Social Anxiety in Trans and Gender Diverse People

by

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Submitted in partial fulfilment of the requirements for the degree of

Doctor of Psychology (Clinical)

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Abstract

Compared to the general population, trans and gender diverse (TGD) people have poor mental health outcomes with higher rates of depression, attempted suicide, and anxiety. The present thesis reviews literature detailing the poor mental health outcomes of the TGD population, and the psychological and sociological literature that discuss the sociocultural stressors that may contribute to these poor outcomes.

One of these stresses is from transphobia, which contributes to the stress felt in many social situations. Transphobia can range from alienating, inconsiderate, or judgemental language, through to an invalidation of identity, exclusion, outright discrimination, threats, or actual physical harm. Repeated exposure to the implicit social messages from transphobia can also result in internalised transphobia in which the internalisation of negative social attitudes may result in additional stress. It is argued that anxiety of these social situations may not necessarily be unexpected or representative of an intrinsic dysfunction, and therefore a non-pathological stance is taken throughout the thesis. However, a case is made for investigating and addressing the social anxiety experienced by TGD people due to its negative impact and the clinical features that are analogous to social anxiety disorder (SAD). This form of anxiety is named trans and gender diverse social anxiety (TSA) to highlight the specific context in which it develops and to distinguish it from SAD. To examine the relevance of TSA and its treatment in TGD people, the present thesis undertakes three tasks: a comprehensive and respectful evaluation of gender identity; the development and psychometric evaluation of a measure of TSA in TGD people; and, the
development and feasibility trial of an online/e-health CBT based intervention aimed at addressing TSA.

Gender identity is evaluated throughout the thesis by using the Gender Identity Scale (GIS). This scale is created as part of this research by operationalising the gender identity component of the Gender Unicorn. The scale is then validated by comparing the labels utilised by participants for self-identification of gender with the classes revealed by a latent class analysis of the GIS. The classes identified are consistent with the types of labels used by people assigned to each class, and classes can also distinguish between people who otherwise used umbrella labels to self-identify. The results support the utility and usefulness for the GIS as a way to measure the full diversity of gender identities while still allowing quantitative analyses without problematic assumptions that come with using labels.

To evaluate TSA, a tool analogous to the Liebowitz Social Anxiety Scale (LSAS) is created. This tool, known as the trans and gender diverse social anxiety scale (TSAS), describes 35 social situations that were chosen as being specifically relevant for TGD people based on a review of literature, consultation with TGD community leaders, and TGD focus groups. The TSAS is administered to a community sample of 215 TGD adults via an online survey. For each situation in the TSAS, participants are asked to rate their level of fear in that situation and the how often they avoid that situation.

Validation of the TSAS begins with obtaining evidence for structural validity by the proposal of a bifactor structure, with a general factor of TSA and 5 specific factors, which is then confirmed via a confirmatory factor analysis. Two tests of measurement invariance across groups defined by country of residence
and by gender identity provide evidence of generalisability. Evidence of convergent validity is obtained through a comparison with the LSAS and evidence of discriminant validity is obtained through comparisons with the 21-item version of the Depression, Anxiety, and Stress Scales (DASS), the Personal Wellbeing Index, the Multidimensional Scale of Perceived Social Support (MSPSS), the Courage to Challenge (CTC) scale for hardiness, and a stigma scale. A path analysis reveals that the TSAS fully mediates the relationship from perceived stigma to DASS and partially mediates the relationship from CTC to DASS. Enacted stigma interacts with both MSPSS and CTC to have a small effect in predicting TSA.

An 8-week trans and gender diverse social anxiety program (TSAP) is then created, using an existing CBT-based online program for anxiety, and a feasibility trial conducted. Results show that the adaptation of the CBT contents to the TGD context is acceptable to the TGD community. The TSAP was well received with feedback highlighting the need for such a program. Attrition is a major problem however, and future research would need to investigate ways of increasing adherence to the program prior to a clinical trial being undertaken.

The results from this thesis support the move away from cisgender and categorical notions of gender. The GIS enables a continuous measure of gender, while also allowing for classification if required. These results also support a conceptualisation and measurement of social anxiety that is tied to situations that are specific to the TGD community. Some of these situations are either not applicable or not recognised as being as stressful in the cisgender community. Finally, there appears to be merit in an e-health approach to mitigating TSA and assisting the TGD community. The needs of TGD people are different to those
with SAD, however, and further exploration is required in determining how best to retain TGD people in an e-health program.
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Chapter 1

An intervention to reduce social anxiety in trans and gender diverse people

Trans and gender diverse (TGD) people are a marginalised group who are at high risk of poor mental health outcomes. Social factors, such as transphobia, contribute to TGD people being much more likely to experience anxiety or depression compared to the rest of the general population (Pitts, Couch, Mulcare, Croy, & Mitchell, 2009; Rotondi et al., 2011) with extremely high rates of attempted suicide within the community (Clements-Nolle, Marx, & Katz, 2006; Goldblum et al., 2012; Grant et al., 2011a). Some TGD people also experience high levels of distress due to the conflict between their gender identity and the sex they were assigned at birth (Knudson, De Cuypere, & Bockting, 2010). The process of resolving the conflict can be emotionally challenging in both accessing any necessary medical interventions, and in making publically visible changes that are congruent with their gender identity (H. Barker & Wylie, 2008; Pitts et al., 2009).

Anxiety and distress can also arise from inconsiderate or incorrect use of terminology, especially from health professionals who may alienate TGD people with their choice of terms and use of language (D. B. Hagen & Galupo, 2014). It is important and respectful to use terms with which the people being described identify (Ansara & Hegarty, 2014) and that are inclusive of members of the TGD community (D. B. Hagen & Galupo, 2014). This can be difficult, however, when the community itself is heterogeneous and with differing goals (Davidson, 2007); where the accepted meanings and subjective associations with terms in the community are continuously evolving according to context and circumstance (Rawson & Williams, 2014); and where not everyone within the group identifies
with one single term (Kuper, Nussbaum, & Mustanski, 2012). The difficulty is compounded when some people in the TGD community would prefer labels not to be used at all (Voices of Central Pennsylvania, 2000), whilst others see the utility in labels to organise unity and support with the community (Roberts, 2011), or to build resilience by describing a personal gender identity (Singh, Hays, & Watson, 2011).

Perhaps it is best to remember Wittgenstein (1958) when it comes to understanding that some words do not have exact definitions or clear boundaries. Terms gain meaning in their use; different words have different significance and associations to different members of the community. This acknowledges that the terms used in this research are a best-effort to be respectful, though not necessarily ideal, and that using the wrong terms can contribute to feelings of alienation (Langer, 2011). The terms used in this research and their definitions are therefore in accordance with recommendations by several TGD organisations (ACON, 2017; GLAAD, 2015; National Center for Transgender Equality, 2014; Trans Media Watch, 2013; TransGender Victoria, 2013).

*Trans and gender diverse* is an umbrella term to describe people who do not identify with the gender that they were assigned at birth (ACON, 2017). *Trans* is often thought of as short for *transgender* (Davidson, 2007; Victorian Goverment, 2016), which was itself intended to be an inclusive umbrella term (Coleman et al., 2012; Davidson, 2007). There is often disagreement about what it means in practice, and some groups therefore find themselves excluded or actively distance themselves from it (Davidson, 2007). Some people feel ostracised by the community for not being “trans enough” (Langer, 2011) where there may be a connotation is that *trans* is short for *transsexual*, who are people
that tend to identify with the gender binary and often seek medical interventions
to help bring their body in line with their identity (National Center for
Transgender Equality, 2014). *Trans* is sometimes interpreted as the Latin root
meaning *across*, the implication being that people are moving from the gender
they were assigned at birth to another gender (National LGBTI Health Alliance,
2013), or *beyond*, where people are transcending the boundaries of gender
(Rainbow Health Ontario, 2016). These limitations with the label *trans* means
that *gender diverse* is now often use to represent all people who identify outside
of the man/woman gender binary (National LGBTI Health Alliance, 2013;
Rainbow Health Ontario, 2016). The label *trans and gender diverse* is therefore
used to specifically provide inclusion for all the transgender, gender diverse,
gender variant, and gender-nonconforming people who might otherwise feel
excluded.

Exclusion is, of course, not something that only arises from politics within
the TGD community. Most people identify with the gender that they were
assigned at birth and are therefore *cisgender* (Green, 2006), where the Latin root
cis- (meaning *on this side of*) is the opposite of trans-. The assumption by
cisgender people that everyone else is also cisgender is known as *cisnormativity*
(G. R. Bauer et al., 2009). Cisnormative assumptions shape social activity and
becomes institutionalised through policies and practices to create systematic
prejudices that delegitimise and erase TGD identities (G. R. Bauer et al., 2009).

Lack of education about TGD identities and issues makes TGD people
invisible to service providers until they attempt to use the service, at which point
they become hyper-visible and may be judged as unsuitable and unwelcome
(Pyne, 2011). At medical services, TGD people face dilemmas with possible
denial from disclosing, or incorrect treatment and possible unintentional
disclosure if they do not explicitly disclose (G. R. Bauer et al., 2009). Therefore,
while individuals may display discriminatory behaviours in acts of transphobia, it
is cisnormative ideology that marginalises and excludes TGD identities from
participating in society.

TGD people who identify with the gender binary and who are recognised
as being of their identified gender may be provided with the acceptance and
privilege afforded to cisgender people (Tamás Fütty, 2010). This is the concept
of *passing*, which some TGD people see as the ultimate goal, in which a person
does not challenge the gender binary and interacts with society whilst their TGD
status is not discernible (Gagné, Tewksbury, & McGaughey, 1997). Whilst this
may have benefits, such as a reduction in experienced discrimination (Levitt &
Ippolito, 2014b), there are also associated negatives.

The concept of passing is sometimes pejoratively linked to the notion of
deception, as if TGD people are trying to “pass” as something that they are not
(Schilt & Westbrook, 2009). TGD identities may therefore be invalidated with
references to TGD people as “passing as a man/woman” implying deception and
pretence rather than their gender being accepted as legitimate. This is embodied
by the potential backlash that TGD people face when cisgender sexual partners
learn of their partner’s gender history (G. R. Bauer & Hammond, 2015). Passing
is, for many TGD people, a consequence of self-led gender affirming transitions.
It may subsequently allow some TGD people to avoid discrimination, but it does
so by playing to the cisnormative assumptions of society.

If cisnormativity and transphobia remain pervasive, then threats to TGD
people still remain, even for those that do pass. Social dangers shift from the
possible repercussions for being TGD to the repercussion for being discovered to be TGD. The required constant vigilance of actions and level of self-disclosure may be mentally taxing, and research has shown that the level of “outness” is predictive of lower levels of felt stigma and that passing is associated with higher levels of felt stigma (Bockting, Miner, Swinburne Romine, Hamilton, & Coleman, 2013). Higher levels of outness is also associated with lower levels of depression and anxiety (Strain & Shuff, 2010).

Concerns over discrimination of TGD people in employment is well documented (Levitt & Ippolito, 2014b; Pitts et al., 2009) and those attending the conference with higher levels of outness may therefore have felt lower levels of stigma, and better mental health, precisely because their employers did not discriminate against them. No method of sampling may be completely adequate to access certain populations such as poor and homeless TGD people. Strain & Shuff (2010) do, however, provide a theoretical model for their observed phenomenon based on Gagné, Tewksbury, and McGaughey’s (1997) findings of the desire of transsexuals to express their true self.

TGD people seek to express themselves in ways that are authentic and congruent with their gender, and communicate their gender to others while doing so (Gagné et al., 1997; Levitt & Ippolito, 2014b). Meanings of social interactions can change with changes in gender (Gagné et al., 1997), while changes in gender cues mean that TGD people are unable to control the disclosure of their gender as easily as one may control disclosure of sexuality (Bethea & McCollum, 2013). This feeds a desire to be seen and perceived as their identified gender.

The process of exploring and developing gender identity and presentation, also known as transitioning (Budge et al., 2012), is an often long process (Bethea
& McCollum, 2013) with the ultimate aim of being able to live as one’s true self (Gagné et al., 1997). Comfort with their gender identity and a genuine and authentic external appearance provides TGD people with congruence that is predictive of better mental health outcomes (Kozee, Tylka, & Bauerband, 2012). Although the transition process and development of gender identity can be fluid, rather than linear, and without a definite end (L. M. Diamond & Butterworth, 2008), the process of transitioning is predictive of greater congruence (Ho & Mussap, 2016). Helping TGD people in their transition is therefore important for their mental health.

TGD people may face many challenges when transitioning, including distress from discrimination and previously discussed cisnormative assumptions, that can lead to extreme negative emotions and experiences (Budge et al., 2012). Even health professionals who engage with TGD people provide different levels of service depending upon their understanding, interpretation of, and attitude towards TGD people, their own role, and the guidelines for the provision of care to TGD people (Ehrbar & Gorton, 2010). Inability to effectively cope with this challenge can therefore result in TGD people being unable to progress their transition and being unable to achieve potential congruence.

The Standards of Care (SOC) for the Health of Transsexual, Transgender, and Gender Nonconforming People (Coleman et al., 2012) is, arguably, the most well-known set of guidelines used to govern the provision of care for TGD clients. However, it has been criticised for its violation of respect for autonomy of clients (Hale, 2007) and its placement of mental health professionals in a gatekeeping role (R. A. Carroll, 2007). The complexity of gatekeeping may require balancing the affirmation of identity with the nature of medical work and
the risk of lack of knowledge by client. Medical and mental health may, however, be expected to be a form of social support and non-affirmative providers may consequently be stressful to clients (Levitt & Ippolito, 2014b). It could thus be argued that the health system that should be helping TGD people may be contributing to their mental health problems, especially when TGD people have negative or hostile experiences with health professionals (Pitts et al., 2009; Riggs, Coleman, & Due, 2014).

Although satisfaction with health professionals and attitudes towards the SOC are predictive of stress and poor mental health outcomes in TGD people, they lose their predictive value when hardiness is taken into account (Ho & Mussap, 2016). Hardiness can be conceptualised as the desire to remain connected with the people and events around you, whilst having some control over the outcome of those events and learning from those experiences (Maddi, 2004). TGD people who are high in hardiness would therefore continue to fight for their rights to health services and would utilise negative experiences as opportunities to learn and adapt in order to obtain what they want. This helps to explain why personal hardiness is an important predictor of progress in transition, congruence, and mental health outcomes in TGD people (Ho & Mussap, 2016).

Although hardiness can be conceptualised as a personality trait (Maddi et al., 2006; M. S. Smith & Gray, 2009), it is not necessarily unchangeable (Hystad, Olsen, Espevik, & Säfvenbom, 2015). Hardiness is thought to be something that is developed and can be learned (Maddi, 2006) and specific training programs have been shown to be efficacious in raising the hardiness of working adults (Maddi, Kahn, & Maddi, 1998) and college students (Maddi, Harvey, Khoshaba, Fazel, & Resurreccion, 2009). Self-report surveys were used that measured
general attitudes towards: commitment, by being involved in events; control, by trying to influence outcomes; and challenges, where stress and changes are viewed as opportunities for new learning (Maddi et al., 2009, 1998). The program used in these studies focused on techniques for reframing and problem solving, understanding and managing physical signs of tension, relaxation, adaptive acceptance that avoids self-pity and bitterness, interpersonal skills, and nutritional and physical self-care. These are the same type of techniques that are associated with adaptive coping strategies (Frydenberg & Lewis, 2002).

If hardiness can be developed, then TGD people would be well served by professionals that help them to develop hardiness to overcome the challenges they face in life. Mental health professionals are well placed to assist TGD people by providing them with the coping strategies and tools to increase hardiness and overcome poor mental health outcomes, such as anxiety and depression.

