non-clinical voice-hearers may be a result of differences in anxiety or attachment styles. Returning to the theory that intrusive thoughts cause of voice hearing, anxious thoughts and intrusive thoughts share a variety of features (e.g., Langlois et al., 2000), and intrusive thoughts are sometimes considered to be a subset of anxious thoughts. It is possible that anxious thoughts and intrusive thoughts become misattributed to an external source through similar mechanisms. Whether the AVHs originate as anxious thoughts or intrusive thoughts might represent different types of distressing AVHs. One problem arises when considering anxiety as a cause for voice-hearing, however: anxiety disorders themselves have not been found to present with voice hearing. If anxiety

14

explains the distress experienced from AVHs in people with psychosis, and people can experience voice hearing without having psychosis, it would be expected that some people with anxiety would present with a form of verbal hallucinations.

Voice Hearing in Anxiety-Related Disorders

In considering whether dispositional anxiety presents with voice hearing, it is first important to link AVHs to internal processes that occur regardless of whether the voices are heard internally or externally. Findings from research on people with schizophrenia who hear voices provides evidence that many people with schizophrenia do not exclusively experience voices as external. In a study of 50 people diagnosed with schizophrenia who had auditory verbal hallucinations, only 26.5% of participants reported that the voices they heard seemed to emanate exclusively from outside of the head, meaning that the remaining 73.5% experienced some combination of internal and external voice hearing, or potentially exclusively internal voice hearing (Hoffman et al., 2008). Similarly, a study of 35 people with schizophrenia or schizoaffective disorder with auditory verbal hallucinations found that only 40% of participants reported that they heard the voices as always outside the head (Connors et al., 2016). The remaining participants experienced the voices as both inside and outside the head (14.3%), as usually inside the head (5.7%), and as always from inside the head (34.3%). These findings suggest that voices do not need to be heard externally to be interpreted as coming from an external source.

Under the broader scope of internal voices that are interpreted as external to the self, various anxiety-related conditions present with an internal voice. In particular, there is high comorbidity between anxiety and eating disorders (Kaye et al., 2004; Swinbourne et al., 2012), and people with eating disorders commonly experience internal voices that are similar to AVHs

(Noordenbos et al., 2014; Pugh & Waller, 2016a; Tierney & Fox, 2010; Williams et al., 2016).

Research on the internal voice in eating disorders has yielded compelling findings that a process similar to AVHs in psychosis is occurring. Like AVHs, people with eating disorders and an internal voice believe that the voices are separate from or external to the self (Higbed & Fox, 2010; Tierney & Fox, 2010; Williams et al., 2016), and are uncontrollable (Pugh & Waller, 2016a, 2016b; Tierney & Fox, 2010). People with an internal voice also interact with the voice in an internal dialogue. Within this internal dialogue, power dynamics occur between people and their internal voices, where the internal voice is in power (Hormoz et al., 2019; Pugh & Waller, 2016a). Again, like in psychosis, the internal voice takes on certain personality features, such as being benevolent, malevolent, or omnipotent (Hormoz et al., 2019; Noordenbos et al., 2014; Pugh & Waller, 2016a, 2016b). The internal voices can even vary in loudness, and are often heard as internally loud (Tierney & Fox, 2010). Finally, attachment relationships may occur with the internal voices, similar to attachment styles predicting the phenomenological qualities of voices in AVHs. People with eating disorders have reported receiving support and criticism from the internal voice (Tierney & Fox, 2010, 2011), similar to attachment style predicting both dependence on and distress due to the voices in people with AVHs. A particularly illuminating finding within the literature on anorexia nervosa was that people who heard an internal voice described how the voice provided safety for them by guarding the *real self*, keeping their perceived vulnerability hidden (Higbed & Fox, 2010; Tierney & Fox, 2010, 2011; Williams et al., 2016). In their analysis of the identities of people with anorexia, Williams et al. (2016) concluded that the anorexic self was a tool to help people with anorexia detach from painful emotions and thoughts by allowing the anorexic self to take over. Theses findings directly indicate that people with internal voices are seeking safety or reassurance from the internal

voices, despite the criticism they receive. Overall, the similarities between AVHs and internal voices in eating disorders suggest that similar cognitive mechanisms might underlie the experience of hearing voices.

It is possible that the internal voice in eating disorders could originate with anxiety. In two studies examining the comorbidity of anxiety in eating disorders, the majority of people who had comorbid anxiety experienced their anxiety disorder prior to the development of their eating disorder, leading some researchers to posit that anxiety is a precursor to developing an eating disorder (Kaye et al., 2004; Swinbourne et al., 2012). Similarly, some of the verbal content of the internal voice in eating disorders could be conceptualized as related to social anxiety. For example, some of the self-reported statements by the eating disorder voice in the study by Tierney and Fox (2010) were "they hate you and you can't really trust them," "no-one cares about you," or "being close and talking to them will only hurt them," which relate more to social concerns than eating concerns. Finally, fear of gaining weight is often a prominent feature in eating disorders that present with an internal voice. As such, it is plausible that part of the internal voices manifested from anxiety and were exacerbated by the eating disorder.

Outside of eating disorders, a number of anxiety-related disorders have also been found to present with internal voices, such as post-traumatic stress disorder (McCarthy-Jones & Longden, 2016), mood disorders (Toh et al., 2015), and obsessive-compulsive disorder (Chiang & Purdon, 2021). To the authors' knowledge, no research has examined whether anxiety disorders present with hearing an internal voice. However, considering the number of disorders which relate to anxiety that also present with an internal voice, it seems plausible that people with anxiety disorders may have a similar experience of their anxious thoughts. People with anxiety disorders may even engage in a dialogue with their anxious thoughts. Future research is

17

needed to confirm whether anxiety disorders present with internal voices similar to those experienced in other conditions. Confirming a connection between anxious thoughts and voice hearing may help to link the origin of distress to a voice hearing continuum, and could help explain why not everyone who hears voices experiences distress from them.

Implications

The content of auditory verbal hallucinations and anxious thoughts may be similar cognitive experiences. However, it is clear that people with psychosis and people with anxiety experience distress and impairment at a very different level. The distinction between the two experiences might be that people vary in the extent to which they believe their thoughts are uncontrollable and come from an external source. Research examining metacognitive beliefs between psychosis and obsessive-compulsive disorders may support this supposition. Indeed, research has found that similar metacognitive beliefs, such as the need to control the thoughts and negative beliefs about the uncontrollability and danger of having those thoughts exist in both psychosis and obsessive-compulsive disorder (Moritz et al., 2010). Beliefs about the uncontrollability of thoughts seems to be a particularly distressing aspect of the voices. When analyzed simultaneously, one study found that metacognitions about the uncontrollability of thoughts were better able to explain the distress experienced due to hearing voices than beliefs about the malevolence, omnipotence, and benevolence of the voices (van Oosterhout et al., 2013). Beliefs about the uncontrollability and externality of thoughts were also present in the internal voice in eating disorders (Higbed & Fox, 2010; Pugh & Waller, 2016a, 2016b; Tierney & Fox, 2010; Williams et al., 2016). Within anxiety disorders, thoughts may be perceived as uncontrollable, but no research has found that anxious thoughts are experienced as coming from

18

an external source. Taken together, it is possible that perceived uncontrollability and externality of the voices may be important in determining whether anxious thoughts explain AVHs.

It is not hard to imagine how anxious thoughts might be amplified to distressing AVHs through beliefs about uncontrollability and externality. If someone experienced critical or threatening anxious thoughts frequently and believed that they were uncontrollable, those thoughts would be highly distressing. If someone were to believe or even hear the thoughts as coming from an external source, it would amplify the distress experienced because there would be more evidence that the thoughts are uncontrollable and unlikely to cease. In addition, the thoughts might be given more weight because they are perceived to be coming from other people. Given that anxious thoughts are representative of negative core beliefs about the self, the perception that anxious thoughts were coming from another person would be experienced as a threat to the self. This threat would then cause more anxious thoughts in turn, increasing the frequency of anxious thoughts and thereby causing people to experience AVHs more frequently. This cycle of threat would still be possible in people who do not hear anxious thoughts externally or believe the thoughts are external because they still experience the thoughts as representing external others. In this way, experiencing voices may represent a spectrum of distress, where different combinations and levels of beliefs that the voices are external and uncontrollable could lead to varying levels of distress. At the lowest end of this spectrum might be anxiety disorders because people with anxiety disorders might identify with their anxious thoughts, or they might recognize that the thoughts are internally-generated, while still believing that the thoughts represent thoughts others might have. Having such beliefs would still create less distress because the critical thoughts are not interpreted as actually coming from others. In this way, anxious

thoughts and auditory verbal hallucinations may be on the same or a similar continuum of experiences that is governed by perceived controllability and perceived origin of thoughts.

Although the current literature could be conceptualized in a way that supports a continuum of anxious thoughts and AVHs, more research is needed to determine whether such a continuum exists. In particular, future research should examine the phenomenological experience of anxious thoughts to examine whether anxiety presents with thoughts that are similar to the internal voices heard in psychosis and other anxiety-related conditions. If anxious thoughts are phenomenologically similar, research could then compare metacognitions between conditions that present with internal voices to determine whether they differ in the extent to which they believe the thoughts are uncontrollable and externally-generated. Such research might help to explain the difference in distress between people with AVHs in psychosis and people with other disorders that present with internal voices similar to AVHs in psychosis.

If future research confirms that AVHs are anxious thoughts perceived to be external and uncontrollable, this information might help inform cognitive-behavioural therapy for AVHs. The treatment for AVHs could first target the metacognitive beliefs surrounding AVHs to reduce the experience of hearing voices externally, then focus on challenging the anxious thought content of AVHs. By challenging the anxious thought content and strengthening new core beliefs, it might make people experience anxious thoughts less frequently. If AVHs are anxious thoughts that are amplified by metacognitions, reducing the frequency of anxious thoughts would also reduce the likelihood that people would hear distressing external voices.

Conclusions

There has been little research examining whether anxiety could have a causal relationship with AVHs. The evidence presented in this review suggests that anxiety may represent a feasible

explanatory mechanism for why AVHs are distressing. If AVHs are anxious thoughts, they would represent a threat to an individual's core beliefs because they are perceived as coming from others. The individual's reaction to threat would cause even more anxious thoughts – and therefore more AVHs – to occur. Although metacognitive beliefs about uncontrollability and origin of thoughts might explain why AVHs are experienced differently from anxious thoughts, more research is needed to determine whether and how anxious thoughts could manifest in the form of AVHs. Overall, the evidence reviewed suggests that anxiety may play an important role in the development and maintenance of AVHs, and future research comparing anxious thoughts and AVHs might provide further insight into the treatment of auditory verbal hallucinations.

Chapter 2: When my Anxiety Speaks to Me, What Does it Sound Like?

Anxiety is one of the most prevalent mental health difficulties. A recent meta-regression study found that 11.6% of the population worldwide experienced an anxiety disorder over the past year (Baxter et al., 2013). Despite the high occurrence of anxiety disorders, research examining the phenomenology of anxious thoughts is surprisingly sparse. No previous research has examined the phenomenology of anxious thoughts, including whether anxiety presents with an internal dialogue. An internal dialogue is an interaction between internal thoughts, where one or more parts of the thoughts represent an internal, critical, second-or third-person voice. The internal dialogue is well-documented in psychosis (Bentall, 1990; Morrison et al., 1995; Salvatore et al., 2020) and in eating disorders (Hormoz et al., 2019; Noordenbos et al., 2014; Pugh, 2016), and may impact the length and severity of illness (Pugh & Waller, 2016b, 2016a). Similar to the internal voices in psychosis and eating disorders, anxious thoughts often take the form of critical internal thoughts. The way the self responds internally to anxious thoughts may be an important indicator of how anxiety is perpetuated. Given the impact of the internal dialogue in related conditions, it is necessary to explore whether people with anxiety difficulties experience an internal dialogue exist, and its association with factors known to maintain anxiety.

Internal Voice Characteristics

A range of mental health difficulties are characterized by a critical internal voice that *speaks* in the second- or third-person, including eating disorders (e.g., Pugh, 2016), post-traumatic stress disorder (McCarthy-Jones & Longden, 2016), and mood disorders (e.g., Toh et al., 2015). It is also argued that the external voices reported by people with psychosis are actually internal voices that have been misattributed to an external source (Bentall, 1990; Morrison, 1998; Salvatore et al., 2020). Research has found that people who report an internal voice and/or *hear*

an external voice experience the voices as separate from the self (Daalman et al., 2013; Daalman et al., 2011; Higbed & Fox, 2010; Morrison, 1998; Morrison et al., 1995; Tierney & Fox, 2010; Williams et al., 2016), uncontrollable (Pugh & Waller, 2016a, 2016b; Rooke & Birchwood, 1998; Tierney & Fox, 2010), and louder than other thoughts (Birchwood et al., 2000; Tierney & Fox, 2010). The internal voice is also governed by an internal power struggle where the voice holds power (Birchwood et al., 2000; Gilbert et al., 2001; Hormoz et al., 2019; Pugh & Waller, 2016a). People also report the internal voice as having personalities, which they describe as benevolent, malevolent, or omnipotent (e.g., Birchwood et al., 2000; Chadwick & Birchwood, 1995; Hormoz et al., 2019; Noordenbos et al., 2014; Pugh & Waller, 2016a, 2016b).

Interactions with Internal Voices

People with psychosis report that they interact with the internal voice similar to how they interact with people, with the same power dynamics (Birchwood et al., 2000, 2004; Gilbert et al., 2001; Hayward, 2003). People with eating disorders similarly report arguing with the internal voice (Tierney & Fox, 2010). People with anorexia nervosa have even reported feeling attached to the *anorexia voice*, leading some researchers to believe the internal voice is a representation of attachment relationships with early caregivers (Pugh, 2016). Consistent with this, 45% of people diagnosed with psychosis who heard voices identified the voices as representing abusive parents, and 30% as representing non-abusive parents (Corstens & Longden, 2013).