To do this requires a clear and detailed understanding of the specific threats to the mental health of TGD people. TGD people express themselves in ways that may be seen as being outside of social norms which exposes them to negative stereotyping and discrimination. As outlined earlier, discrimination, harassment, and violence add to their distress. These can lead to fears and anxiety of their safety, of constant scrutiny, and of negative evaluation in social situations (Dargie, Blair, Pukall, & Coyle, 2014). Anxiety, though justifiable in such circumstances, can stand in the way of TGD and gender-diverse people living their daily lives. This can also impede upon the ability of TGD people to negotiate the requirements for necessary medical interventions (Shipherd, Green, & Abramovitz, 2010), which leads to further anxiety and poor mental health outcomes.
Helping TGD people combat the anxiety from social discrimination may help them to complete routine daily activities, while helping them potentially deal with the challenges of accessing medical interventions and making any other necessary changes. A focus on combating anxiety in social situations may therefore provide TGD people the resources they need to live fulfilling lives while remaining true to their gender identity.

Therefore, research is required to create and validate a typology of social situations that elicit anxiety in TGD people. Such a typology would assist researchers in identifying and further understanding the situations TGD people find anxiety provoking as a group, and guide clinicians in their efforts to address specific sources of anxiety in their TGD clients. Interventions aimed at reducing anxiety and increasing hardiness can then be targeted to TGD people by providing coping strategies for specific situational stressors. Before assisting TGD people with anxiety, however, it is important to have a good understanding of the psychological theories of anxiety, the interactions with social situations, and how these apply to the TGD experience of anxiety.
Anxiety

Conceptualisation of anxiety is divided into state anxiety, which is the current transitory experience, and is distinguished from trait anxiety, which is the disposition to respond with anxiety (Spielberger, 1966). The experience of state anxiety can be described as an emotion that is biologically characterised by activation of the sympathetic nervous system, which includes an increase in heart rate and blood pressure, along with faster and shallower breathing (Kreibig, 2010). This is accompanied with subjective feelings of foreboding of danger or disintegration (Grinker, 1966).

Fear, however, has potentially adaptive functionality by allowing people to identify and react to dangerous stimuli (Öhman, 2000). Behaviourists argue that phobia and anxiety are conditioned responses as demonstrated by Watson’s (1920) experiments with Little Albert. Pairing of naturally feared unconditioned stimuli with previously neutral social situations could therefore result in a social anxiety disorder (SAD) and conditioning can overgeneralise to other, previously safe, stimuli to result in a generalised anxiety disorder (GAD; Lissek et al., 2014).

Cognitive theorists argue, however, that thoughts and beliefs play an important part in anxiety. In Reiss’ (1991) expectancy theory, for example, fear of a particular situation is based on expectations (what will happen in that event) and sensitivities (reasons for fearing that event). Expectancies and sensitivities apply across three domains: physical (external) danger, anxiety, and negative social evaluation. It is suggested that adaptive responses become maladaptive when estimates regarding the probability and cost of future events become biased and overly pessimistic, thus resulting in distress at the smallest possibility of a negative outcome (Grupe & Nitschke, 2013).
Anxiety sensitivity, or the inclination to respond to specific sensations associated with anxiety, is different to trait anxiety, which is the inclination to respond to stressful situations with anxiety (S. Taylor, Koch, & Crockett, 1991). The belief in anxiety sensitivity is that the symptomatic responses to anxiety are signs of physical or mental illnesses (Reiss, 1991). Catastrophic misinterpretations of bodily sensations are linked to panic disorder (S. Taylor et al., 1991) and inducing these symptoms, through hyperventilating, can bring on panic attacks in people with panic disorder or social phobia (Nardi, Valença, Nascimento, Mezzasalma, & Zin, 2001).

The cognitive model has been criticised for being vague in specifying what catastrophic means and what conditions result in cognitions becoming catastrophic, as well as how these cognitions are acquired and how they can be measured independently of panic (Bouton, Mineka, & Barlow, 2001). The behavioural interoceptive model (Goldstein & Chambless, 1978) posits that somatic anxiety symptoms become conditioned stimuli that elicit the conditioned response of a panic attack. The modern learning perspective was presented (Bouton et al., 2001) to address criticisms that the interoceptive model appears to over-predict panic since panic should occur every time a conditioned stimulus is encountered, and, if panic does not occur, the conditioned response should be subject to extinction. According to the modern learning theory, various stimuli condition the systems of emotions, cognitions, and behaviours. The different systems interact and moderate the course of conditioning and the likelihood of a panic attack. Other cognitions, such as sense of control and predictability of aversive events, also interact with the conditioning process.
In a cognitive-behavioural model of SAD, Clark and Wells (1995) suggest that the main precipitants of anxiety, when entering a feared social situation, are maladaptive cognitions about their ability to behave appropriately or adequately, and the shift of attentional focus to themselves. This results in greater focus on their own anxiety symptoms and biased interpretation of the events that impact on the person’s ability to attend to the social situation and other people’s behaviours. People with SAD, according to Clark and Wells, also believe that how they feel is the same as how they appear and this further increases their misperception of the level of threat of the situation. This creates a feedback loop in which anxiety is increased and, due to their reduced ability to attend to what is happening externally, their behaviour may contribute to a self-fulfilling prophecy of inadequate behaviour.

The impact of this feedback loop may depend on the stability of the person’s belief about themselves. Campbell (1996) introduced the concept of self-concept clarity as the extent to which a person’s self-concept is stable, internally consistent, and clearly and confidently defined. Campbell showed that low self-concept clarity was associated with chronic ruminative self-analysis and self-consciousness. This suggests that people with low self-concept clarity do not engage in self-reflection any more than people with high clarity, but they experience more intrusive self-relevant thoughts and are more concerned about how their behaviour is viewed and evaluated by others.

Self-concept clarity has been found to mediate the relationship between stress and subjective well-being (Ritchie, Sedikides, Wildschut, Arndt, & Gidron, 2011) and is predictive of social anxiety (Stopa, Brown, Luke, & Hirsch, 2010). Use of positive self-imagery was found to increase self-concept clarity, increase
social performance, and reduce anxiety (Stopa, Brown, & Hirsch, 2012). This further strengthens the link between self-concept clarity, its role in social anxiety, and association with maladaptive cognitions that precipitate or maintain social anxiety.

People with SAD also tend to engage in safety behaviours or avoidance of anxiety provoking situations. Evidence (P. F. Lovibond, Mitchell, Minard, Brady, & Menzies, 2009) supports Clark and Wells’ (1995) theory that safety behaviours maintain, and may contribute to, anxiety. Engaging in safety behaviours or avoidance means that people do not test and disconfirm their beliefs about the situation, and therefore somatic anxiety responses to conditioned stimuli are not given the opportunity to be extinguished. This creates another feedback loop that helps to maintain or increase anxiety. Some safety behaviours (e.g. tightly gripping an object) may increase somatic responses (e.g. trembling, tenseness) that add to the feedback loop of hypervigilance of anxiety symptoms.

However, the use of exposure as a treatment, in the form of systematic desensitisation, may be difficult in SAD depending on the specificity, variability, and duration of the social situation (G. Butler & Wells, 1995). Specificity and variability affect the ability to create graded hierarchies and to control the exposure exercise, whilst the brief duration of many social interactions means that people aren’t able to experience the habituation and decline in their anxiety. An aim of exposure therapy in cognitive behavioural therapy (CBT) is to test and change cognitions (Clark & Wells, 1995) and one of the possible cognitions to target is the estimated social cost of events (Hofmann, 2000) that tend to be biased in people with SAD (Gregory, Peters, Abbott, Gaston, & Rapee, 2015). Modern approaches to CBT modify cognitions by using exposure to show that the
costs of social mishaps are not as bad as expected (Fang, Sawyer, Asnaani, & Hofmann, 2013), and this form of exposure therapy is not affected by the problems discussed for systematic desensitisation.

Borgeat et al. (2009) demonstrated that exposure in the form of cognitive restructuring and systematic desensitisation, where possible (e.g. public speaking), are both efficacious. Cognitive restructuring showed longer lasting decreases in performance anxiety and decreases in social avoidance that continued to decrease after a 12 month follow-up. Interestingly, systematic desensitisation showed faster decreases in negative cognitions as measured by the Social Interaction Self Statement Test (SISST). This was consistent with earlier studies that showed that cognitions changed in therapies that did not have explicit cognitive strategies (Hofmann, 2004a; Newman, Hofmann, Trabert, Roth, & Taylor, 1994) and supports the conclusion that treatments for SAD are not necessarily mode specific.

Systematic reviews of evidence for CBT conclude that it is the best intervention for the initial treatment of SAD and is just as efficacious as pharmacotherapy (Canton, Scott, & Glue, 2012; Mayo-Wilson et al., 2014). Earlier research questioned the mechanisms of action with poor evidence for cognitive variables mediating treatment outcomes (Hofmann, 2004b). Research has since provided evidence for mediating cognitions such as the beliefs about the changeability of emotions (De Castella et al., 2015), probability and cost estimates of social events (Gregory et al., 2015), negative interpretation bias (Beard & Amir, 2010), and effects of uncertainty (Grupe & Nitschke, 2013).

Fear of evaluation has also been found to be associated with social anxiety, but evidence has only been provided through cross-sectional studies
Fear of positive evaluation (FPE), where people believe they will be unable to maintain performance or meet future raised expectations and will therefore fail in the future, has been found to differentiate social anxiety from depression (Weeks, 2014) and provides a cognitive-behavioural explanation for the phenomenon of disqualifying or minimizing positive experiences (Weeks, Heimberg, Rodebaugh, & Norton, 2008). The efficacy of CBT and the current evidence for the mechanisms of action help to strengthen the argument for a cognitive-behavioural model of social anxiety.

If the cognitive behavioural model is correct, then targeting cognitions should be a valid strategy for the prevention of anxiety disorders (Otto, Smits, & Reese, 2004). Evidence to support this hypothesis is sparse; CBT based programs to foster resilience in children (Seiler, 2008) or adults exist (Padesky & Mooney, 2012), but, whilst research based on these programs show improvement in levels of anxiety (O’Callaghan & Cunningham, 2015) or mental well-being (Bhutani, 2015), they lack explicit links showing an increase in resilience. There is evidence, however, for the efficacy of CBT in the prevention of panic disorder (Gardenswartz & Craske, 2001) and the reduction of stress and increase in perceived control over stress (Rose et al., 2013). Perceived control has been shown to be a moderator of resilience (Diehl & Hay, 2010), which is consistent with the theory of control being a key component of hardiness (Maddi, 2013). Cognitive-behavioural techniques have also been shown to reduce the cortisol stress response in healthy participants (Gaab et al., 2003). There is evidence, therefore, that CBT may foster increased biological resilience and psychological hardiness to help people deal with stress.
Earlier research has made a distinction between two different types of life events that contribute to stress: daily hassles and major life events. Daily hassles, while frustrating, are relatively minor and occur on a daily basis, whilst major life events are infrequent, dramatic, and severely taxing (Kanner, Coyne, Schaefer, & Lazarus, 1981). It was shown that daily hassles, but not major life events, are correlated to psychological symptoms (Kanner et al., 1981). This was supported by later research that also showed that daily hassles, but not major life events, are associated with the tendency to interpret events as threatening and to monitor for threat related information (Russell & Davey, 1993). Daily hassles therefore play a larger role in mental health problems, such as anxiety; are related to the cognitive processes in the cognitive-behavioural model such as interpretation bias; and are therefore more important to develop hardiness towards.

Recent research continues to add evidence for the importance of daily hassles; both physiologically, with daily hassles being related to cortisol secretion (Vasiliadis, Forget, & Préville, 2013), and cognitively, where catastrophizing acts as a mediator between daily hassles and anxiety (S. M. Chan, Chan, & Kwok, 2014). The relationship between stress and worry has also been found to be moderated by intolerance of uncertainty and is a greater predictor of worry than major life events (Zlomke & Jeter, 2014). Intolerance of uncertainty is further linked to perceptions of increased costs of negative outcomes (Bredemeier & Berenbaum, 2008), as per the expectancy theory of anxiety, and is also a moderator between daily hassles and anxiety (C. Y. Chen & Hong, 2010). There is, therefore, good evidence for the relationship between daily hassles and cognitions.
Strong evidence was provided by a 10-year longitudinal study that found that reactivity to daily stressors is a long-term predictor of affective disorders (Charles, Piazza, Mogle, Sliwinski, & Almeida, 2013). It was concluded that how people respond to minor events in their lives is important for their mental health. Similarly, Cassidy (2000) found that the number of major life events an individual experiences is predictive of hardiness rather than distress, and it is the perceived stress from life events that predicts illness and behaviours. Cassidy concluded that how people cope with events is more important that the event itself. This reinforces the importance of the possible role that CBT could have in providing people with good coping strategies to prevent mental health problems and increase hardiness.

**The Trans and Gender Diverse Experience of Anxiety**

The distinction between daily hassles and major life events is important for TGD people given the range of challenging experiences they face. These may range from daily hassles in the form of discrimination or harassment (Grant et al., 2011a), through to major life events such as coming out or even gender confirmation surgery. Their daily hassles are therefore possibly additional to the daily hassles encountered by cisgender people, and consequently may contribute to the poorer mental outcomes of TGD people. This suggests that CBT could be effective at helping TGD people to cope with existing mental health problems and also provide them with effective coping mechanisms to deal with future hassles.

It is important to make a distinction between external sources of anxiety, such as daily hassles, and the internal conflict about gender and their identity (Ehrensaft, 2013). This internal conflict, or *gender dysphoria*, can be a source of anxiety and emotional difficulty as people seek to explore, accept, and resolve
their gender identity (Budge et al., 2012; Gagné et al., 1997). The distress from
gender dysphoria therefore has an internal source and is not due to social
pressures or discrimination.

Carroll (1999) notes that theories about treatments which aim to reduce
the distress of gender dysphoria by helping people accept the gender they were
assigned at birth have not been supported by empirical research. Carroll argues
that the course of action to resolve issues of gender identity is dependent upon
individual identities, which can be very diverse (Dargie et al., 2014). The extent
to which individual TGD people seek to change their appearance, presentation, or
seek medical interventions such as hormones or surgery, therefore also varies
(Kuper et al., 2012).

Evidence suggests that, for those seeking medical interventions, mental
health improves after accessing hormones (Colton Meier, Fitzgerald, Pardo, &
Babcock, 2011; Gómez-Gil et al., 2012; Wassersug et al., 2007) or surgery (R.
Carroll, 1999; Riggs et al., 2014). Research on the change in mental health of
TGD people who do not seek mental intervention is scant. However, it has been
shown that congruence between appearance and identity predicts positive mental
health (Kozee et al., 2012). TGD people speak of positive emotions when they no
longer have to hide their gender identity, and the source of stressors begins to
shift from internal conflict to external sources of discrimination (Budge et al.,
2012).

The minority stress model described by Myer (2003) categorises stressors
according to their reliance on an individual’s perception and appraisal. Distal
processes are external and objective whilst proximal stressors are psychological
and subjective. The three processes suggested by Meyer in order from distal to
proximal are the external objective stressful events (both chronic and acute), expectations of these events and associated vigilance, and the internalisation of negative social attitudes. Although Meyer only wrote about the LGB community, the minority stress model can also apply to the TGD population with the resulting need for a focus on social and psychological interventions (Austin & Craig, 2015; Bockting et al., 2013; Breslow et al., 2015; Hendricks & Testa, 2012; Reisner, Greytak, Parsons, & Ybarra, 2015; Tebbe & Moradi, 2016; Testa et al., 2012).