There are two frameworks that might explain the interactional nature of the internal dialogue. First, Bowlby's (1969) Attachment Theory posits that as children, people form attachment relationships with caregivers based on how consistently parents respond to distress cues of their children. Bosmans et al. (2020) combined Learning Theory and Attachment Theory to create the Learning Theory of Attachment, which explains how attachment relationships might

develop via safety-seeking. The Learning Theory of Attachment suggests that secure attachment relationships form depending on whether or not parents act as safety cues for their children. Securely attached children will believe that a negative expected event will not occur when their parents are present. Avoidant attachment might develop when parents are not responsive to children's attempts to seek reassurance, which would mean that the parents would not act as a safety cue. Anxious-ambivalent attachment might develop when parents act as safety cues for children only some of the time. This intermittent reinforcement would still maintain support-seeking behaviour because children receive a mixture of safety and criticism over time.

If the expectation of inconsistent support were internalized, people with an anxious attachment style might seek support from an internal voice, but like the caregivers in the external world, the voice would provide support in the form of criticism. This inconsistency in responding somewhat maps onto the experience of the internal voice in people with eating disorders. In two studies, people with an internal dialogue in eating disorders reported that they initially received support from the eating disorder voice, but that over time, the voice became more malevolent, hostile, and critical (Tierney & Fox, 2010, 2011). A particularly illuminating finding was that people with anorexia had an anorexic self with its own voice that provided safety for them by guarding the *real self*, keeping their perceived vulnerability hidden (Higbed & Fox, 2010; Tierney & Fox, 2010, 2011; Williams et al., 2016). In their analysis of the identities of people with anorexia, Williams et al. (2016) concluded that the anorexic self was a tool to help people with anorexia detach from painful emotions and thoughts by allowing the anorexic self to take over. Williams et al. also noted that the anorexic self seemed to protect people from having to give their full self to others by pushing others away. This mixture of criticism and protection seems to mirror anxious attachment. In support of this possibility, attachment styles relate to the

characteristics of internal voices. Anxious attachment relates to higher voice intrusiveness, higher voice dominance, more dependence on the voice, and more distress experienced from the voice (Pilton et al., 2016; Robson & Mason, 2015). Taken together, attachment style may predict or explain the relationship between people and their internal voices.

Another framework that might predict people's relationship with internal voices is the interpersonal circumplex. The interpersonal circumplex suggests that two orthogonal constructs – dominance and affiliation – can explain the relationship dynamic between two people (Leary, 1957). When people interact, they tend to match the other's affiliation and complement the other's dominance (Sadler & Woody, 2017). Applied to an internal dialogue, a hostile and dominant voice might cause hostile submission. Put another way, if someone hears an internal voice that feels critical and forceful (e.g., "you are stupid"), they may respond by accepting what the critical voice is saying as true (e.g., "I guess you're right").

Development of a Voice

Although Attachment Theory and the interpersonal circumplex provide potential frameworks for understanding the relationships people have with their internal voices, they may not explain why people develop an internal dialogue. Indeed, multiple studies have found that attachment style did not predict the presence of auditory verbal hallucinations in psychosis (Pearce et al., 2017; Pickering et al., 2008; Wickham et al., 2015). Instead, one possible explanation for the development of an internal voice is that people experience intrusive thoughts that become understood as external events (Morrison et al., 1995). Intrusive thoughts are a highly common experience (Fullana et al., 2009; Purdon & Clark, 1993; Radomsky et al., 2014), with as many as 94% of people experiencing at least one intrusive thought within three months (Radomsky et al., 2014). The frequency of intrusive thoughts in the general population provides

the foundation for Morrison and colleagues' (1995) theory of how an internal voice might develop. They argued that when someone experiences a negative intrusive thought, it presents a challenge to their positive self-image. To maintain a positive self-image, people might attribute the thought to an external source and eliminate responsibility for those thoughts. When faced with thoughts from a perceived external source, people might interact with the thoughts to suppress or argue against them. Indeed, similarities between psychosis and OCD, such as repetitiveness of thoughts, the need to control the thoughts, and holding negative beliefs about the uncontrollability and danger of having those thoughts (Hoffman et al., 2008; Moritz et al., 2010) suggest that intrusive thoughts could be the voices that people with psychosis hear.

Another potential pathway to developing a critical internal voice is through childhood trauma. Critical internal voices often develop after childhood traumas such as bereavement, emotional abuse, sexual abuse, and physical abuse (e.g., Bentall et al., 2012; Morrison & Petersen, 2003; Read et al., 2003; Romme & Escher, 1989, Varese et al. 2012). Although it does not provide causal evidence, the finding that trauma precedes critical internal voices suggests that trauma may be involved in the development of a critical internal voice. However, it is unclear how trauma might cause a critical internal voice to occur. One study found that intrusive thoughts mediated the relationship between childhood trauma and hallucination-proneness (Bortolon & Raffard, 2019). When combined with the hypothesis that intrusive thoughts lead to voice hearing (Morrison et al., 1995), these findings suggest that trauma could lead to the development of critical internal voices through intrusive thoughts. Another possibility is that trauma causes difficulties with monitoring the source of thoughts, causing people to believe that thoughts are external (Bentall et al., 2012). Trauma might also make people more predisposed to experiencing dissociation, which could lead to feeling separate from internal thoughts (Morrison

& Petersen, 2003). Finally, it is possible that internal voices are the internalized voices of childhood aggressors in the cases of physical, emotional, or sexual abuse (Reiff et al., 2012).

Internal Dialogue in Anxiety

It is reasonable to believe that an internal dialogue could exist within people with anxiety disorders because of similarities between anxiety and factors related to critical internal voice hearing. Given that adverse childhood experiences are to the development of both an internal dialogue (Bentall et al., 2012; Morrison & Petersen, 2003; Read et al., 2005; Romme & Escher, 1989), and to anxiety disorders (Bifulco et al., 2006), it is possible that people who develop anxiety disorders due to childhood traumas may also develop a critical internal voice. Anxiety disorders are also frequently present in people with eating disorders (Kaye et al., 2004; Swinbourne et al., 2012) and psychosis (Delespaul et al., 2002; Lysaker & Salyers, 2007), which suggests that there may be similar cognitive factors across conditions. Finally, preliminary evidence in obsessive-compulsive disorder, an anxiety-related disorder, has found that over 70% of people with OCD experience a highly credible and distressing internal voice (Chiang & Purdon, 2021). Taken together, it is quite likely that some people with anxiety disorders experience a critical internal voice. No research has yet explored whether anxiety disorders present with a critical internal voice. The first goal of the study was to determine the extent to which people high and low in dispositional anxiety experience a critical internal voice or dialogue when anxious. The second goal of the study was to understand the phenomenology of the internal voice in order to develop an operational definition of the *voice* and constructs on which to develop a quantitative assessment of the voice. The third and final goal of this study was to determine whether characteristics of the internal dialogue or the experience of an internal dialogue itself differentiated the low and high dispositional anxiety groups.