The proximal processes of minority stress may, however, be explained using the same principles for social anxiety as discussed previously. Given the occurrence of chronic stressful social events, TGD people may learn to associate those events with negative outcomes through conditioned learning. They then have expectations of what will happen in those events and reasons for fearing expected outcomes, which is explained by expectancy theory. Those who have low self-concept clarity are likely to be self-conscious and concerned about what others are thinking, which leads to monitoring for threat related information. Some TGD people who pass and are not openly out may also be highly vigilant of threat related information. This may then involve biased interpretations of ambiguous stimuli, biased cost estimations and catastrophizing. These links to theories of learning and anxiety are a possible explanation for the anticipation and expectation of stressful events and subsequent vigilance that is described in the second process of the minority stress theory (Figure 1).
Feinstein, Davila, and Yoneda (2012) suggest that the self-consciousness and ruminative self-analysis of people with low self-concept clarity results in them looking to external sources to help them define themselves. In situations where minorities are exposed to stigma for non-conformance to social norms, Feinstein et al. argue that individuals with low self-concept clarity may therefore internalise the negative attitudes of society in an attempt to define themselves.

especially when they are at the early stages of developing their identity. This is therefore a possible explanation for the third process of the minority stress model in which TGD people may have internalised transphobia.

In an attempt to cope, some TGD people may engage in avoidant behaviour, but avoidant coping tends to lead to emotional hardship (Budge et al., 2012). As previously discussed, avoidance is a key part in the maintenance of anxiety, including social anxiety. These people would therefore benefit from assistance in developing the skills required for facilitative coping and to build social support.

The transphobic attitudes of some gay and lesbian people (Stone, 2009; Weiss, Alexander, & Yescavage, 2003) are intimidating for some TGD people trying to find social support from the wider lesbian, gay, bisexual, and transgender (LGBT) community. Within the TGD community, some people endorse hierarchical structures based on how close someone is to an arbitrary TGD prototype (Angel, 2013; Gabriel, 2014). The lack of support from similar minority communities means that some TGD people therefore feel like they do not have a safe space (Grossman, D’augelli, & Frank, 2011) and find themselves with anxiety towards yet another social situation.

However, some TGD people have been able to utilise adaptive techniques to cope effectively and these can be informative in helping those who have low hardiness. Some of the strategies used are directly related to theories discussed earlier, such as building a high level of self-concept clarity by generating their own clear definition of their gender, acknowledging and embracing their own self-worth, and being aware of oppression to prevent internalisation of negative messages (Singh et al., 2011). Being aware of oppression also allows people to
fight back, both in immediate situations and through more distal social activism, which allows TGD people to gain strength through adversity (Scourfield, Roen, & McDermott, 2008; Singh et al., 2011).

A very common theme in the literature for useful coping strategies is the importance of finding supportive people and a supportive community (Budge et al., 2012; Budge, Rossman, & Howard, 2014; Grossman et al., 2011; Singh et al., 2011; Stieglitz, 2010). This may require relocating or actively seeking out appropriate organisations (Scourfield et al., 2008). Building self-efficacy and social problem solving skills may be helpful in facilitating this. Helping TGD people reduce their anxiety in social situations may therefore help in cultivating supports around them whilst also enabling them to function more effectively in daily life.

Although TGD people may have anxieties and fears about various social situations and of being negatively evaluated, many of these fears are due to real events of discrimination and micro aggressions (G. R. Bauer et al., 2009; Couch et al., 2007). Determining whether the displayed anxiety and behaviour was out of proportion to actual threats would be a clinical decision, but limiting help to those with a clinical diagnosis is a disservice to all the TGD people who are justified in their reactions but whose lives are still being impacted. Hence, the focus of this research is not on whether or not individual TGD people have SAD. Rather, the focus is on: (a) helping TGD people deal with and live with the daily hassles and anxiety inducing situations that come from living in a society that, although slowly getting better, is not always accepting; and (b) on giving TGD people the courage to challenge cisnormative structures to live an authentic life that is worth living.
It has been established, in the discussion above, however, that the cognitive models and theories proposed for social anxiety may also be applicable to the social anxiety experienced by TGD people. Specific situations can make certain thoughts and beliefs salient, but these may not necessarily be the same situations as those captured in classic measures of social anxiety such as the Liebowitz Social Anxiety Scale. The social contexts that are susceptible to discrimination provide the contexts for the distress of TGD people and research is required to determine if the TGD experience of social anxiety can be empirically distinguished from SAD. This would therefore require the construction of a new scale to capture the TGD experience of social anxiety and the items in this scale can be useful in informing treatment.

Another adaptive coping strategy that TGD people may use is to seek professional support (Budge et al., 2012). However, lack of training at a professional level means that many health practitioners are unfamiliar and inexperienced with helping TGD people (Snelgrove, Jasudavisius, Rowe, Head, & Bauer, 2012), which often results in TGD people having to educate the practitioner (Grant et al., 2011a). Inexperienced practitioners may also stereotype TGD people and attribute all their problems to their TGD identities, and some TGD people are therefore reluctant to disclose their TGD status to health professionals (G. R. Bauer et al., 2009; Pitts et al., 2009). Empathetic and knowledgeable professionals are, consequently, highly valued (Pitts et al., 2009), but TGD people lament the lack of choice available, which contributes to greater demand and lower accessibility on existing human resources (Ho & Mussap, 2016; Wylie, Hainsworth, & Ryles, 2008).
It may therefore be worthwhile to examine methods of providing interventions that address these problems. One potential method may be via e-health, since help is now available to anyone with an internet connection and the anonymity of the web means that people retain their privacy. The bottleneck in accessing practitioners is removed and people who are isolated, either spatially or socially, from a suitable practitioner is also able to access help. The delivery of an intervention via the internet, to assist TGD people reduce anxiety in social situations, is therefore appealing and the feasibility of this needs to be examined. It is worth restating that the goal of such an intervention or treatment is to address a symptom and not a condition. The symptom of anxiety is a potential natural reaction to the condition of transphobia that is expressed through discrimination and micro aggressions.
Internet Interventions

Although at present there is no precise and comprehensive definition of e-health (Oh, Rizo, Enkin, & Jadad, 2005), there is general consensus that it embodies several characteristics. These include efficiency (J. Mitchell, 2000), greater empowerment of consumers through accessible information and education, delivery of evidence based interventions across geographical boundaries, and providing care that is equitably accessible (Eysenbach, 2001). Delivering mental health interventions across the internet is a use that falls under the ambiguous e-health umbrella (J. Mitchell, 2000), and internet technologies can be utilised to deliver mental health interventions in many different ways. Barak, Klein, & Proudfoot (2009) proposed four classifications of internet-supported interventions according to their modality: (a) Web based interventions, (b) online counselling and therapy, (c) internet-operated therapeutic software, (d) other online activities. Clients have differences in preferences, needs, and habits (Barak, Hen, Boniel-Nissim, & Shapira, 2008) and different modalities are better suited to providing different types of support and for serving different needs.

Letters and telephone calls, as the means of communication in therapy, date back to the time of Freud and are an effective mode of treatment (Perle, Langsam, & Nierenberg, 2011). Online counselling and therapy is an extension of this that allows clinicians to utilise existing skills in internet communications to engage with those who may not be able to attend traditional face to face sessions due to issues with distance, schedules, or social isolation (Barak et al., 2009; Grohol, 2004). Communication can be asynchronous such as via email, or it may synchronous using chat or instant messaging (IM) platforms, or audio and video (webcam) conferencing technologies.
There is evidence supporting the efficacy of online therapy using chat or IM but the studies have been criticised for being poor with few randomised controlled trials (Dowling & Rickwood, 2013). There is also promising evidence for the efficacy of therapy over Skype (Yuen, Herbert, Forman, Goetter, Juarascio, et al., 2013) including an RCT which found that the gains obtained by those over Skype were sustained for longer than those meeting in person (Choi et al., 2014). Both of these studies suffer, however, from relatively small sample sizes.

The use of chat or IM helps deliver on the potential of equitable and accessible care by providing emotionally safe environments for people who may find telephone or face to face counselling too confrontational (King et al., 2006). However, online counselling still requires a therapist to be actively engaged (Barak et al., 2008) and the slow speed of text communication may actually be a decrease in efficiency (Bambling, King, Reid, & Wegner, 2008). Availability constraints of human therapists in terms of wait times or working hours also runs counter to the vision of an internet that is available anytime and anywhere (Keshav, 2005). Overcoming these weaknesses implies a certain level of automation or access to a greater pool of resources.

Conversations with artificial intelligence programs fall under the category of internet-operated therapeutic software that also includes online games, and virtual environments (Barak et al., 2009). ELIZA was an early program designed to mimic a Rogerian psychotherapist, but was created for technical reasons rather than actual interest in psychology (Weizenbaum, 1966). The concept has been developed further, however, and there is evidence for the effectiveness of conversational software agents in changing health behaviour (Bickmore,
Schulman, & Sidner, 2013) and tentative support for problem solving personal
issues in non-clinical populations (Gaffney, Mansell, Edwards, & Wright, 2013).

Creating these types of computerised tailored interventions is inherently
difficult, and the costs and effort involved in modifying and adapting legacy
research projects stifles the uptake of these interventions in wider practice
(Vinson et al., 2011). Recent research has looked into ways of developing
systems that reduce the complexity of adoption by creating and utilising open
source software (see http://relationalagents.com) that can be customised to
specific domains by the modification of pseudo-coded models and recipes
(Bickmore et al., 2013; Bickmore, Schulman, & Sidner, 2011). However, given
that the people creating the model in the above research are also involved in the
creation of the software system, they have experience and knowledge about the
system that doesn’t translate to those looking to adopt the system for the first
time. That experience is likely to translate to faster development times and easier
adaptation of models compared with other users (Tüzün & Tekinerdogan, 2015).
Evidence so far has also been targeted to behaviour change in health psychology
rather than the problems associated with clinical psychology. It is therefore less
certain if the evidence for efficacy is transferable.

Another type of software is gaming and virtual worlds. Prior research in
the use of offline games has provided evidence for their efficacy in providing
social skills, improving mental health outcomes, and facilitating therapeutic
engagement with younger people (Aventin, Houston, & Macdonald, 2014;
Fanning & Brighton, 2007). Modern online virtual worlds show promise in
treating SAD by enabling the creation of different scenarios for exposure
exercises and the practice of social skills (Hartanto et al., 2014; Yuen, Herbert,
The ability to create and control the environment is highly advantageous in allowing the therapist to tailor the situation to the client at that particular point in time so that their anxiety is at the optimum levels for CBT work.

There is a suggestion that merely interacting in an online virtual environment, without the assistance of a therapist, provides mental health gains (Gilbert, Murphy, Krueger, Ludwig, & Efron, 2013). For this reason, there is some uncertainty about the size of independent contributions from the planned therapeutic interventions versus the online virtual environment. Research in this mode of therapy is relative immature and more work needs to be done to explore potential gains and determine the individual contributions and size of effects.

Interacting with other people online is also possible via the use of online support forums. Barak et al. (2009) categorise this under “other online activities” which also includes activities such blogs and podcasts. Online forums help to improve the emotional and social well-being of participants (Mo & Coulson, 2014; Pendry & Salvatore, 2015). Being able to exchange and share information with people who understand and identify with similar problems (Mo & Coulson, 2014) provides a sense of group identification. This fulfils social emotional needs that may not be available offline (Pendry & Salvatore, 2015), which may include expanding the person’s social network (Tanis, 2008).

Sharing on an online support forum is less risky than sharing with family or close friends who may be judgmental, overprotective, or where the relationship has obligatory demands or expectations that may be stressful (Tanis, 2008). Online forums therefore appear to be especially helpful for people who are stigmatised, especially since people with lived experience are able to provide
useful information (Pendry & Salvatore, 2015; Tanis, 2008). The benefit gained from an online forum may, however, be dependent on how much a person identifies with other forum members (Pendry & Salvatore, 2015). In a support forum for bereaved family members, for example, differences in the relationships to the deceased (e.g. spouse, parent) or in their stage of grief was enough to reduce interaction and bonding between different people (Oliver et al., 2015). The benefit of support forums can also be reduced by inappropriate online behaviour that may be facilitated by the social disinhibition that occurs when being online (Malik & Coulson, 2010; Mo & Coulson, 2014).

Pendry & Salvatore (2015) suggest, however, that anonymity provided by traditional forums is an important factor in the benefits that online support groups provide. They argue that newer forms of social media, such as Facebook, are less anonymous and don’t provide the safety of being able to initially lurk (read posts without contributing) that traditional forums provide. This is inconsistent with prior research by Tanis (2008) who showed that anonymity wasn’t related to perceived helpfulness of forums. Tanis argues that participants may not feel that anonymity was necessary amongst people with similar experience, although those who choose not to provide a picture of themselves as part of their online presence may feel that they are valued for their contribution rather than their appearance. Oliver et al. (2015) received positive feedback on the usefulness of a Facebook support group, although their research was not supported with assessments of clinical outcomes. The use of secret Facebook groups, where only group members can see who the posts in the group and the membership list, also helps to counter the reservations of Pendry & Salvatore.
Many online support groups have members that may be considered experts due to their lived experience and the information they provide is valuable to other members of the group (Tanis, 2008). Participants may, however, feel overloaded with the amount of information that is available (Mo & Coulson, 2014) and the accuracy and quality of information, provided by people who are not qualified health specialists, cannot be ensured (Malik & Coulson, 2010; Mo & Coulson, 2014). In an online support forum for infertility, some people found it difficult to read about the negative experiences that other people had, whilst others experienced jealousy and pain reading about other people’s successful pregnancies (Malik & Coulson, 2010). The possible dependence on the social aspect of online forums, rather than the provision of theory driven interventions, (Pendry & Salvatore, 2015) may mean that the benefits of online forums are moderated by many social and personal factors.

Blogging, which has a slightly more unidirectional flow of information, also has similar benefits and dangers to online support groups. One of the main benefits of blogging is the therapeutic and cathartic nature of writing (DeGroot & Carmack, 2012; Nagel & Anthony, 2009) that is shared by the text medium of online forums (Tanis, 2008). Reading blogs or comments left on blogs provide a sense of validation and a shared space, but blogs are also vulnerable to inappropriate comments and to viewing by complete strangers. The therapeutic benefit may therefore be moderated by factors that are difficult to predict.

Web-based interventions, on the other hand, are intended to create behaviour change and can be education interventions, self-guided therapeutic interventions, or human-supported therapeutic interventions (Barak et al., 2009). There are disagreements over whether websites that only offer information should
be considered as interventions (Ritterband et al., 2003; Ritterband & Thorndike, 2006). Systematic reviews have shown, however, that psychoeducation can have positive effects on people with mental disorders (Lyman et al., 2014; Shah, Klainin-Yobas, Torres, & Kannusamy, 2014) and can, therefore, be therapeutic without providing a therapeutic intervention that was designed to change behaviour (Barak et al., 2009). Educational websites consequently deserve to be listed as a type of web-based intervention even though they may not provide specific or comprehensive treatment programs.

Provision of feedback regarding progress of treatment is considered an important component of therapeutic internet interventions (Barak et al., 2009; Ritterband et al., 2003). Although web-based educational interventions do not provide treatments, they may provide a degree of feedback and support (Barak et al., 2009) by supplying self-assessment tools to help people decide whether to consult a mental health professional. Examples of this can be seen on the Black Dog Institute site that has self-tests for depression and bipolar disorder (http://www.blackdoginstitute.org.au/).