27

Method

Research Design Overview

To determine whether an internal dialogue existed within people with high dispositional anxiety, the author conducted semi-structured interviews and used the Framework Method (Gale et al., 2013) to analyze interview transcripts. The semi-structured interview included a combination of agnostic and direct questions to balance the goal of confirming and examining the qualities of an internal voice in dispositional anxiety while allowing participants to describe an alternate experience of anxious thoughts. The Framework Method was used to analyze the interview transcriptions, drawing on the internal voice/dialogue characteristics identified in previous research. Themes drawn from previous literature included speaker number, pronoun use, identity, and resemblance, among others. Although theory informed the themes of the framework, specific codes were flexible to information that emerged through coding. Once developed, three coders, including two main researchers and a research assistant (RA), used the framework to code the data. Sources of potential researcher bias are included in Appendix A.

Participants

Participants were 37 undergraduate students enrolled in at least one psychology course at the University of Waterloo. We recruited participants until we had a minimum of 15 participants who had low anxiety and 15 who had high anxiety. The reasoning for this sample size was that firstly, qualitative research typically requires 20 or fewer participants to reach saturation when the coding framework has a high number of codes per participant **(**van Rijnsoever, 2017**)**, which was the case in the present study. Secondly, in pilot studies for developing quantitative measures, the change in the length of confidence intervals of the dependent variable greatly declines after around 30 participants (Johanson & Brooks, 2010). Therefore, the target number of participants

28

was 30 participants, equally split between participants with high and low dispositional anxiety.

Recruitment continued until all filled timeslots were complete, resulting in 37 participants.

Details about the recruitment procedure can be found in Appendix B.

Prospective participants completed an initial screening questionnaire that included the

Depression, Anxiety, and Stress Scale – 21-item measure (DASS-21). Individuals who scored

more than 2 on the anxiety subscale of the DASS-21 were eligible, as those scoring less may not

have an anxious episode on which to report. Participants who reported that English was not their

first language were excluded as there may be need to elaborate, explain, or use examples to

communicate meaning which introduces interviewer bias. Participants were predominantly

White and South Asian, with an average age of 20 (see Table 1).

Measures

Anxiety

We measured participants' anxiety using the Depression, Anxiety, and Stress Scale –

shortened form (DASS-21). The DASS-21 includes 21 items, 7 of which form the anxiety

subscale. Participants rated each item from 0 (*did not apply to me at all*) to 3 (*Applied to me very

much or most of the time*). We summed participants' ratings on the anxiety subscale items to

determine their level of anxiety. To match clinical normative data, we doubled participants'

anxiety subscale scores to match the original 42-item Depression, Anxiety, and Stress Scale. The

internal consistency of the anxiety subscale in this sample was good ($r = .88$).

Semi-Structured Interview

Participants first answered a question asking them to recount verbatim their anxious

thoughts during a recent and memorable experience of anxiety. The interviewer asked follow-up

questions to ask about participants' anxious thoughts in greater depth. After participants

29

recounted their experience, the interviewer provided an example of how anxiety might appear as an internal dialogue. Following that example, the interviewer asked participants whether they experienced an internal dialogue. If participants endorsed an internal dialogue, they answered a series of open-ended questions about the nature of the internal dialogue, including who the speakers were, who they resembled, the qualities of the speakers' voices, and what the speakers' motives were, among other questions. If participants did not endorse an internal dialogue, they answered a different series of questions that resembled the questions on the internal dialogue, but instead focused on anxious thoughts. At the end of the interview, participants rated their internal speakers/anxious thoughts on warmth, helpfulness, the extent to which their internal voices/thoughts reduced anxiety, and the extent to which they identified with their internal speakers/thoughts using a 0 to 100 scale. Those who identified multiple speakers also rated the speakers' dominance and intention to be helpful. We added only one question during data collection, which asked how frequently participants experienced the internal dialogue.

Procedure

All data were collected through semi-structured interviews that were conducted via videoconferencing. A brief online survey at the beginning of the study session was used to obtain consent, gather demographic information, and administer the DASS-21. After the survey, participants completed the above semi-structured interview. The survey and interview together took 53 minutes on average, with a range of 25 to 76 minutes.

Data Analysis

The interviews were transcribed, and the first author (TE) created a coding framework that represented phenomenological qualities of the internal dialogue as identified in previous research. When coding was complete, the interviewer removed all unused codes to prevent

inflation in reliability. Finally, within each theme, the framework included fillable sections for coders to add new codes if needed. Data for the first five participants were coded independently, after which the coders met to discuss discrepancies and to refine and clarify the definition of each code. After meeting, each researcher independently coded the remaining participants. The first author then determined whether discrepancies in coding existed. When there were discrepancies, the author retained the codes that were applied by a majority of coders.

In addition to the qualitative coding above, we analyzed participants' ratings of speaker dominance, speaker warmth, speaker helpfulness, speaker motive, identification with each speaker, and anxiety reduction caused by each speaker. The quantitative analyses included only participants who endorsed an internal dialogue and who the coders rated as experiencing an internal dialogue. The author performed t-tests to compare participants' ratings of speakers and to compare ratings of speakers between participants low and high in dispositional anxiety. The author also performed correlations to explore the relationships between speaker dominance, speaker warmth, and the extent to which each speaker increased anxiety. There were no specific predictions for the quantitative analyses. All quantitative results were exploratory.

Results

Intercoder Reliability Analyses

The authors used two methods of determining reliability of the codes. For all themes that had only one dichotomous code applied to participants, the author used Hayes's macro for SPSS to obtain the Krippendorff's alpha (Hayes & Krippendorff, 2007). The author used the Krippendorff's alpha because it can evaluate the intercoder reliability of three coders in one value. However, the Krippendorff's alpha applies to individual codes, not overall themes. The author sought to examine the reliability of overall themes instead of individual codes. Instead,

when multiple codes existed within a theme, the author determined the reliability of overall themes using Pearson correlations. For each theme to which the Krippendorff's alpha did not apply, the author averaged the correlations between each pair of coders (i.e., an average of three correlations). The author did not expect high correlations between coders because there were a number of inconsistencies in participants' responses. To reflect the inconsistencies, the author interpreted average correlations of .6 and higher to reflect adequate reliability. For all reliability and intercoder reliability calculations, the author excluded the first five participants because the codes were agreed upon by all three coders as part of the coding process.

Participant Exclusions and Grouping

Four participants were excluded from the final results. One participant was excluded because they reported English as their second language, and they required significant elaboration to understand the questions. A second participant was excluded from the study because they reported that they had Attention Deficit Hyperactivity Disorder, and their description of anxiety was highly unique. A third participant was excluded because they were not comfortable talking about some of the details related to their anxiety. Finally, a fourth participant was excluded because they thought exclusively in images, preventing any study of verbal thoughts.

The final sample included 33 participants. We used participants' scores on the DASS-21 to separate them into groups of low and high dispositional anxiety. We separated the groups using a clinical cut-off score of 15.5 on the anxiety subscale of the DASS-21 – this corresponds to half a standard deviation above the average anxiety subscale score for people with Generalized Anxiety Disorder (Brown et al., 1997). Sixteen participants who scored higher than 15.5 on the DASS-21 anxiety subscale formed the high dispositional anxiety group ($M = 23.20$, $SD = 6.88$). The remaining 17 participants formed the low dispositional anxiety group ($M = 6.94$, $SD = 4.70$).

Internal Dialogue in Dispositional Anxiety

The first study goal was to examine whether people experienced their anxiety in the form of an internal dialogue. Of the 33 participants, 28 participants experienced their anxiety with multiple speakers. Coders unanimously agreed that 11 participants experienced multiple speakers. Three of the 28 participants reported that they experienced an internal dialogue without prompting. Of the 28 participants coded as experiencing multiple speakers, 25 reported experiencing multiple speakers during the interview. The remaining participants' reports of anxiety suggested multiple speakers despite the interviewer's and participants' mutual understanding during interview that multiple speakers were not present. Twenty-eight participants reported experiencing multiple speakers in the interviews. Overall, there was poor reliability for ratings of multiple speakers ($\alpha = .20$), which may have been due to people switching from first to person perspective in the same voice.

Coders also rated whether participants parts of participants' thoughts responded to each other to determine whether an internal dialogue existed. Twenty-four participants experienced such a back-and-forth. However, there was poor intercoder reliability for coding a back and forth ($\alpha = .14$), which may have been due to difficulties rating the presence of multiple voices.

Phenomenology of Anxious Thoughts

The lack of reliability in coding whether people experienced multiple speakers prevents further examination of anxious thoughts within the context of an internal dialogue. Instead, the remaining results focus on participants' general experience of anxiety. Given that participants described more than one type of thought during their experience of anxiety, thoughts that caused the most anxiety are referred to as *anxious thoughts*, whereas the other thoughts are referred to as *accompanying thoughts*. There were also a number of inconsistencies in participants responses.

To account for this, instead of coding which qualities were specific to one speaker within the internal dialogue (e.g., coding the pronouns used by each speaker separately), the researchers coded the presence of each quality, regardless of whether the code applied to anxious thoughts or to the accompanying thoughts. Finally, to facilitate better understanding of the data, the author reviewed the codes for each participant and attempted to determine which thoughts participants were referring to for each code. These interpretations should be viewed with less weight given that they depend on the author's judgement alone.

Across the phenomenological qualities of anxious thoughts, people high and low in dispositional anxiety were very similar. Most codes applied to both groups an equal number of times. We demarcated notable differences from group similarities by comparing the number of times a code applied to participants in each group. When the researchers applied a code to least three more participants (roughly 10% of the sample) in one group than in the other group, we noted those differences in the results below. Unless otherwise noted, participants high and low in dispositional anxiety did not differ in the phenomenological quality.

Self-referent Pronouns

A majority of participants referred to themselves internally using first- and second-person pronouns. Coders rated 32 participants as using *I* to refer to themselves. One participant did not use first-person pronouns, likely because their anxiety focused on a terminally ill family member, and they did not refer to themselves in their anxious thoughts. Coders rated 28 participants as using second-person pronouns. Twenty-six participants referred to themselves as *you*, while the remaining two referred to themselves as *we*. Of the four participants who referred to themselves using only first-person pronouns, three were rated by coders as not having an internal dialogue. There was high reliability for coding pronouns, $r_{avg} = .82$.

Participants' thoughts were not consistently represented by one type of pronoun. They often described anxious thoughts using first-person pronouns, but then later used second-person pronouns to describe the same thoughts. Inconsistency in memory may have caused the reversal of pronouns, but pronoun use also seems to be fluid. For example, one participant said "I think it mainly starts with *I*… 'I did this' or 'I did this really well' … But as it gradually evolves, I think it turns more into a *you*, where I think 'You could have done this better,' or 'you did this.'" Conversely, participants sometimes separated the different parts of their anxious thoughts by pronoun-use, with one participant stating that their anxiety was "almost like a funny conversation back and forth about *I* versus *we*."

Thought Content Resemblance

Twenty participants described at least one side of their anxious thoughts as representing a family member. Of those 20 participants, 15 participants experienced at least one side of their anxious thoughts as resembling their parents. Speakers also resembled siblings, extended family members, friends or close friends, significant others, their boss, or inspiring public figures. There was no clear pattern of whether the anxious or accompanying thoughts resembled family members more frequently. In some cases, the thoughts resembled a critical family member:

> (My family) would constantly say 'you're not good enough for this. You can't do
>
> this. Why are you doing this?' And (anxiety) just brings back all the memories. When I
>
> think of bad things it directly relates to them.

Other times, the thought content represented a family member or friend who is trying to counter the anxiety by calming down (e.g., "the (accompanying thoughts are) probably my friends and my parents trying to you know, calm me down.") or by providing motivation or support (e.g.,

"The positive part I feel like a lot of my friends, family members are like that. They always motivate me to keep going."). There was good reliability for thought resemblance, $r_{avg} = .69$.

Internal Sound of the Anxious Thoughts

A large majority of participants experienced their anxious thoughts exclusively in the sound of their own thoughts. Only five participants heard one of the sides of their thoughts in another person's voice. Of those five participants, some described their thoughts as part of an imagined conversation with another person. Others said they had mental representations of other people, and internally heard the voices of the other people outside of an imagined interaction.

Participants also described hearing their thoughts as sounding different in volume, pitch, or clarity when compared to how they speak aloud. Nineteen participants described one part of their thoughts as louder than their average thoughts. It seemed that most participants reported that the anxious thoughts were louder than their average speaking voice. Four participants described having a quieter thought as well, usually in the context of having louder anxious thoughts and quieter accompanying thoughts. For three participants, at least one side of their anxious thoughts occurred lower in pitch. Finally, three participants reported at least one side of their anxious thoughts as being clearer in sound than the other side. Of those three participants, two described their anxious thoughts clearer in sound than the accompanying thoughts. Interestingly, all three participants who described one side of their thoughts as being clearer were high in dispositional anxiety. Ratings of the thoughts' sound had good reliability, $r_{avg} = .711$.

Intent Behind Anxious Thoughts

As part of the interview, participants answered a question about the intentions behind each speaker in the internal dialogue. Although the question focused on the motives of each speaker, participants often responded by describing what the anxiety was trying to do for them.

The participants' approach to answering the question suggests that their responses may be interpreted as their understanding of the function of their anxious thoughts. The following data includes only participants who identified during the interview that their anxiety appeared in the form of an internal dialogue ($N = 28$).