In contrast to the type of content used in web-based educational interventions, self-guided web-based therapeutic interventions and human-supported therapeutic interventions are based on effective face-to-face interventions (Ritterband et al., 2003) that are designed to create positive changes in cognitions, behaviour, and emotions (Barak et al., 2009). The difference between self-guided and human-supported interventions is the provision of support, guidance, and feedback by a human, which can be a mental health professional or a peer supporter (Barak et al., 2009). Peer support, e.g. via online forums, is considered to be an adjunct to treatment whereas professional support
via email, instant messaging, or web conferencing, may be more fundamental to the intervention (Barak et al., 2009). Self-guided interventions provide feedback from automated assessments, and it has been shown that the mode of assessment (automated or clinician) does not affect treatment outcomes (Mason & Andrews, 2014).

A review and meta-analysis by Barak et al. (2008) found that e-health therapies across a range of problems are, in general, as effective as face to face treatment, and that there wasn’t a significant difference in effect sizes between web interventions and online-communication therapy with a clinician. However, people under 18 and those over 40 were less effectively treated. Treatments were also more effective in dealing with emotions, thoughts, and behaviours and less effective for physiological and somatic problems. It would seem, therefore, that web based interventions would be ideal for treating middle aged people with anxiety.

Later research showed that fully automated web interventions are effective for treating adults of all ages for different types of anxiety, including SAD, and in reducing the clinical severity of anxiety disorders, increasing quality of life, and increasing participant’s confidence in managing their mental health (Klein, Meyer, Austin, & Kyrios, 2011). It was previously argued that therapist guidance affects outcomes and is important for treatment adherence (Andersson, 2009). However, Klein et al. (2009) showed that the effectiveness of their web therapy for anxiety was independent of the frequency of contact with an associated therapist. Furthermore, meta-analysis by Barak et al. (2008) found that communication supplementing web interventions did not contribute to the effectiveness of the intervention and, in some cases, hinders effectiveness. Barak
et al. hypothesise that communication may reduce anonymity, which might be a contributor to the effectiveness of the intervention.

Whilst those previous studies address concerns over effectiveness of interventions without therapist assistance, they do not address concerns over treatment adherence. Attrition is a problematic phenomenon in web interventions with extremely high rates of people failing to complete the intervention (Eysenbach, 2005). After reviewing 19 studies of internet based treatment programs, Melville, Casey, & Kavanagh (2010) conclude that evidence implicating specific variables as being predictive of participant dropout remains limited. Results from various studies are inconsistent with each other and Melville et al. argue that there are, as yet, no known ways to reduce the rate of attrition.

Even though variables within individual studies may be associated with attrition, AL-Asadi, Klein, & Meyer (2014) demonstrated that statistical methods may be used to establish that people who do and do not complete treatment would be likely to give similar answers. This shows that the attrition is not biased and does not affect the statistical results of treatment effectiveness. AL-Asadi et al. were therefore able to demonstrate that web interventions for anxiety are effective at reducing symptoms and provide the cost and availability advantages of e-health.

**E-Health in the TGD context**

Usenet newsgroups were early forms of online virtual communities that provided groups members with a sense of group identities (Burnett & Bonnici, 2003). The TGD community has had an explicit online presence since the
creation of alt.transgendered\(^1\) on Usenet in 1992, although it is likely that private e-mailing lists predated this newsgroup. Several other newsgroups specifically for peer support, such as soc.support.transgendered, alt.support.srs, and alt.support.crossdressing, soon followed.

Although Usenet newsgroups are no longer highly utilised (Kim, Schneider, Ager, & Feldmann, 2010), resources for TGD people have been created that reflect the evolution of internet technologies. Online discussion forums, blogs and podcasts are available and many people have also utilised YouTube as a means to document a transition process or for a video blog. Many of these resources tend to be collated into various lists or directories (e.g. Heartland TGD Wellness Group, [http://transwellness.org/resources/online-resources/blogs-and-forums/](http://transwellness.org/resources/online-resources/blogs-and-forums/); Susan’s Place, [https://www.susans.org/links/](https://www.susans.org/links/); Trans Road Map, [http://www.tsroadmap.com/info/transgender-forum.html](http://www.tsroadmap.com/info/transgender-forum.html). The rise of social media means that many of these resources have also moved onto social media platforms such as tumblr (see Neutrosis, [http://neutrois.com/community/](http://neutrois.com/community/)) or Facebook, such as Gender Diversity Australia (GenDA; [https://www.facebook.com/groups/113915225435033/](https://www.facebook.com/groups/113915225435033/)) and Trans Health Australia: Victoria – Tasmania ([https://www.facebook.com/groups/transhealth.vic/](https://www.facebook.com/groups/transhealth.vic/)).

Given the previous discussion about the benefit of online forums to stigmatised groups, it is unsurprising that online forums are being utilised by TGD people.

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\(^1\) Although the term “transgendered” was used regularly by members of the TGD community in the past and is still in use by some today, many in the TGD community feel that it is offensive (J. Herman, 2010). *Transgender* is often conceptualised as an adjective and not as a verb. Hence, while someone may be transgender, they do not transgender, nor are they “transgendered”, or “transgendering”. Similarly, *transgenderism* is also sometimes seen as being offensive (Williams, 2015).
Research in the dynamics of online TGD forums is lacking. It is likely that many of the benefits and dangers that exist in other online forums also apply to TGD forums. TGD people recognise the expertise of lived experience (Pitts et al., 2009) and would therefore be likely to recognise some members of online forums as having valuable experience and expertise to share. However, there are questions from within the TGD community about the accuracy of some of the information posted on these forums (James, 2015). It would appear, therefore, that the TGD community is well resourced in this area of online activity and that they derive similar benefits and hindrances from their online activity compared with other online forums.

Turning to the provision of online services by clinicians, a search of the Australian Psychological Society (APS) website reveals 113 psychologists within a 200km radius\(^2\) of Melbourne, Australia that offer services via Skype for anxiety and phobias (http://www.psychology.org.au/FindaPsychologist/). In a TGD context, the same search reveals 6 psychologists who offer a service via Skype for gender dysphoria, which reflects the smaller number of clinicians available to TGD people in general (Pitts et al., 2009). International therapists also provide worldwide services for TGD people wishing to obtain a letter of recommendation for surgery under the WPATH SOC (e.g. http://www.gendertherapist.com/).

As previously noted, many TGD people may wish to speak to clinicians that are knowledgeable and welcoming of variations in gender identity (Pitts et al., 2009), but the same clients may not necessarily have issues with or be wanting to speak about gender dysphoria. The APS website does not provide the ability to search for such psychologists. It could be argued that psychologists with the

\(^2\) Whilst Skype services should theoretically transcend locality, the APS website does not allow for searches without providing a location and a radius boundary.
capability of assessing for gender dysphoria may also be amiable to TGD people whilst also being able to discuss other issues. However, previously identified concerns remain over some therapists attributing all issues to the TGD status of the client (G. R. Bauer et al., 2009). There is, therefore, limited availability of online counselling and therapy for TGD people, and the highlighted drawbacks provide a good argument for investigating the delivery of other types of online services.

There is no research literature in the health fields examining the use of online software and virtual environments to assist TGD people. Several web articles discuss how TGD people may explore their gender using online virtual worlds, such as Second Life (Seabrook, 2012), or online games that allow players to choose the gender of their character (Dale, 2014; Janiuk, 2014). These virtual environments allow TGD people to interact with others in their identified gender and have played an important role in personal TGD journeys (Dale, 2014; Garcia, 2012; Janiuk, 2014). TGD people who do not identify with the gender binary still have a difficult time, however, as gender customisation for characters in games usually adhere to the gender binary (Sheva, 2015).

Beyond the exploration of gender and socialisation, the lack of research on therapeutic uses of online environments for TGD people may reflect the unsuitability of the medium. Virtual environments are used to treat SAD by extinguishing the anxiety response of clients to social situations (Hartanto et al., 2014). The discrimination, harassment, and violence that TGD people face is real, however, with many articles describing its occurrence online (Dale, 2014; Janiuk, 2014; Koebler, 2015; Sheva, 2015). These articles describe the dangers of revealing one’s TGD status and changes in behaviour to prevent being outed
online such as avoiding the use of web cams or voice chat. This is similar to the backlash that TGD people may receive in the offline world when they are outed (G. R. Bauer & Hammond, 2015). General online environments are potentially not a safe place for TGD people (Koebler, 2015) and exposure techniques for treating SAD in online virtual environments may not transfer well to the TGD space.

The remaining mode of online therapy is web interventions. Resources for TGD people tend to be limited to information about TGD identities and the logistics of living as a TGD person (e.g. 

http://nonbinary.org/wiki/practical_resources, https://www.susans.org/links/). Online mental health resources are scarcer and are still presented as information or advice (e.g. http://thelstop.org/2013/08/how-tocope-with-transgender-stress/, http://www.tsroadmap.com/mental/index.html). Whilst there are several online interventions available for anxiety, none of them are targeted to the TGD context or take into the account the needs of the TGD population and the reality of the harassment and discrimination that they face that contribute to their anxiety. There is, therefore, a gap in the provision of mental health services to the TGD population that deserves attention.
Summary and Research Aims

The preceding literature review documented the ways in which discrimination, transphobia, and cisnormative structural prejudice serve as social stressors that impact negatively on the mental health and wellbeing of TGD people. These social stressors can affect the perception and appraisal of situations, and the internalisation of negative social messages by TGD people in ways that: (a) precipitate and perpetuate social anxiety, (b) interfere with their daily functioning, (c) prevent them from accessing medical support, and (d) hinder their ability to live in ways that are congruent with their gender identity. Complicating attempts at addressing social anxiety in TGD people using conventional psychotherapeutic approaches is that the fear of discrimination and prejudice experienced in TGD social anxiety is different from the misinterpreted bodily symptoms and overestimated social cost of evaluation that is characteristic of, and implicated in, SAD. In other words, clinicians currently lack interventions tailored to the needs of TGD patients suffering from TGD specific forms of social anxiety. It is the contention of the present thesis that it is therefore worth investigating the TGD experience of social anxiety, and use the results to develop interventions to help TGD people deal effectively with daily social stressors.

Providing interventions to TGD people requires understanding of the contexts and social situations that induce anxiety. It is therefore proposed that a review of literature and community and professional consultation be utilised to develop a typology of social situations that elicit anxiety in TGD people. As reviewed in the preceding discussion, this may include interactions with family, co-workers, health-professionals, and peers that involve invalidation of identity, “coming out”, discrimination, navigation of the health system and its
practitioners. This typology will be used to inform the creation of the TGD Social Anxiety (TSA) scale whose psychometric properties will be evaluated in a second study on a sample of TGD adults. If, as hypothesized, these daily hassles, minority stressors, and consequent cognitions (such as expectations of rejection and internalisation of negative social attitudes) impact on the mental health of TGD people, then this scale will be predictive of anxiety and mental health outcomes of TGD people. The predictive validity of the scale can therefore be tested by comparison against results for validated scales of mental health outcomes.

If the experience of TGD specific social anxiety is different from that of SAD, then the TSA scale should also have discriminative validity. Given the argument made for the differentiation between SAD and TSA, it is expected that constructs measured by the TSA scale will be different from constructs evaluated by clinically validated measures of SAD. It is also predicted that the results from the TSA scale should therefore also explain variance in mental health outcomes beyond those explained by measures of SAD.

Although the daily hassles facing TGD people exist and are, in the absence of a fundamental shift in public attitude, largely unavoidable, interventions can nonetheless target the maladaptive thoughts, self-focus, poor self-concept clarity, and anxiety-perpetuating safety behaviours held by some TGD people and replace them with adaptive coping mechanisms. That is, the psychological theories and the cognitive model for SAD remain applicable to the TGD context and the TSA scale can be used to inform suitable interventions.

However, provision of psychological interventions to TGD people can be difficult due to the few available professionals available who have expertise with
TGD people. Access to help is further encumbered by fear of discrimination from health professionals and concerns over privacy. Online web interventions take advantage of the promises of e–health to help overcome some of the challenges present when assisting the TGD community by providing quality interventions that are not tied to the availability of individual clinicians and, with an internet connection, can be accessed from anywhere without concerns of privacy or fear of discrimination.

Given the evidence for the effectiveness of self-guided web interventions for SAD, if the psychological processes that precipitate and perpetuate SAD and TSA are the same, then mechanisms of change in these interventions should have efficacy for TSA. The differences in context between SAD and TSA mean, however, that the same interventions could not be used verbatim. It is therefore proposed that an existing self-guided web intervention be modified using TGD specific contexts and examples as identified by the TSA scale. The intervention will therefore be targeted to TGD people, framed within an appropriate context and using relevant examples, while retaining techniques that have been found to be effective, albeit in people with a different form of anxiety.

The modification of existing interventions does carry the risk that the intervention developed is not suitable or well received by the TGD community. TGD people may find it insulting and unacceptable that they are being asked to work on themselves when the problem arguably lies in the wider social context and requires broader social change – even though there may be a benefit to learning and utilising adaptive mechanisms to cope with the real experiences of discrimination that they may face on a daily basis. It would therefore be advisable to proceed with caution and to conduct a feasibility trial of
the modified intervention to determine if it is acceptable and suitable for the TGD population. A gap has been identified in existing services, but a feasibility trial could also confirm if there is demand for such an intervention from within the community.
Chapter 2

Beyond an infographic: Using the Gender Unicorn to measure gender

Prior to developing a scale to measure social anxiety or conducting a feasibility trial for interventions for TGD people, it is important that there is a sensitive and accurate measure to collect gender information. Gender identity is an important facet of a person’s identity (Wood & Eagly, 2009), yet current methods of operationalizing gender may be inadequate for capturing the diversity in gender identities. This chapter therefore reports on the implementation, psychometric properties, and sociocultural meanings of a measure of gender adapted from a popular infographic: the Gender Unicorn. This measure aims to operationalize gender in a manner that is inclusive and useful for evaluating the rich diversity of gender identities and gender expressions within transgender and gender diverse populations.

Gender identity is an individual’s internal sense of being a woman/female, a man/male, and/or a non-binary gender (GLAAD, 2015; J. L. Johnson, Greaves, & Repta, 2009; Pinn, 2003). Gender identity does not necessarily correspond to the sex that a person is assigned at birth, which is usually based on genital appearance (Tate, Ledbetter, & Youssef, 2013). Despite the complexity of gender as a construct and the diversity of gender identities present in the population, many researchers continue to measure their participants’ gender using a single self-report item that offer participants a choice of female and male (Tate et al., 2013; Treharne, 2011; Westbrook & Saperstein, 2015). This conflates gender with sex, and participants whose gender identity does not conform to the woman/man binary may find themselves excluded from such research or their gender misrepresented and/or constrained to inappropriate gender categories.
(Treharne, 2011). This could potentially underestimate the effects of gender and gender diversity (Westbrook & Saperstein, 2015).

**Measuring Gender in Inclusive Ways**

*Gender*, rather than *sex*, is the correct term and construct to use when referring to social groupings of people (American Psychological Association, 2010). Unnecessary uncertainty is created when the terms used are associated with sex, but gender is supposedly the topic of discussion (Muehlenhard & Peterson, 2011; Runnels, Tudiver, Doull, & Boscoe, 2014). For example, *female* and *male* are often associated with sex and therefore *woman* and *man* are the preferred terms to use when assessing gender (Ansara & Hegarty, 2014; Tate et al., 2013). Correct use of language is therefore extremely important.

The importance of language continues to apply in the use of gendered language to describe groups of people. Using gendered language to identify people in ways that they do not identify themselves is considered *misgendering* (Ansara & Hegarty, 2012, 2014). Misgendering is a sexist practice that delegitimizes people’s own designation of gender (Ansara & Hegarty, 2014). Forcing people to endorse a binary option for gender, and consequently describing them with those labels, may therefore constitute a form of discriminatory practice through the potential misgendering of participants who do not identify with the gender binary.