For both participants high and low in dispositional anxiety, at least one part of their anxious thoughts was trying to help. Of the 28 participants who answered a question about the motives of speakers, 25 reported that one or both of the speakers was helpful. There were a number of participants who reported that their anxious thoughts were trying to help in some way, but ended up causing difficulty. Five participants had responses indicating that their anxious thoughts were trying to protect them from potential risks. For example, one participant experienced an anxious voice that mirrored past criticisms from others. When describing their anxious thoughts, they discussed how the thoughts would protect them by preventing them from experiencing the criticism again: "I understand that (the anxiety is) trying to protect me from experiencing having someone tell me that again. … But it doesn't feel fantastic and usually is not helpful." Of the participants who experienced part of their anxious thoughts as trying to provide safety or protection, all five of them described the safety/protection motive in relation to the anxious thoughts. Five participants also described their thoughts as trying to hold them accountable. Interestingly, only one of the participants high in dispositional anxiety reported that part of their anxious thoughts was trying to keep them accountable, compared to four people low in dispositional anxiety. Four participants also described one or more parts of their anxious thoughts as trying to problem-solve. In contrast to helpful motives, five participants described their anxious thoughts as deliberately unhelpful or sabotaging. For example, one participant described the difference between their positive (accompanying) and negative (anxious) thoughts:

"the intentions of the positive (thoughts) are to make sure I'm happy, whereas the negative ones are to continuously beat me down (and) make sure I don't succeed." The reliability for coding the motive behind anxious thoughts was adequate ($r_{avg} = .65$).

Internal Thoughts as a Back and Forth

Although there was poor intercoder reliability for determining whether a back and forth existed, there was good reliability for coding the interaction qualities of internal voices ($r_{avg} = .74$). Eleven participants described their anxious thoughts as appearing in the form of an argument. For example, one participant likened their anxious thoughts to an argument between family members: "It's not a debate, but more an argument. Kind of like two family members arguing. They know each other, but they're just not seeing each other." Participants identified with various other dynamics: four participants described their anxious thoughts as having a fierce or intense dynamic, three participants described a dramatic internal dynamic while anxious, and five described the internal dynamic as being calm despite feeling anxious.

Quantitative Findings

By the end of the interview, most participants could label and distinguish at least two separate voices as part of their anxious thoughts. When there were more than two voices, the analyses included the most and the least anxiety-provoking voices. Only participants who were coded as having an internal dialogue and who recognized their thoughts as an internal dialogue during the interview were included in the quantitative analyses ($N = 26$). Of these participants, three were excluded from the quantitative analyses: One participant was an outlier across multiple ratings because their anxiety was uniquely focused on others. Another had a unique experience of anxiety where their two sides of anxious thoughts represented different sides of a major life decision, which resulted in ratings significantly different from other participants. The

remaining participant had only identified one anxious voice during the interview. As such, a total of 23 participants remained for quantitative analyses. There were no specific predictions regarding the quantitative analyses. All quantitative findings are exploratory.

First, we examined whether there were differences between participants low and high in dispositional anxiety across voice dominance, voice warmth, voice helpfulness, voice motive, the extent to which the voice increases anxiety, and the extent to which participants identify with the voice, for both the anxious and accompanying thoughts/voices. We examined group differences for both the anxious and accompanying thoughts. Across all variables, participants low and high in dispositional anxiety did not significantly differ (see Table 2).

Next, the author examined whether the different parts of anxious thoughts differed across participants who were coded as experiencing an internal dialogue. Participants rated the anxious thoughts as more dominant, less warm, less helpful, and less motivated to be helpful than the accompanying thoughts (see Table 3), suggesting that participants experience the anxious thoughts as very cold and dominant. Participants also identified with the accompanying thoughts more than their anxious thoughts on average.

Finally, we examined the relationships between dominance, warmth, and the extent to which the thoughts increased anxiety. Only the anxious thoughts' level of dominance was related to their level of warmth ($r = -.61$). The more dominant the anxious thoughts were, the colder they were. There was no significant relationship between dominance and warmth for the accompanying thoughts. Dominance and warmth of the anxious thoughts did not relate to the dominance and warmth of the accompanying thoughts. However, for both anxious and accompanying thoughts, warmth related to the extent to which the thoughts increased anxiety (r

= -.52 and -.44 respectively). For both anxious and accompanying thoughts, the colder they were, the more they increased anxiety.

Discussion

The first goal of the study was to determine whether dispositional anxiety presents with an internal dialogue. Regarding this goal, the data were inconclusive. Although the majority of participants endorsed having an internal dialogue, the intercoder reliability of coding the presence of an internal dialogue was quite low. The low reliability precludes any firm conclusions about the presence of an internal dialogue. Various factors may have reduced reliability. First, participants seemed to have difficulty recounting their anxious thoughts verbatim, as indicated by self-contradictory responses and reporting of general anxious thoughts despite instructions asking them to focus on a single instance. This difficulty may reflect poor memory of the past anxious experience, which is a limitation of this study. Another source of unreliability was that 25 of the 28 participants who identified multiple speakers did not recognize multiple speakers as part to their anxious thoughts until prompted. Participants' memories of the accompanying thoughts may be less accurate because the anxious thoughts overshadow them. As such, future research is needed to clarify whether an internal dialogue exists in dispositional anxiety. In particular, *in vivo* studies where participants speak aloud their thoughts while experiencing anxiety may provide more reliable data by reducing the impact of memory limitations. Research on participants with diagnoses of anxiety disorders would also help to determine whether people with severe anxiety experience an internal dialogue, and whether key phenomenological features distinguish clinically-significant anxiety from non-clinical anxiety.

Despite low reliability, participants endorsed the experience of cold, dominant, and critical anxious thoughts, which sometimes used second-person pronouns. These results parallel

the experience a cold, critical, and dominant internal voice in people with eating disorders and psychosis (Birchwood et al., 2000; Daalman et al., 2011; Gilbert et al., 2001; Hormoz et al., 2019; Pugh & Waller, 2016a; Tierney & Fox, 2010). Anxiety and conditions with internal voices also shared the experience of hearing the thoughts in another's voice and the identification of thoughts as resembling an attachment figure (Corstens & Longden, 2013). These similarities suggest that similar phenomena could be occurring.

Characteristics of Anxious Thoughts

The second goal of this research was to examine characteristics of the internal dialogue to create a definition of the internal voice. Although participants' descriptions of their anxious thoughts were too unstructured to examine the characteristics of a dialogue, a clear finding was that participants experienced multiple types of thought during anxious episodes. Participants were able to distinguish the dominance, affiliation, helpfulness, and anxiety associated with the thoughts. The anxious thoughts were more dominant, more hostile, less helpful, and more anxiety-provoking than the accompanying thoughts. These findings clearly indicate that the anxious thoughts are much more compelling and harmful than the accompanying thoughts.

Although the anxious thoughts link directly to anxiety, consideration of the accompanying thoughts is important and clinically-relevant because they might represent unsuccessful challenges to anxious thoughts. The failure to provide an argument against anxious thoughts may provide internal evidence that the conclusions of anxious thoughts survive scrutiny, and are therefore valid. Habituation to the arguments against anxious thoughts might lessen the subjective impact of those arguments, and could create a barrier to developing thoughts that counter anxiety. For example, if a client were to consider what a family member might say about an anxious thought may have less impact if the client already internally devalues

41

and overlooks what they think their family member might say. It may be important to assess these thoughts to avoid generating new thoughts that are habituated, unsuccessful challenges to anxiety. Alternatively, the accompanying thoughts might represent safety behaviours by seeking reassurance internally that draws upon reassurance from real attachment figures. It would be important to replace these safety behaviours during exposures with more productive thoughts.

Within the experience of multiple parts to anxious thoughts, nearly every participant used first- and second-person pronouns in their anxious thoughts. There is some evidence that pronoun use can affect people's level of worry. Previous research has found that using third-person pronouns in self-talk to question one's feelings ("why is Tyler feeling this way?") was more effective in reducing Ebola worry than questioning feelings using first-person pronouns ("why am I feeling this way?"; Kross et al., 2017). The authors argued that the use of third-person pronouns reduced worry by evoking fact-based reasoning that is more objective. Although the present study found that participants primarily used first- and second-person pronouns in their anxious thoughts, the use of second-person pronouns may be similarly experienced as fact-based and objective. If people experienced their critical anxious thoughts as more objective, this may cause more distress. If future research confirms that pronoun use impacts anxiety, matching pronouns or using second- or third-person pronouns to form thoughts that counter anxious thoughts might increase the effectiveness of those challenges.

Another characteristic of participants' anxious thoughts was that at least one part of their anxious thoughts resembled attachment figures. Over half of participants who endorsed experiencing an internal dialogue during the interview stated that part of their thoughts resembled someone in their family. Most frequently, participants' thoughts resembled their parents. Participants were also able to identify the motive behind their anxious thoughts.

Although the data was not clear enough to connect motives to who the anxious thoughts resembled, participants often identified that the anxious thoughts were trying to help by providing safety, problem-solving, or holding them accountable.

The functions listed above parallel some functions of parents. This similarity suggests that the function of people's anxious thoughts might vary with attachment style, as described by Bosmans et al. (2020). For example, when securely-attached people experience anxiety, they might experience an accompanying voice that reassures or helps them reason through their anxiety. In contrast, if avoidant attachment forms through unresponsive or critical parents, people with avoidant attachment might experience anxious thoughts as wholly unhelpful, or without a benevolent purpose. Finally, anxiously-attached people might experience both safety and distress from the thoughts. Indeed, some participants in the current study stated that they knew the anxious thoughts were trying to help (e.g., by providing safety), but ultimately caused distress. If people believe their critical, anxious thoughts provide safety, the reliance on anxiety would be maintained when they listen to those thoughts and avoid high levels of distress. This maintenance cycle may explain findings in previous literature that people with an anxious attachment style are more likely to have an anxiety disorder (Eng et al., 2001; Nielsen et al., 2017; Schimmenti & Bifulco, 2015).

Although this study theoretically supported anxious thoughts as embodying attachment styles, the results did not support the application of the interpersonal circumplex to internal voices. Dominance of the anxious thoughts did not predict submission, nor did warmth predict a warm response (or vice versa). The inability of the interpersonal circumplex to explain internal dynamics may be due to the unreliability of participants' descriptions of their anxious thoughts. It is also possible that internal dynamics do not mimic interpersonal interactions in this way.

43

Overall, the internal voice in dispositional anxiety is a cold, dominant, unhelpful, and anxiety-provoking voice that appears with an accompanying voice that aims to counter it. Future research aiming to develop quantitative constructs of the internal voice should aim to assess whether anxious thoughts occur in the context of such accompanying thoughts. The voice that is colder, more dominant, and more unhelpful represents the internal voice in dispositional anxiety. Future research could then incorporate quantitative methods to determine whether second- or third-person voices and attachment figures are also key characteristics of the internal voice.

Impact of Thought Characteristics on Anxiety

The final goal of this research was to examine whether the experience of an internal dialogue related to high anxiety. The study of whether an internal dialogue existed was inconclusive, which prevented exploration of the third goal. In place of this goal, we examined whether differences in the characteristics of anxious thought differed between people low and high in dispositional anxiety. Loudness, tone, dialogue qualities, pronoun use, motives, and the voice in which the anxious thoughts were heard did not differ between those low and high in dispositional anxiety. However, given that coders were unable to discern which speaker was associated with participants' anxiety, it is possible that people high and low in dispositional anxiety experience similar features of anxious thoughts that are represented differently. For example, people low in dispositional anxiety may be more likely to experience supportive or encouraging thoughts that resemble a family member, whereas people high in dispositional anxiety might experience critical, anxious thoughts that resemble a family member. Future research is needed to connect the internal voice features to levels of anxiety.

Internal Voice Comparison: Anxiety Versus Eating Disorders and Psychosis

Two themes present in eating disorders and psychosis that did not emerge from the data were the uncontrollability and external origin of the voice. Although no question directly asked about controllability of the voices, one question asked how the internal voices differed from their average thoughts, which could have allowed for uncontrollability to emerge as a theme. It is possible that participants may not consider uncontrollability to be a primary feature of the internal voice, but would endorse uncontrollability as a feature if directly asked. Given that participants did not have confirmed diagnoses of anxiety, it is also possible that uncontrollability would emerge as a theme in a clinically-anxious population. Considering that difficulty controlling anxious thoughts is a diagnostic criterion for anxiety disorders, it seems likely that such a theme would emerge with a clinically-anxious population. In contrast, the external origin of the internal voice is not a feature of diagnosis for anxiety disorders. In the current study, participants were asked directly whether they experienced their anxious thoughts as though they came from someone else. Only two participants stated that the anxiety voice felt like an entirely different person. It seems that externality is a feature of the internal voice unique to eating disorders and psychosis (Higbed & Fox, 2010; Tierney & Fox, 2010; Williams et al., 2016). This may be a result of dissociation or level of impairment. In the literature on both psychosis and eating disorders, dissociation has been linked to the internal voice (Morrison & Peterson, 2003; Pilton et al., 2015; Pugh et al., 2018). It is possible that the degree of impairment in eating disorders and psychosis causes dissociation, creating the experience of experiencing thoughts as coming from an external source. Finally, in contrast to the dialogue people have with other internal voices, anxiety did not present with an internal dialogue. This finding may be explained by the perceived external origin in psychosis and eating disorders. If someone attributes an

45

internal thought to an external origin, they may develop a clear distinction between their own thoughts and the internal voices to maintain a sense of internal order. Without the need to maintain internal order, people may not develop a clear distinction between internal voices.

Anxiety is Messy

One final interpretation of the data is that anxiety is simply a complicated experience. Participants' difficulty attending to thoughts, inconsistency in responding, and the tendency to generalize anxious thoughts all suggest that anxious thoughts are a complicated and unstructured experience. Premature quantitative examination of an internal dialogue in dispositional anxiety may have found a clear internal dialogue if participants were forced to answer dichotomous questions. The messiness of anxious thoughts in this study provides a reminder of the importance of qualitatively observing a subjective experience before quantitatively measuring it.