One attempt to be more inclusive when measuring gender is to add an option for *transgender*. This single category fails to recognise the multitude of genders within it that may contribute to differences in research outcomes (Budge et al., 2012; Harrison, Grant, & Herman, 2012). It also fails to recognise those who do not identify as transgender but as women or men, neither, or with some
other term (Ansara & Hegarty, 2014). Attempts to address this by adding a fourth option of “do not identify as female, male, or transgender” (The GenIUSS Group, 2014) may still be problematic as people may identify with both transgender and woman or man (Ansara & Hegarty, 2014).

Another option is to expand the selection of gender categories and allowing participants to endorse as many as required (Grant et al., 2011b; Tate et al., 2013; The GenIUSS Group, 2014). However, this approach requires researchers to make assumptions about the terms used. Evolution in the use of gender terms (L. B. Brown, 2016) complicates their selection. Terms that were prevalent in the recent past, such as “transgendered” (Serano, 2007), have faded from use and may even be considered offensive by some within the TGD community (GLAAD, 2015). Even the most common gender identity categories in psychology research between 2002 and 2012 (Moradi et al., 2016), female to male (FTM) and male to female (MTF), may now be considered offensive (Rainbow Health Ontario, 2016). Difficulties with the non-specificity of some terms, such as transgender or genderqueer, remain. Researchers also assume that each participant uses endorsed terms in the same way. This also raises questions about the meaning of multiple endorsements – both at a conceptual level and from an inferential statistics point of view.

Allowing participants to describe their identity in their own words overcomes some of these challenges and ensures, most importantly, that researchers do not misgender respondents (Ansara & Hegarty, 2014). However, this approach is susceptible to the idiosyncratic and changing use of descriptors and forces researchers to make ad hoc groupings of participants if they wish to conduct quantitative analyses on responses (Hyde et al., 2014; Riggs, Power, &
von Doussa, 2016). A list of idiosyncratic genders also makes it difficult to
determine how diverse and representative a sample may be, which defeats the
purpose of collecting the demographic information (Connelly, 2013).

From the Gingerbread Person to the Gender Unicorn

This chapter investigates the possibility that infographics used to educate
about gender diversity may serve as the basis for measuring gender in a manner
that is inclusive, not reliant on particular linguistic descriptors, and suitable for
use with TGD people. A strength of using these infographics is their history of
development and adoption by the TGD community (“Gingerbread Person,” 2011;
Lawson, 2011; Pan & Moore, 2014). The TGD community places importance on
being involved in the discourse and conceptualisation of their gender identity (Pan
& Moore, 2014). This is exemplified through the creation of the Gender Unicorn
to reclaim discourse and conceptualisation from someone who was not part of the
TGD community (Pan & Moore, 2014). The most respectful way of measuring
gender would therefore be to utilise materials that the TGD community as a group
has reviewed and accepted as the best way to conceptualise their gender diversity.

Early infographics distributed through social media (“Gingerbread
Person,” 2011; Lawson, 2011) drew upon earlier academic work (M. Diamond,
2002) to bring attention to the distinction between the constructs of sex, gender,
sexual orientation, and gender expression. Lawson’s (2011) Gingerbread Person
further represented each construct as a continuum. Each construct was
represented by a line anchored by male and female (or masculine/feminine in the
case of gender expression) with the centres of each line labelled intersex for sex,
genderqueer for gender, bisexual for orientation, and androgynous for gender
expression.
The Genderbread Person (Killerman, 2012a) continued this structure with several changes. The sex and gender constructs were re-labelled biological sex and gender identity, with the gender identity line now anchored by woman and man, with genderqueer at the midpoint. The Genderbread Person was updated shortly afterwards (Killerman, 2012b) with each construct now represented by two lines rather than one. Gender identity utilized two lines each anchored by nongendered on the left and woman-ness and man-ness on the right (with no label between these anchors). This allowed people to use the woman/man labels independently without being constrained to a gender-binary response. For example, someone who was bigender could mark both lines in gender identity highly and someone who did not identify with any gender could mark both lines at zero (left). This was unclear in the previous version where the middle of the scale might be applicable to both, or people who did not identify with any gender might feel excluded. Similarly, two lines anchored by agender and feminine or masculine represented gender expression, two lines anchored by asex and female-ness or male-ness represented biological sex, and two lines anchored by nobody and women/females/femininity or men/males/masculinity represented sexual orientation (now labelled sexual attraction).

The importance of correct and inclusive language motivated the creation of the Gender Unicorn to address limitations in the revised Genderbread Person (Pan & Moore, 2014). Pan and Moore (2014) argued that nongendered is neither the only term nor the preferred term (agender) that can anchor each of the gender identity scales. They therefore removed the use of labels to anchor any of the scales. Furthermore, they criticised Killerman (2012b) for incorrectly using agender to anchor gender expression. Pan and Moore also argued that “biological
sex” was ambiguous and harmful to trans people, suggesting that sex assigned at birth was more accurate. They dismissed the term “asex” based on it not being a real word and meaningless given that everyone has some sex characteristics prescribed to them. They also added a third scale to gender as some cultures have genders outside of the male/female binary.

The Gender Unicorn consists of five constructs: gender identity, gender expression, sex assigned at birth, physically attracted to, and emotionally attracted to. Sex assigned at birth is the only construct that is categorical with three options: female, male, and other/intersex. The other four constructs are continuous with three dimensions each. Each dimension has a nil value at one end and an unlabelled maximum value at the other, with no explicit anchors provided. Gender identity has the dimensions female/woman/girl, male/man/boy, and other gender(s). Gender expression has the dimensions feminine, masculine, and other. Physically attracted to and emotionally attracted to both have the dimensions women, men, and other gender(s).

Adapting the Gender Unicorn for Use as a Measurement Tool

In summary, the Gender Unicorn represents not only a departure from the traditional cis-binary conceptualization of gender, it calls into question the adequacy of describing gender along a continuum anchored by woman and man, and the adequacy of only having two dimensions to measure gender. It also provides the basis for representing gender in ways that are not overly dependent on linguistic gender descriptors.

However, while the Gender Unicorn has been used successfully as a teaching resource (Solotke, Sitkin, Schwartz, & Encandela, 2017) its use in research to measure gender requires further psychometric validation. This study
is only concerned, however, with the measurement of the internal sense of gender, which differs from how other people may perceive a person’s gender (Westbrook & Saperstein, 2015). Gender expression is therefore not validated and neither are physical or emotional attraction, which are related to sexual identity. The present study therefore evaluated the Gender Unicorn as a measure of gender in which respondents use sliding scales to indicate their level of identification with female/woman/girl, male/man/boy, and other gender(s). This study refers to the measure as the Gender Identity Scale (GIS) as it uses only a subset of the Gender Unicorn and psychometric practice may require some modifications to the scale.

The GIS is validated with TGD people because, as noted in the literature review, this population presents researchers with the greatest challenge in terms of measuring gender, and are the most vulnerable to misgendering in current research (Ansara & Hegarty, 2012, 2014). Participant’s pattern of responding to the GIS is analysed via a latent class analysis (LCA) to reveal underlying gender identity classes. Some people are likely to identify with the gender “binary” and therefore the LCA will identify classes of participants that highly identify with only one of female/woman/girl or male/man/boy. If people identify with genders outside of the binary (Pan & Moore, 2014), then the LCA should also identify a class of participants that highly identify with only other gender(s). The GIS has, however, separate dimensions of gender identity so that those dimensions may vary independently. This suggests that the LCA should also identify classes of participants that identify with different combinations of those dimensions, which includes not identifying with any gender at all.

An examination of the way that people linguistically describe their gender, within each of the classes identified by the LCA, determines if the classes have a
meaning that is consistent with participants’ own designations of gender. There are commonly accepted definitions for many labels (e.g. M. J. Barker & Richards, 2015; “Gender Identities,” 2015; TransGender Victoria, 2013), but some definitions can be broad. Usage consistent with those definitions suggests that labels with a currently clear definition (e.g. woman or man) would consistently appear in a single class. However, umbrella labels such as genderqueer or non-binary can cover many different types of identities including, but not limited to, masculine, feminine, neutral, or bi-gender (TransGender Victoria, 2013), and would therefore not appear exclusively within one class. A Latent Class Analysis (LCA) will analyse the patterns of responding to the GIS from TGD participants to test the following hypotheses:

H1: Three gender classes will correspond to participants who identify highly with only one of the three dimensions in the GIS – female/woman/girl, male/man/boy, or other gender(s).

H2: One gender class will consist of participants who do not identify with any of the dimensions of the GIS.

H3: A gender class or classes will include participants who identify with a combination of dimensions of the GIS.

H4: Participants who describe their gender using “conventional” labels, such as woman or man, will appear predominantly in the corresponding LCA gender class.

H5: Participants describing their gender using umbrella labels, such as genderqueer or transgender, will not identify exclusively with a single GIS dimension, and will appear across multiple LCA gender classes.
Method

Participants

The 269 participants were aged between 18 and 79 years (\(M = 39.40, SD = 14.45\)), although 17 participants did not provide age data. The country of birth for the participants were: Australia (\(n = 121\)), United States (\(n = 84\)), United Kingdom (\(n = 26\)), Canada (\(n = 12\)), New Zealand (\(n = 9\)), Germany (\(n = 3\)), two each from Ireland and Turkey, one each from China, Colombia, Iran, Japan, Luxemburg, Spain, Trinidad and Tobago, and three people who did not provide that information. In terms of sex assigned at birth, 150 (56.1%) participants reported being assigned female at birth (AFAB), 113 (42.7%) reported being assigned male at birth (AMAB), and three (1.1%) reported being intersex/other. This was a more even AFAB:AMAB ratio (1.3:1) than reported by previous studies, which was typically from 2:1 (Hyde et al., 2014) to 3:1 (Couch et al., 2007; Ho & Mussap, 2016).

Measures

Although the Gender Unicorn (Pan & Moore, 2014) consists of five constructs, only two – gender identity and sex assigned at birth – were included in the GIS. Gender expression was not included as, although it may be a way of communicating gender, it may not be consistent with gender roles and may not necessarily be reflective of a person’s gender identity (American Psychological Association, 2010). Physical and emotional attractions are concepts related to sexuality rather than gender, and so were not used in this study (American Psychological Association, 2010; Pan & Moore, 2014).

The resultant GIS thus measured gender identity by asking “How much do you identify with the following genders?” and used the three dimensions of
female/woman/girl, male/man/boy, and other gender(s). The scales in the Gender Unicorn are not labelled or anchored, and are represented as a continuous line. Each scale in the GIS is anchored with labels to provide guidance for the direction of response from Not at all to Very strongly and points were also numerically labelled (0, 10, … 90, 100) so that responses would more likely be interval-level data (Davies, 2008). Scales were implemented using sliders to convey the concept of continuity from the Gender Unicorn, but the sliders were constrained to only allow input on the labelled points. The scales were therefore 11 point scales, which allow respondents enough options to perceive that they are able to express themselves adequately without decreasing test-retest reliability (Preston & Colman, 2000).

Participants were also asked “How would you usually describe your gender?” and a text field was provided for responses. The GIS asks for sex assigned at birth using the three mutually exclusive categories of female, male, and other/intersex.

Procedure
The Deakin University Human Research Ethics Committee approved this study. Participants for this study were recruited via posts in online support forums, social media, and websites. Examples included: Gender Diversity Australia and Association of Transgender Professionals support forums, and Gender Queer Australia website. Recruitment also utilised physical notices placed in the clubrooms of university lesbian, gay, bisexual, transgender, and intersex (LGBTI) clubs and associations, and encouraged peer referral to the study. The study was advertised as being open to adults (18 years of age or older) who self-identified as trans or gender diverse. Advertisements directed
participants to an online survey that they could complete after: (a) reading the
plain language statement, (b) providing consent, (c) confirming that they were
over the age of 18 years, and (d) confirming that they identify as trans or gender
diverse. Age and gender identity were thus the only inclusion criteria.

Analytic Design

An LCA of participant responses, using R (Version 3.2.5; R Core Team,
2016) with packages psych (Version 1.6.12; Revelle, 2016) and mclust (Version
5.2; Fraley, Raftery, Murphy, & Scrucca, 2012), derived classes based on similar
patterns of responding. LCA does not make assumptions concerning the nature of
observed variables that are inputted into the model (it is non-parametric),
requiring only independence of observations between classes (Oberski, 2016).
Tein, Coxe, and Cham (2013) note that the minimum sample size requirements
for LCAs is understudied and the risk of underpowered studies is that the number
of classes extracted is less than the true number of classes in the data. The
Bayesian Information Criterion (BIC) was therefore used for potential solutions to
determine the number of classes to extract.

The presence of predicted gender classes in the results of the LCA was the
test for hypotheses H1, H2, and H3. For example, according to H1 the LCA
should identify classes of “binary” participants (i.e., participants who identify
exclusively with the “female/woman/girl” or “male/man/boy” dimensions of the
GIS). Failure to do so, particularly given previous research documenting the
prevalence of these binary gender identities in the TGD community (Riggs &
Due, 2013), would result in the rejection of H1 and a reconsideration of the GIS
and/or or methodology. Similarly, a failure to identify participants who do not
identify with any GIS dimensions (H2) or with a combination of several
dimensions (H3), would result in the rejection of these hypotheses. Such an outcome would be at odds with current understanding of gender diversity (Pan & Moore, 2014; Riggs & Due, 2013).

The following procedure tested hypotheses H4 and H5. Participant responses to the open-ended question asking them to describe their gender in their own words determined their assignment to the following groups:

1. “Binary” labels such as *male, man, guy*, or *boy*.
2. “Binary” labels such as *female, woman*, or *girl*.
3. Non-binary but relatively specific labels such as *transfemme, transmasc, agender, or neutrois* (Gender Spectrum, n.d.; gqid, 2015)
4. Umbrella terms such as *genderqueer, transgender, non-binary* (Gender Spectrum, n.d.; gqid, 2015), or statements that gave no clear indication of gender such as “I don’t.”

A Chi-square test compared the prevalence of groups 1 and 2 (individually) across the classes identified by the LCA. A Fisher’s Exact test was used if the Chi-square assumption was violated, such as when any of the frequencies were less than five. A non-significant result for either of these two groups would suggest that the usage of the “binary” is not dependent upon the genders identified by the GIS, and that hypothesis H4 should be rejected. An odds ratio for the usage of these “binary” labels that was not in favour of the relevant “binary” classes identified by the LCA also indicated that hypothesis H4 should be rejected.
A binomial test, to determine if the proportion of people using umbrella terms was greater than zero in more than one of the classes identified by the LCA, was the test for hypothesis H5. Failure of the test would indicate that the umbrella labels had a more precise meaning than predicted and that hypothesis H5 be rejected.

If participants responded with more than one gender label, the order of the four groups listed above determined their group assignment. For example, if participant responded genderqueer man, then the use of the man label meant an assignment to group 1. This strategy had the advantage of increasing the frequency of “binary” labels appearing in all the non-binary classes identified by the LCA, therefore making the Chi-square test less likely to pass. It simultaneously reduced the frequency of umbrella labels, therefore making the binomial test more difficult. This provides greater confidence that any significant results were not due to confirmatory bias. This strategy does not imply that resultant group assignment was representative of their gender or should supersede their own original designation of gender in any way.

The label used by each participant in group 4 was compared with known definitions (Gender Spectrum, n.d.; gqid, 2015) to explore the match between current definitions, the classification by the LCA, and the response to the GIS. This analysis is not part of a specific hypothesis, but it provides rich qualitative data regarding how responses to the GIS relate to current usage of gender labels.