Conclusion

Despite the messiness of anxious thoughts, people experience their anxious thoughts as critical, cold, and dominant. When faced with these difficult thoughts, they respond by attempting to counter the thoughts internally. Participants in this study minimized the thoughts that accompanied their anxiety. It may be important to assess these internal responses in a clinical setting because they could represent internal safety behaviours or habituated alternative thoughts that challenge anxiety unsuccessfully. Otherwise, this study found that participants high and low in dispositional anxiety did not differ across a number of different phenomenological features. Based on these findings, it seems likely that only the meaning behind anxious thoughts will predict whether people will experience significantly impairing anxiety.

Table 1

Demographic Characteristics of Participants

Demographic	*n*
Gender:	
Men	5
Women	28
Population Group:	
White	19
South Asian (e.g., East Indian, Pakistani)	10
Black	2
Filipino	1
Arab	1
Southeast Asian (e.g., Vietnamese, Laotian)	2

Note. $N = 33$. All participants were students at the University of Waterloo. Participants were 20.04 years old on average (SD = 2.84). For both Gender and Population Group demographics, participants could select from more response options than presented in this table. Only response options used by participants were retained for the table.

Table 2

T-tests Comparing Anxious Thoughts and Accompanying Thoughts Across Participants Low and

High in Dispositional Anxiety

Thought Type and Characteristic	High Anxiety Mean (SD)	Low Anxiety Mean (SD)	*p*-Value
Anxious Thoughts			
Dominance	74.44 (22.86)	78.79 (22.58)	.659
Warmth	27.78 (28.84)	20.50 (23.77)	.517
Helpfulness	28.00 (25.61)	27.86 (29.00)	.991
Intention to be Helpful	48.33 (26.22)	39.36 (34.71)	.515
Identification With Anxious Thoughts	43.89 (31.60)	45.36 (30.22)	.912
Extent to Anxious Thoughts Increase Anxiety	83.22 (16.93)	86.21 (12.95)	.636
Accompanying Thoughts			
Dominance	51.22 (28.80)	62.57 (21.60)	.292
Warmth	80.44 (22.87)	65.93 (26.77)	.195
Helpfulness	78.00 (23.57)	55.79 (32.70)	.093
Intention to be Helpful	91.44 (12.45)	84.29 (20.37)	.357
Identification With Accompanying Thoughts	69.22 (23.57)	67.50 (23.76)	.866
Extent to Which Accompanying Thoughts Increase Anxiety	19.89 (21.07)	29.14 (24.90)	.367

Table 3

T-tests Comparing Participants' Ratings of the Qualities of Different Thoughts Experienced

While Feeling Anxious

Thought Characteristic	Anxious Thoughts Mean (SD)	Accompanying Thoughts Mean (SD)	*p*-Value
Dominance	75.41 (22.42)	55.81 (24.83)	.024
Warmth	23.35 (25.49)	71.61 (25.81)	< .001
Helpfulness	27.91 (27.12)	64.48 (30.93)	< .001
Intention to be Helpful	42.87 (31.34)	87.09 (17.73)	< .001
Identification With Each Type of Thought	44.78 (30.06)	68.17 (23.16)	.009
Extent to Which Type of Thought Increases Anxiety	85.04 (14.33)	25.52 (23.43)	< .001

Note. Participants rated each variable in the context of understanding different parts of their thoughts as internal voices related to anxiety. Only participants who rated the thought characteristics in the context of internal voices were included. Two participants were excluded due to being outliers or having inapplicable data. Twenty-five participants remained for the analyses shown above.

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Appendices

Appendix A: Researcher Description and Bias

Knowledge of anxiety, diagnostic assessment, and the internal dialogue may have influenced coders' approach to coding. The two primary researchers knew the goals of the study, had training in diagnostic assessment, and were familiar with the literature on anxiety and the internal dialogue. Their knowledge of the goals of the study may have also predisposed them to interpreting participants' responses as an internal dialogue. Although blind to the anxiety group status of participants, their training in diagnostic assessment may have alerted them to which participants were high or low in dispositional anxiety, which could have impacted their coding. Similarly, the interviewer's understanding of anxiety and the internal dialogue may have also led him to ask further follow-up questions and ignore other areas for follow-up. The other researcher also had experience in cognitive-behavioural chairwork (see Pugh, 2018), which may have further predisposed her to seeing an internal dialogue when coding the data. In contrast to the authors, the final coder was an RA who was not familiar with the study goals, nor were they familiar with the literature on anxiety and the internal dialogue. In terms of ethnicity, the authors identified as White Canadians and the RA identified as Asian Canadian. The researchers' respective cultural backgrounds may have contributed to their interpretation of anxious thoughts and whether an internal dialogue may be present in people with dispositional anxiety.

The researchers took steps to reduce bias during study planning, data collection, and data analysis. In planning the study, the interviewer intended to maintain an agnostic approach to asking about participants' anxious thoughts to avoid room for biasing their responses. As such, the interviewer started the interview with a broad, open-ended question. This allowed for participants to describe their anxiety in the way they understood it, without researcher influence.

The interviewer pursued closed-ended questions about the internal dialogue following

participants' raw description of their anxious thoughts. During data collection, the interviewer

maintained reflexive notes (Finlay, 2012) where he reflected on his interpretations of

participants' statements and his own potential sources of bias. As a result of the reflexive notes,

the interviewer adjusted his style of asking follow-up questions to reduce the focus on an internal

monologue and allow for the possibility of vague thinking that does not resemble verbal

thoughts. Although many participants expressed their anxiety in a monologue or dialogue form,

it was important to not bias their description of their anxious thoughts. Finally, researchers

gathered to discuss differences in coding after the first 5 participants to discuss how they

understood and defined each category while coding. After resolving differences, they coded the

remaining participants. For the remaining participants, they used majority rules to determine

whether a code applied, which reduced the amount of bias from each individual researcher.

Appendix B: Researcher-Participant Relationship

Another area of potential bias was the demand characteristics of the interview. In particular, all participants were undergraduate students. The interviewer was a master's student in the psychology program, which may have created a power relationship in the interview. This relationship may have been stronger in students who were taking a psychology major. It is possible that participants may have fit their experience of anxiety into the structure of an internal dialogue because of this power imbalance. Whenever participants made remarks regarding the desire to give the interviewer good data for his thesis, the interviewer reassured participants that he was interested in getting an understanding of their experience, and that there was no correct or incorrect answer.

Appendix C: Recruitment Process

All eligible participants had the opportunity to read a brief online summary of what the research entailed before volunteering to participate. The online summary informed participants that the researchers' goal was to learn more about anxious thoughts and the form they take, and that they would receive credit toward their psychology course for their participation. The summary did not mention the internal dialogue. Participant recruitment occurred between October and December 2020. The target number of participants was not based on thematic saturation because we were applying a framework based on existing literature, which meant that no new themes were generated from the data. Instead, recruitment ceased when a minimum of 15 participants high in dispositional anxiety and 15 participants low in dispositional anxiety had completed the study. The target number of participants was informed by a combination of qualitative and quantitative literature. This study received approval from the Office of Research Ethics at the University of Waterloo before recruitment began.