**Results**

Responses to the GIS are plotted as a three-dimensional scatterplot with each axis of the plot corresponding to a subscale within the GIS (Figure 2). Note that due to overlapping responses each data point is numbered to indicate how
many participants correspond to that point. Visual inspection of Figure 2 indicates that while each subscale was fully utilized across participants (i.e., responses to each ranged from 0 to 100) combinations of gender dimensions (that presumably corresponded to a participant’s gender identity) were asymmetrical, with no participants identifying very strongly with all three genders. The most common response was to identify exclusively with one dimension of the gender “binary”: female/woman/girl or male/man/boy. However, many participants clearly identified with a non-binary gender, including people who identified with no gender at all and might be categorised as agender, and those who had a strong sense of gender but one that could not be located in the female-male plane.

Responses were separated out and plotted according to sex assigned at birth and, as shown in Figure 3, the identities of AMAB participants appear to cluster towards a binary female/woman/girl identity. AFAB participants appear to have a greater range of gender identities with more participants identifying moderately or highly with a gender that aligns with their sex assigned at birth or with other. There were thirty percent more AMAB participants than AFAB participants, but more than twice as many people identified as a binary female/woman/girl gender compared to a binary male/man/boy gender.
Figure 2. Self-reported gender identity of participants plotted in 3-dimensional space with each axis representing one of the gender dimensions. Numbers represent how many people identify with the gender represented by that point.

An LCA was then used to identify classes of participants on the basis of their pattern of responding to the three gender identity questions contained in the GIS. Figure 4 shows that the best model according to the Bayesian Information Criterion (BIC) is a seven class solution with covariances that have equal volume, equal shape, and varying orientation. Figure 5 shows the classification for each response point. Groups were numbered as shown in Table 1 with descriptive labels based on the scale means for each classification as shown in Figure 6.
Figure 3. Plots of gender identity by sex assigned at birth. Upper diagonal is for people who were assigned male at birth. Lower diagonal is for people who were assigned female at birth.
Figure 4. Bayesian Information Criterion for mclust models versus the number of classes extracted for the LCA. Each line and symbol represents a different parameterization of the covariance matrix, where each letter describes the volume, shape, and orientation of the covariance structure. I = Identity matrix, E= Equal, V = Variable. Parameterizations ending with II therefore have spherical distributions, those ending with EI or VI have diagonal distributions, and those ending with E or V have ellipsoidal distributions.
Table 1.
Descriptive classifications with total number of assigned-female-at-birth (AFAB), assigned-male-at-birth (AMAB), and intersex participants

<table>
<thead>
<tr>
<th>Class</th>
<th>n AFAB</th>
<th>n AMAB</th>
<th>n intersex</th>
<th>n total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (+) GIS_woman</td>
<td>7</td>
<td>126</td>
<td>2</td>
<td>135</td>
</tr>
<tr>
<td>2. (▲) GIS_man</td>
<td>58</td>
<td>0</td>
<td>1</td>
<td>59</td>
</tr>
<tr>
<td>3. (□) GIS_other</td>
<td>18</td>
<td>3</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>4. (●) GIS_(woman)+(other)</td>
<td>9</td>
<td>8</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>5. (x) GIS_man+other</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>6. (■) GIS_woman+(other)</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>7. (○) GIS_none</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. Symbols correspond to the classes in Figure 3.

Figure 5. Classifications from latent class analysis with covariances of components superimposed.
Figure 6. Plots of mean GIS dimension scores for each category identified by the LCA. Error bars are for the standard error of the mean. For each plot, M = male/man/boy dimension, W = female/woman/girl dimension, O = other gender(s) dimension.
The names of the classes identified by the LCA in Table 1 are descriptive of the GIS dimensions with which participants in that class tended to identify. It is important to note that not everyone in each class described their gender using the name of that class. Therefore, the names are not representative of the genders in that class and it would misgendering to say, for example, that the GIS_man class was a group of men. It would be more accurate to say that the GIS_man class was a group of people who tended to highly identify with the male/man/boy dimension of the GIS and low with all the other dimensions.

The GIS_woman, GIS_man, and GIS_other classes appear to be made up of people who identify highly with only a single GIS dimension. The GIS_(woman)+(other), GIS_woman+(other), and GIS_man+other categories appear to be made of people who identify with a combination of dimensions. The GIS_none category appears to be made up of people who have a very low identification with all the dimensions, although the standard error for the male/man/boy dimension is notably large for that class.

Participant’s textual response for the description of their gender determined their assignment to groups, as detailed in the analytic design. The resultant contingency table (Table 2) allowed the combination of columns to create further contingency tables to compare how many people used a man-type label versus how many did not, and how many people used a woman-type label versus how many did not. A full list of the labels that people used (Figure 7) shows that more people used non-binary or umbrella labels than accounted for in the contingency table. Their use of another term meant their allocation to one of the “binary” groups to maintain independence between groups.
Table 2.

Contingency table of participants with rows categorized by the LCA identified classes and columns categorized by assigned group based on the terms in the label used by participant to describe their gender identity.

<table>
<thead>
<tr>
<th>Class</th>
<th>Man</th>
<th>Woman</th>
<th>Umbrella</th>
<th>Non-Binary Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS_woman</td>
<td>0</td>
<td>105</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>GIS_man</td>
<td>49</td>
<td>0</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>GIS_other</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>GIS_(woman)+(other)</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>GIS_man+(other)</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>GIS_woman+(other)</td>
<td>0</td>
<td>8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>GIS_none</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. Column labels are not indicative of the participant’s own designations of gender and are only for the analysis of language as described in the text.

Table 2 shows that four classes had no people use a man-type label and only one person in the GIS_none class used a man-type label. A generalisation of the Fisher’s Exact test with all the classes showed that the proportion of people using the man-type label significantly differed by class ($p < .001$). A Fisher’s Exact test comparing the GIS_man and GIS_none class showed that people in the GIS_man class were significantly more likely to use the man-type label ($p < .001$, $OR = 42.88$). A Chi-square test with Yates’ continuity correction comparing the GIS_man and GIS_man+(other) class showed that people in the GIS_man class were significantly more likely to use the man-type label ($\chi^2(1, N = 75) = 13.64$, $p < 0.001$, $OR = 9.63$).
<table>
<thead>
<tr>
<th><strong>GIS_man</strong></th>
<th><strong>GIS_woman</strong></th>
<th><strong>GIS_other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male / man / guy (31)</td>
<td>FTM (7)</td>
<td>Female / woman (71)</td>
</tr>
<tr>
<td>Trans guy/man/male (14)</td>
<td>Transmasculine (5)</td>
<td>Trans/transgender</td>
</tr>
<tr>
<td>Non-binary (4)</td>
<td>Agender (4)</td>
<td>woman/female/girl (29)</td>
</tr>
<tr>
<td>Trans / transgender (3)</td>
<td>Masculine (2)</td>
<td>Transgender / trans (7)</td>
</tr>
<tr>
<td>Demiboy (1)</td>
<td>Genderqueer (1)</td>
<td>Mostly female (2)</td>
</tr>
<tr>
<td>Demiflux (1)</td>
<td>Queer (1)</td>
<td>Non-binary (2)</td>
</tr>
<tr>
<td>… of/with trans experience (3)</td>
<td></td>
<td>Feminine (1)</td>
</tr>
<tr>
<td>“Male with transsexual history” (1)</td>
<td></td>
<td>Diverse (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>GIS_man+(other)</strong></th>
<th><strong>GIS_woman+(other)</strong></th>
<th><strong>GIS_none</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Genderqueer (5)</td>
<td>Non-binary (5)</td>
<td>Agender (4)</td>
</tr>
<tr>
<td>Male / man (2)</td>
<td>Trans man/boy (2)</td>
<td>Non-binary (2)</td>
</tr>
<tr>
<td>Trans masculine (3)</td>
<td>Non-binary boy/boi (1)</td>
<td>Null gender (1)</td>
</tr>
</tbody>
</table>

**Figure 7.** Summary of terms that participants used to describe their gender and grouped according to LCA class. Participants may have used more than one term each.
Table 2 shows that four classes had no people use a woman-type label and only four people in the GIS_(woman)+(other) class used a woman-type label. A generalisation of the Fisher’s Exact test with all the classes showed that the proportion of people using the woman-type label significantly differed by class ($p < .001$). A Fisher’s Exact test comparing the GIS_woman and GIS_(woman)+(other) class showed that people in the GIS_woman class were significantly more likely to use the woman-type label ($p < .001$, $OR = 11.77$). A Chi-square test with Yates’ continuity correction comparing the GIS_woman and GIS_woman+(other) class showed that the proportion of people using a woman-type label did not significantly differ according to class ($\chi^2(1, N = 145) < 0.01$, $p = .96$, $OR = 1.36$).

An investigation into the usage of labels by people in the GIS_woman+(other) class found that only two people used woman-type labels without any modifiers and, out of those two, only one person used a woman-type label (“Female”) as their sole description of gender. All the other seven people used a trans or transgender qualification such as “Transgender Woman” and one person described their gender as “woman or trans woman.”

The results of the binomial tests (Table 3) showed that, in all but the GIS_man class, the proportion of people using umbrella terms was significantly greater than .001. Binomial tests cannot fail with a true value of zero, hence the value of .001 is used to test if the proportion of people using umbrella terms was significantly greater than zero.
Table 3.

*Results of a binomial test to determine if the proportion of umbrella term usage is greater than .001 for each class.*

<table>
<thead>
<tr>
<th>Class</th>
<th>$n$ true</th>
<th>$n$ trials</th>
<th>Proportion</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS_woman</td>
<td>15</td>
<td>134</td>
<td>.11</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>GIS_man</td>
<td>1</td>
<td>57</td>
<td>.02</td>
<td>.06</td>
</tr>
<tr>
<td>GIS_other</td>
<td>15</td>
<td>21</td>
<td>.71</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>GIS_(woman)+(other)</td>
<td>9</td>
<td>17</td>
<td>.53</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>GIS_man+(other)</td>
<td>8</td>
<td>18</td>
<td>.44</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>GIS_woman+(other)</td>
<td>1</td>
<td>11</td>
<td>.09</td>
<td>.01</td>
</tr>
<tr>
<td>GIS_none</td>
<td>3</td>
<td>8</td>
<td>.38</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

Note. A *true* for the binomial test is someone who only used an umbrella term. People who used an umbrella term in combination with a specific term (e.g. genderqueer woman) were not counted as *true*.

Participants used non-binary but specific labels (Table 4) in ways that were consistent with current definitions (gqid, 2015; Micah, 2016; ShineSA, 2017). One participant in the GIS_woman class identified as a lesbian, which is a sexual orientation rather than a gender identity. It does have implications regarding gender, however, which are consistent with their responses to the GIS. The LCA potentially misclassified three participants in the GIS_woman class, who identified as bigender or non-binary transmasculine, but whose gender descriptions are consistent with their responses to the GIS. The LCA also potentially misclassified two participants in the GIS_man class who identified as agender, but their gender descriptions are also consistent with their responses to the GIS.
Table 4.

Responses to GIS and descriptions of gender for participants who used non-binary but relatively specific labels for descriptions of their gender. Participants are grouped by the assigned class from the LCA.

<table>
<thead>
<tr>
<th>Man</th>
<th>Woman</th>
<th>Other</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS_woman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>100</td>
<td>0</td>
<td>Transgender lesbian</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>0</td>
<td>Bigender</td>
</tr>
<tr>
<td>30</td>
<td>90</td>
<td>0</td>
<td>Feminine (tomboyish)</td>
</tr>
<tr>
<td>20</td>
<td>80</td>
<td>0</td>
<td>Two Spirited</td>
</tr>
<tr>
<td>80</td>
<td>40</td>
<td>0</td>
<td>Non binary transmasculine Gender fluid, mostly female but residual maleness</td>
</tr>
<tr>
<td>20</td>
<td>80</td>
<td>0</td>
<td>Mostly female</td>
</tr>
<tr>
<td>10</td>
<td>90</td>
<td>0</td>
<td>androgynous</td>
</tr>
<tr>
<td>0</td>
<td>70</td>
<td>0</td>
<td>Bi-gender</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>0</td>
<td>Crossdressing</td>
</tr>
<tr>
<td>30</td>
<td>70</td>
<td>0</td>
<td>Elegantly feminine</td>
</tr>
<tr>
<td>0</td>
<td>100</td>
<td>0</td>
<td>Mostly female</td>
</tr>
<tr>
<td>20</td>
<td>80</td>
<td>0</td>
<td>Masculine</td>
</tr>
<tr>
<td>40</td>
<td>60</td>
<td>0</td>
<td>Crossdressing</td>
</tr>
<tr>
<td>GIS_man</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>30</td>
<td>agender</td>
</tr>
<tr>
<td>80</td>
<td>20</td>
<td>0</td>
<td>Transmasculine</td>
</tr>
<tr>
<td>70</td>
<td>20</td>
<td>10</td>
<td>Trans-masculine</td>
</tr>
<tr>
<td>90</td>
<td>0</td>
<td>20</td>
<td>Masculine</td>
</tr>
<tr>
<td>30</td>
<td>10</td>
<td>50</td>
<td>Demiflux or agender.</td>
</tr>
<tr>
<td>80</td>
<td>0</td>
<td>10</td>
<td>Transmasculine</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>0</td>
<td>Transmasculine</td>
</tr>
<tr>
<td>GIS_other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>80</td>
<td>Genderless or agender</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>100</td>
<td>Neuter</td>
</tr>
<tr>
<td>0</td>
<td>60</td>
<td>40</td>
<td>Nonbinary Demigender femme</td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>Woman</td>
<td>Other</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>0</td>
<td>10</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>0</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
</tbody>
</table>

**GIS_(woman)+(other)**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>60</td>
<td>50</td>
<td>50</td>
<td>transfeminine, genderqueer</td>
</tr>
<tr>
<td>10</td>
<td>80</td>
<td>30</td>
<td>30</td>
<td>Non binary femme</td>
</tr>
<tr>
<td>60</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>some days i feel a lot more feminine than other days</td>
</tr>
<tr>
<td>10</td>
<td>60</td>
<td>70</td>
<td>70</td>
<td>agender/genderfluid/demigirl</td>
</tr>
</tbody>
</table>

**GIS_man+(other)**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>Trans Masculine</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>70</td>
<td>70</td>
<td>Transmasculine nonbinary</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
<td>70</td>
<td>70</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

**GIS_woman+(other)**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>80</td>
<td>50</td>
<td>50</td>
<td>a bit of both</td>
</tr>
<tr>
<td>40</td>
<td>80</td>
<td>70</td>
<td>70</td>
<td>Trans - femme</td>
</tr>
</tbody>
</table>

**GIS_none**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Nope! (agender/null gender)</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Agender</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Agender</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Agender, nonbinary</td>
</tr>
</tbody>
</table>
Discussion

The results confirmed that the gender identity dimensions of the Gender Unicorn could be operationalised in the form of a Gender Identity Scale and used to measure gender in a TGD population. Analyses of patterns of responses to the GIS revealed seven gender classes. There were classes in which there was high identification with only of one each of the three dimensions. There were also classes corresponding to identification with more than one dimension— combinations with the dimension for other gender(s) in particular. This suggests that the other gender(s) dimension is important and that ignoring this dimension would lead to incorrect conclusions about participants’ genders.

There was also a class corresponding to low identification with all of the gender dimensions. This suggests that some participants would not be able to record their gender correctly using older systems that represent man and woman as opposites on a single continuum. The genders of some participants therefore do vary independently on the different dimensions. The multi-dimensional system of measuring gender therefore appears to be useful.

Unsurprisingly, participants used “binary” labels of gender clearly that were consistent with their responses to the GIS. The meaning of the trans- prefix or the transgender label was less clear. The “binary” labels were prioritised to create the test groups but the GIS_woman+(other) class showed that the trans- prefix or the transgender could be an important part of the participant’s identity (Levitt & Ippolito, 2014a) and may be explicitly different to being only a man or woman. The use of these labels in the GIS_man and GIS_woman class alternatively shows that people may use these labels in recognition of their history and/or experiences rather than their identity being any different to a man or
woman (Levitt & Ippolito, 2014a). People therefore use the same labels for different purposes and with different implications. These labels are therefore difficult to interpret without additional information but the responses to the GIS helps to clarify those meanings.

Usage of other non-umbrella labels appeared to be consistent with responses to the GIS and occurred even within the GIS_man and GIS_woman class. This demonstrates the continuous nature and lack of boundaries between genders as people’s identities move away from the gender binary. People may still have a leaning towards one side of the binary without totally relating to it. Participants may use terms such as demi-boy and demi-girl (M. J. Barker & Richards, 2015) or transmasculine and transfeminine (ShineSA, 2017) to describe these identities. These genders represent people who do not identify completely with a binary gender (gqid, 2015). There is otherwise no hard line or definition that a person crosses where they must identify as a man or woman versus demi- or trans-. This reinforces the difficulty of classifications via labels and the importance of not using the LCA class names as designations of gender. This also reinforces the usefulness of the GIS in clarifying the meaning of labels.

Similarly, people who have a neutral gender may identify as neutrois or neutral (Micah, 2016), but there is overlap where people could identify as neutrois versus demi-. The overlap means that people may use different labels but respond in the same way to the GIS, or they may use the same label but respond differently to the GIS. Manual groupings based on these labels may therefore be erroneous and the GIS can again provide clarity.

Participants used umbrella terms across most of the classes. This highlights the difficulty of grouping people based on umbrella terms such as
transgender or genderqueer. The GIS (and the LCA) is able to distinguish between different types of genderqueer and non-binary genders. The GIS therefore respects the great diversity of gender identities, but still maintains clarity without forcing participants to utilise language with which they may not be comfortable.

Inconsistent use of gender terminology was particularly evident with participants who did not identify with any gender at all. Agender is potentially an ambiguous term as it may also mean a neutral gender rather than an absence of gender (Micah, 2016) but some community groups do define it solely as having no gender (ShineSA, 2017). An identity of agender boy would appear to be contradictory using the latter definition, yet it would be reasonable under the former definition – even if it still does not provide a clear idea of exactly how someone identifies. The GIS provides the ability to categorise people independently of label definitions. Even though language evolves over time and individuals create new labels to identify with (L. B. Brown, 2016), the GIS would still allow consistent reporting, classification, and identification of the diversity and similarities in gender identities captured.

The GIS also provides a meaningful way to identify gender when participants are unable or unwilling to provide linguistic descriptions. Several participants provided responses that would not be possible to classify based on the written descriptions alone. The results suggest that it would be erroneous to believe that not providing a specific label is indicative of similar gender identities. If gender was a grouping variable, without the GIS, researchers may improperly allocate these participants or exclude their valuable input from the research.
Researchers must consider the implications of assigning people to groups that may be incongruent with their self-designated label, (e.g. placing someone who identifies as a man into a group in which all the other members identify as genderqueer). It is important to recognise the context and limitations of the classification and to remember that self-designated identities are not invalid—they are only inadequate for the purpose of group comparisons. Researchers therefore need to be careful not to misgender participants by naming groups with labels that misgender their members, (e.g. “the masculine genderqueer group”). It is for this reason that this study uses descriptive labels for the classes rather than using specific gender identities. It is important to reinforce that the names of the classes are not the gender of the people within that class, but are representative of their responses to the GIS.

**Limitations / Considerations**

A potential complication to the interpretation of the results is the way participants understand the construct of gender and how that might have then influenced their interpretation of the questions on the GIS. Some participants may have explicitly viewed the scales as in competition with each other, so that they were unable to identify highly on more than one. In this interpretation, gender would have a “limited capacity” and if one were to identify highly on one scale, then they would have to reduce their identity on another.

The formatting of the survey may have contributed to or reinforced this interpretation. The dimensions are numbered from 0 to 100 to help reinforce that it was a continuous construct, rather than categorical. The numbers also reinforce the labels, where 0 was labelled *Not at all* and 100 was labelled *Very strongly*. Participants may have interpreted these as overall percentages however, and
therefore adjusted their overall identity such that all their responses added up to 100. This may introduce ambiguity for some responses. Participants who have the same gender may have responded differently to the GIS based on differences in their belief that the scores need to sum to 100.

If participants view gender as having a fixed quantity (of 100 percent), then they may also misinterpret the other gender(s) dimension. For example, examining the response of “genderqueer/neutrois/agender” where the participant has responded 0 to male/man/boy, 10 to female/woman/girl, and 90 to other gender(s), there are two possible explanations or reasons for that response. The first is that the participant interprets neutrois, agender to mean a neutral gender that exists outside of the traditional binary, and they identify highly with that gender. An alternative is that the person identifies as almost genderless and they identify highly with being genderless. They therefore misinterpreted the other gender(s) dimension as being a “filler” category, to allow scores to sum to 100, rather than a gender that exists outside of the male/female binary.

The creators of the Gender Unicorn did not intend these limitations, as evidenced by an example they provide where multiple dimensions are marked highly. The dimensions on the original infographic are not numbered nor anchored with labels, but were added in line with best practice for psychological instruments (Preston & Colman, 2000). These particular numbers, however, may be confounding. It would be advisable, in the future, to utilise a straightforward numbering scheme with a different number of points, such as 0 to 8, so that the implication of summing to 100 percent is not present. It may also be useful to explicitly state that participants may identify highly on more than one dimension,
or very low on all the dimensions. A short explanation of the other gender(s) dimension may also be helpful in reducing confusion.

The method for querying gender may have been confusing and a potential confound for people who identify as genderfluid. The query did not specify a timeframe and the implementation of each dimension accepted only a single response. Future versions of the scale should therefore specify a time point, such as “right now.” Future research could also explore the change and diversity of genderfluid identities by allowing participants to designate a range that they identify with.

**Conclusion**

This study highlights the potential of the GIS as a measure of gender identity that allows researchers to collect gender identity information from participants in a manner that is not reliant on labels and that does not misgender them. Researchers can present the diversity and range of gender identities of participants without needing to summarise lists of self-designated labels. This will facilitate the accurate capturing of gender information during the development of the TSA scale and during the feasibility trial of the intervention for anxiety. However, there was also evidence that the numerical anchors of the scale used in this study and the interpretation of the other gender(s) dimension introduces potential confounds. Some straightforward changes in subsequent iterations of the GIS could address these issues, but the GIS will be used in its current form for this thesis to maintain the consistency in instruments and reporting between studies.
Chapter 3

The creation of a typology of social situations

The social stressors that trans and gender diverse (TGD) people commonly encounter in the form of pervasive discrimination, prejudice, hostility, transphobia, and marginalization is well documented in research literature (G. R. Bauer et al., 2009; Bockting et al., 2013; Couch et al., 2007; Grant et al., 2011b). Remembering that expectable responses to common stressors do not constitute a mental disorder (American Psychiatric Association, 2013), it is important to therefore avoid unnecessary and unfair pathologising of TGD clients in relation to their psychological responses to these stressors.

This is not to suggest that TGD people would not benefit from clinical assistance. On the contrary, the DSM-5 states that treatment can be warranted despite the lack of a mental disorder, and suggests considering factors such as symptom salience, severity, and patient distress to determine need (American Psychiatric Association, 2013). Viewed in this context, the modifications that many TGD people make to daily activities as a result of fear of discrimination from society (Couch et al., 2007), together with the stigma and poor mental health outcomes (Bockting et al., 2013), may indeed constitute a level of salience, severity, and distress worthy of clinical intervention. Ideally the social factors themselves, the sources of discrimination and hostility, would be addressed first rather than the responses of TGD people. Pragmatically, social progress is relatively slow and unpredictable, while TGD people deserve to live fulfilling social lives now.

The premise of the present research is to devise an evidence based intervention to assist TGD people with difficulties they may be experiencing in
social situations, cope effectively with potential discrimination, and assist them to live lives worth living, without unduly pathologising them. Identifying which social situations an individual has difficulties with can assist clinicians in targeting interventions to those situations. Knowing whether difficulties are confined to specific social situations or generalized across multiple social situations can assist clinicians in understanding the severity of the problem and may also serve as a useful outcome measure to track the change in difficulties over time. On these bases it was reasoned that a comprehensive and contemporary typology of potentially difficult situations could therefore be a useful clinical tool in the understanding, prediction, and intervention of problems with TGD clients.

Previously, in the context of SAD, a similar rationale motivated the creation of the Liebowitz Social Anxiety Scale (LSAS), which was designed specifically to cover a broad range of relevant social situations (Liebowitz, 1987). The LSAS originally had subscales for performance and social anxiety, but Holt, Heimberg, Hope, and Liebowitz (1992) demonstrated that the scale was useful in understanding the different situational domains (as opposed to social situations) that people with social anxiety disorder have difficulties with. Situational domains, as developed by Holt et al., are groupings of similar situations, and assist with the understanding of how anxiety generalises within and across domains.

A similar methodology could therefore be utilised when trying to better understand the social situations that may elicit anxiety responses from TGD people. A premise for this study is that TGD people experience invalidation, discrimination, or social sanctions for their gender identity. Fear of experiencing
that again results in anxiety, which we have termed trans and gender diverse social anxiety (TSA). Current models of social anxiety disorder (SAD), however, theorise that people overestimate their anxious appearance based on internal cues and have biased interpretations of external cues to confirm their belief of negative outcomes (Schultz & Heimberg, 2008). These differences mean that TGD people may potentially experience anxiety in different situations and contexts relative to other people with symptoms of SAD, and that the LSAS may therefore not be an appropriate tool to use. This research consequently sought to create a typology that is analogous to the LSAS but that is suitable for use with TGD people.

**Identifying Situational Domains**

In developing a trans and gender diverse social anxiety scale (TSAS), a lesson can be learnt from prior research on the LSAS in identifying the situational domains or factor structure of the scale. The original subscales for performance and social anxiety were conceptually created and not statistically confirmed at the time (Liebowitz, 1987). Subsequent research using a confirmatory factor analysis (CFA) found that the two factor structure postulated by Liebowitz (1987) was a poor fit to observed data (Safren et al., 1999). There has been a pattern in the research where factor structures proposed using exploratory methods, such as exploratory factor analysis, are disconfirmed in subsequent research (Baker, Heinrichs, Kim, & Hofmann, 2002; Forni dos Santos, Loureiro, de Crippa, & de Osório, 2013; Levin, Marom, Gur, Wechter, & Hermesh, 2002; Oakman, Van Ameringen, Mancini, & Farvolden, 2003; Safren et al., 1999). The factor structure of the LSAS therefore remains controversial with a lack of consistency between factor structures proposed by exploratory methods and confirmatory analyses conducted later.
The inability of CFA to confirm the findings of EFA research is not uncommon in psychology and may be due to EFA being a data-driven technique that provides more freedom, and is therefore more liberal, than CFAs (MacCallum & Austin, 2000; van Prooijen & van der Kloot, 2001). The theory-driven approach for a CFA requires researchers to specify factor loadings and justifiable cross-loadings. Residual associations that occur within an EFA do not occur, which may therefore contribute to a CFA rejecting prior models (Byrne, 2005; Marsh, Morin, Parker, & Kaur, 2014). Given that a CFA is more rigorous than an EFA (Byrne, 2005) and is less likely than EFA to take advantage of chance characteristics in the data (Fabrigar, Wegener, MacCallum, & Strahan, 1999), it is therefore a preferable method where an a priori model can be specified.

To develop an a priori model for the TSAS, prior theories of anxiety were examined that suggest that anxiety is a developed response—whether by classical conditioning (Lissek et al., 2014), pessimistic beliefs about external events (Grupe & Nitschke, 2013), or beliefs about one’s own adequacy in a situation (Clark & Wells, 1995). According to Brofenbrenner’s social ecological theory, interactions in the immediate external environment are fundamental to human development, but these processes vary in a spatial context (Tudge, Mokrova, Hatfield, & Karnik, 2009). Differences in spatial context could therefore be a way to define different situational domains; close personal relationships would be closest in context while general social interactions would be farther away.

TGD people may have fears about how people close to them will react to their gender identity, especially if their fears are materialised by a loss of support from family members, close friends or romantic partners (Budge, Katz-Wise, et
Perceptions of loss of social support has a significant association with anxiety in TGD people (Budge, Adelson, & Howard, 2013). This highlights the importance of close relationships and supports the idea that close personal relationships are an important unique social domain, especially in regards to reactions to disclosure about gender identity.

Ambiguity in feedback and interactions could also increase with social distance. Members of both majority and minority groups tend to exhibit threat responses to social rejection. Attributional ambiguity means that people in minority groups also tend to exhibit threat responses to positive feedback from majority groups due to a doubt of the sincerity of the feedback (Mendes, McCoy, Major, & Blascovich, 2008). This type of attributional ambiguity may be more likely to increase as social distance increases and interactions become briefer, which provides less opportunity to clarify any ambiguity. Positive behaviours or expressions, such as stares or smiles, could be interpreted as hiding transphobic thoughts and used as further evidence of danger to reinforce beliefs underlying anxiety. For this reason, general social interactions are a potential situational domain.

One context where TGD people might expect to be able interact without discrimination is within the LGBT community. Some LGB people hold transphobic attitudes (Stone, 2009; Weiss et al., 2003) however, and the transgender community contains its own hierarchical prejudice (Angel, 2013; Gabriel, 2014) with conflict over who is included and excluded by the transgender umbrella (Davidson, 2007). It is unsurprising therefore, that some TGD people would feel unsafe in such situations (Grossman et al., 2011). These experiences
could lead to expectations of negative experiences with resulting anxiety and avoidance of interaction with other LGBT people. Given that community connection is a resilience strategy (Singh et al., 2011), this may even lead to difficulties in forming new relationships when people are unable to turn to those who would normally be expected to be the most supportive. Interaction with the LGBT community is therefore another important situational domain.

Although transphobia may be one reason for the marginalisation of TGD people, they can also be marginalised through systematic and institutional erasure by managing trans and gender diversity in a way that ultimately inscribes it as impossible or invalid (Namaste, 2000). This happens in a very salient way when TGD people try to access health care. It may be due to lack of the educational information available to practitioners which results in them being unprepared to assist or insensitive to client needs (G. R. Bauer et al., 2009; D. B. Hagen & Galupo, 2014). This may also lead to what is colloquially referred to as the “Trans broken arm syndrome” in which everything, from mental health to literally a broken arm, is blamed on gender identity and/or hormone therapy (O’Hara, 2015; Payton, 2015). Approval for medical procedures can be tied to sex designations, which may leave TGD people unable to access procedures that are not aligned with their gender identity, and it can put them in uncomfortable positions when accessing services in sex-segregated clinics (G. R. Bauer et al., 2009; Dispenza et al., 2012). People may therefore be required to choose between difficult, anxiety provoking situations or forgoing the services they seek. Access of health services are therefore an important context to consider due to sex or gender often being made salient.
Institutional discrimination can also be enforced via authoritative structures where TGD people are denied permission based on their gender identity. This may happen when dealing with explicit authorities such as the police, or bureaucratic authorities such as when seeking to change documentation, applying for jobs, or applying for housing (Couch et al., 2007). Workplaces without established protections or policies may cause problems for those intending to transition at work (Brewster, Mennicke, Velez, & Tebbe, 2014). A common feature of these situations is the power differential that places TGD people in a subordinate position. Inducing these differentials in power can lead to a reduced sense of agency or personal control (Obhi, Swiderski, & Brubacher, 2012), which is a large vulnerability factor for anxiety disorders (Gallagher, Bentley, & Barlow, 2014). Contexts that involve power differentials are, for this reason, an important situational domain to consider.

These five domains of interaction potentially make unique contributions to anxiety for TGD people. These domains could therefore be underlying factors in a scale designed to measure TSA and were consequently utilised as the foundation upon which the TSAS was developed.

These domains are:

1. Close personal relationships
2. General social interaction
3. Authoritarian interactions
4. Interaction with the LGBT community
5. Accessing health services.
Development Process

An integrative approach to scale development was utilised combining aspects of a rational-theoretical approach and a factor-analytic approach. Simms (2008) stated that a rational-theoretical approach requires the developer to write questions that appear consistent with their theoretical understanding of the target construct but in its pure form, without regard to psychometric properties. Alternatively, a factor-analytic approach uses a factor analysis to identify dimensions with internal consistency, but lacks theory to label the resultant dimensions. An integrative approach avoids the shortcomings of poor construct and discriminant validity of a pure rational-theoretical approach while also avoiding the lack of theoretical basis for dimensions in a factor-analytic approach (Simms, 2008). As recommended by Simms (2008), the scale development process originally described by Loevinger (1957) was followed.

Substantive validity phase.

A literature search was performed to identify previous attempts at conceptualising and measuring social anxiety specific to TGD people (Simms, 2008). The electronic databases Academic Search complete, LGBT Life with Full Test, Medline Complete, PsycArticles, PsycExtra, Psychology & Behavioural Sciences Collection, PsycINFO, and SCOPUS were searched using the search term: “social anxiety” or “social phobia” AND transgender or transsexual or transexual or “gender variant” or “gender non-conforming” or “gender diverse”. Twenty six articles were obtained, 25 of which explored social anxiety using existing measures for SAD. One article presented the development of the Gender Minority Stress and Resilience (GMSR) measure (Testa, Habarth, Peta, Balsam, & Bockting, 2015) that covered experiences of discrimination, rejection,
victimisation, and non-affirmation of gender identity. The GSMR does not explicitly measure anxiety in different situations, with discrimination, rejection, and victimisation questions requiring a yes/no response depending on whether they had been experienced at all in the past. Current difficulties across different social situations and domains were not captured in the same way that the LSAS captured difficult situations for people with SAD. This literature search failed to provide evidence for a measure of the specific type of social anxiety that we named TSA. There was, therefore, a potential need for such a scale to be created. Given that the TSAS is conceptually based on the LSAS, but in a different context, and that the self-report version of the LSAS has been shown to have good psychometric properties (Baker et al., 2002), it was decided that the TSAS would utilise the same response format. Each situation would therefore be rated on a fear scale and an avoidance scale using a four point Likert scale. Ratings on the fear scale were coded from 0 to 3 that corresponded to the level of fear being none, mild, moderate, and severe. Avoidance ratings were also coded from 0 to 3 and corresponded with the amount of avoidance being never, occasionally, often, and usually.

A pool of items was created and sent out for expert review (Simms, 2008), with the review group ultimately consisting of: a medical practitioner; a clinical psychologist; a general psychologist (all three of whom work with TGD clients); two transgender women who served on committees for advocacy of TGD people; a transgender woman who served on the committee of an online gender diverse support group; a trans man who formerly lead a support group for TGD youth; and, a focus group consisting of seven trans men.
Feedback and discussions with members of the review group resulted in some items in the pool being modified, others deleted, and some new items were also created. The final pool of items utilised in the structural validity phase, and the situational domain they were hypothesised to belong to, is shown in Table 5. Domain headings were not used as part of the administered scale and are only included here for clarity.

As noted earlier, identifying the prevalence of anxiety across different domains for a particular individual would be useful in clinical practice. However, the use of an overall scale score, for hypothesis testing or identifying severity of overall TSA, would also be useful. Psychological measures that are hypothesised to cover related domains, such as the LSAS, are often also intended to assess a single general construct (F. F. Chen, West, & Sousa, 2006). It is therefore argued that modelling measures as simply unidimensional or multidimensional is the wrong approach, and that use of a bifactor model is a better approach (Reise, Moore, & Haviland, 2010).

The TSAS was conceived to be a measurement of a type of social anxiety, specific to TGD people, and is therefore consistent with a unidimensional latent structure. Perfectly unidimensional data is extremely unlikely in practice and multidimensional models are therefore often proposed as alternative models (Reise et al., 2010). In this case, the TSAS was also constructed with five different domains in mind, which is consistent with multidimensional latent structures.

Three types of multidimensional structures are proposed as possible alternatives. One type is a correlated traits model in which the theoretical domains are correlated with each other. There is no one common dimension,
however, so use of the scale as a single measure would need to be argued for based on the correlation between the factors (Reise et al., 2010). This is inconsistent with the previous discussion regarding TSA.
Table 5.

*TSAS items*

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Close personal relationships</strong></td>
</tr>
<tr>
<td>1</td>
<td>Engaging in sexually intimate activity</td>
</tr>
<tr>
<td>2</td>
<td>Coming out to a friend or family member</td>
</tr>
<tr>
<td>3</td>
<td>Revealing your trans or gender diverse status to a cisgender romantic partner / lover</td>
</tr>
<tr>
<td>4</td>
<td>Meeting the parents or friends of a cisgender romantic partner / lover</td>
</tr>
<tr>
<td></td>
<td><strong>General Social Interaction</strong></td>
</tr>
<tr>
<td>5</td>
<td>Interacting with people you don’t know at a (non-trans or gender diverse related) gathering</td>
</tr>
<tr>
<td>6</td>
<td>Interacting with colleagues or classmates</td>
</tr>
<tr>
<td>7</td>
<td>Going to work / school</td>
</tr>
<tr>
<td>8</td>
<td>Voicing your opinion or answering a question at work / school</td>
</tr>
<tr>
<td>9</td>
<td>Talking to a stranger over the phone</td>
</tr>
<tr>
<td>10</td>
<td>‘Coming out’ as trans or gender diverse or transitioning at work or school</td>
</tr>
<tr>
<td>11</td>
<td>Talking with an authority figure (e.g. manager or teacher) at work or school</td>
</tr>
<tr>
<td>12</td>
<td>Interacting with religious people</td>
</tr>
<tr>
<td>13</td>
<td>Going to bars or clubs not advertised as being LGBTI friendly</td>
</tr>
<tr>
<td>14</td>
<td>Catching public transport</td>
</tr>
<tr>
<td>15</td>
<td>Making friends</td>
</tr>
<tr>
<td>16</td>
<td>Attending a job interview</td>
</tr>
<tr>
<td>17</td>
<td>Going out to complete daily errands (e.g. buying groceries)</td>
</tr>
<tr>
<td>18</td>
<td>Shopping for clothes</td>
</tr>
<tr>
<td>19</td>
<td>Walking alone in public (e.g past a building site)</td>
</tr>
<tr>
<td>No</td>
<td>Item</td>
</tr>
<tr>
<td>----</td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>Using public toilets / change rooms</td>
</tr>
</tbody>
</table>

Authoritarian interactions / Power differentials

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Interacting with law enforcement (e.g. police, protective service officers)</td>
</tr>
<tr>
<td>22</td>
<td>Interacting with civilian security guards and bouncers</td>
</tr>
<tr>
<td>23</td>
<td>Interacting with religious leaders (e.g. a chaplain, mullah, monk, rabbi, etc.)</td>
</tr>
<tr>
<td>24</td>
<td>Applying for photo ID / licence / passport</td>
</tr>
<tr>
<td>25</td>
<td>Going through building or airport security / being screened or searched</td>
</tr>
<tr>
<td>26</td>
<td>Providing proof of identity to a bank / business / club / voting</td>
</tr>
<tr>
<td>27</td>
<td>Applying for accommodation</td>
</tr>
</tbody>
</table>

Interaction with the LGBT community

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Interacting with cisgender gay, lesbian, or bisexual people</td>
</tr>
<tr>
<td>29</td>
<td>Attending trans or gender diverse support groups</td>
</tr>
<tr>
<td>30</td>
<td>Attending an LGBTI event</td>
</tr>
<tr>
<td>31</td>
<td>Accessing services for trans and gender diverse people that are advertised under the gay and lesbian umbrella (e.g. gay and lesbian community resource centre)</td>
</tr>
</tbody>
</table>

Accessing health services

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Visiting a health professional (e.g. GP / dentist / hospital) for general health issue</td>
</tr>
<tr>
<td>33</td>
<td>Accessing gender-specific health services (e.g., a woman’s clinic for gynaecological issues or men’s clinic for prostate issues)</td>
</tr>
<tr>
<td>34</td>
<td>Visiting a health professional to seek gender-transitioning medical services (e.g. hormone treatment or gender confirmation surgery)</td>
</tr>
<tr>
<td>35</td>
<td>Visiting mental health practitioners for issues not related to gender identity</td>
</tr>
<tr>
<td>36</td>
<td>Organising health insurance / interacting with health insurance agencies</td>
</tr>
</tbody>
</table>
A second-order model utilizes a second dimension, representing TSA, to represent a common cause that explains the relationships between the underlying first-order factors. There is no direction relationship between TSA and individual items, however, as the relationships are mediated by the first-order factors (Reise et al., 2010). This illustrates an assumption of both the second-order and the correlated traits model that the target latent factor, TSA, consists of commonalities in the domains and not of commonalities in the items.

Alternatively, a bifactor model is proposed where a single general latent factor, TSA, explains what is common amongst all the items, while orthogonal group factors explain additional commonalities amongst domains or subsets of the items. This allows the role of domain factors to be studied independently of the general factor. If domain factors are specified that only reflect the general factor, they can be identified by the resultant loadings onto the domain factor. Such misspecifications are easily missed when modelled as a second-order model (F. F. Chen et al., 2006).

It was therefore hypothesised that the TSAS could be modelled as a bifactor structure with five situational domains that were group factors, and a general factor, TSA, onto which items also load. It was also hypothesized that a bifactor structure would have significantly better fit than alternative single factor, second-order, or oblique single-order factor models.

**Structural Validity Phase**

**Method**

**Participants.** The 215 participants in this study were aged between 18 and 78 years ($M = 38.86$, $SD = 14.99$), although 14 participants did not provide age data. Gender was measured using the previously discussed Gender Identity
Scale (GIS) and, as can be seen in Figure 8, participants reported a wide variety of gender identities although many appeared to identify only with one of the gender binaries. Representation according to sex assigned at birth was fairly even with 119 participants being AMAB, 93 participants being AFAB, and 3 participants reporting being intersex/other. Participants were recruited via posts in online support forums, social media, and websites. Physical notices were placed in the clubrooms of university clubs and associations that had been formed for sex and gender diverse students. Chain sampling was also encouraged. The study was advertised as being open to adults who were trans or gender diverse.

**Figure 8.** Self-reported gender identity of participants.
A majority of participants were born or are currently living in Australia as shown in Table 6. A large number were also born or living in the United States of America, with a smaller number from Canada and the United Kingdom.

Participants were from a wide range of education backgrounds, as can be seen in Table 7. Participant education levels appear to be reasonably comparable with the general population. In Australia, for example, 60.8% of people aged between 20-64 years have a non-school qualification at Certificate III level or above (Australian Bureau of Statistics, 2016) compared to the 55.3% present in this sample. As shown in Table 8, participants have a wide range of employment statuses and there were more participants currently studying than there were with some non-school education, which suggests that a number of participants stopped studying (temporarily or permanently) without completing their degree.
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<th>No. Living Here</th>
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</thead>
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<tr>
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<td>0</td>
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<td>Japan</td>
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<td>Luxembourg</td>
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<td>1</td>
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</tr>
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<td>0</td>
</tr>
<tr>
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<tr>
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</table>
### Table 7.  
*Education level of participants*

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<td>High school graduate (high school diploma or equivalent including GED)</td>
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<tr>
<td>Associate degree in college / university / TAFE (1 or 2 years)</td>
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<tr>
<td>Bachelor's degree</td>
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<td>Honour's degree</td>
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<td>Postgraduate diploma</td>
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<tr>
<td>Doctoral degree</td>
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<tr>
<td>Professional degree (JD, MD)</td>
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</table>

### Table 8.  
*Employment status of participants*

<table>
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<td>Part-time work</td>
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<td>Not employed</td>
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<tr>
<td>Retired</td>
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<tr>
<td>Studying</td>
<td>49</td>
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</tbody>
</table>
Participants were queried about their personal and household incomes to assess their socioeconomic status against the income percentiles for the general population of the country that the participant was living in (Australian Bureau of Statistics, 2015, 2017; United States Census Bureau, 2016a, 2016b). As shown in Figure 9, participants were from a wide range of income statuses. Participants from the lowest personal income quartile in Australia were over represented, while the highest household income quintile in Australia was under represented. Conversely, participants from the USA tended to be from either the highest or the lowest personal income quartile.

Figure 9. Participants according to personal income quartile and household income quintiles (from lowest to highest) for Australia and the United States of America

Measures. Participants were instructed: “Read each situation carefully and reflect on any negative emotions you associate with that situation. If you do not normally experience that situation in your daily life, then try to imagine that situation (How do you think it would affect you emotionally? Would you avoid that situation?). Please base your ratings on the way that the situations have affected you in the last week.” Level of anxiety or fear was rated using a 4-point
Likert scale (0 = *None*, 3 = *Severe*), and avoidance was rated using a 4-point Likert scale (0 = *Never*, 3 = *Usually*).

**Procedure.** The study was approved by the Deakin University Human Research Ethics Committee. Participants were directed to an online survey, created using Qualtrics (https://www.qualtrics.com), which they could complete after: (a) reading the plain language statement, (b) providing consent, (c) confirming that they were over the age of 18 years, and (d) confirming that they identify as trans or gender diverse.

Participation was voluntary and three $100 international gift vouchers were offered as a potential prize payment as an incentive to participate. Participants were instructed that the prize would be drawn once 200 responses had been collected (or when the survey was closed if 200 responses were not received). To be eligible for the draw, participants needed to provide an email address which was removed from the data following the draw. Eligible participants were allocated sequential numbers and the draw was conducted using a uniform random number generator to provide the numbers for three winners.

Statistical analysis was performed using R (Version 3.2.5; R Core Team, 2016) with packages ltm (Version 1.0-0; Rizopoulos, 2006), lavaan (Version 0.5-22; Rosseel, 2012), missForest (Version 1.4; Stekhoven, 2013), psych (Version 1.6.12; Revelle, 2016), and semTools (Version 0.4-14; semTools Contributors, 2016).

**Results**

**Missing Values.** Items were checked for anomalous and missing values. It was noticed that nine participants did not provide any responses to the TGASS on the avoidance scale. These participants were therefore removed from further
analysis of the avoidance scale. The item about coming out to partner’s parents had the most number of missing values on both the anxiety scale (6 items, 2.8% of values) and the avoidance scale (8 items, 3.9% of values) with 1.0% of data missing overall from the anxiety scale and 1.4% of data missing from the avoidance scale overall. Within the anxiety data, 23 cases (10.8%) were incomplete with at least one missing value and, in the avoidance data, 38 cases (18.4%) were incomplete.

Despite being instructed to imagine the social situation described in the TSAS item if they did not have personal experience with that situation, some participants noted that they did not respond to some items because they felt that those items were not applicable to them over the last week. The mechanism for the missing data is unclear. The non-response may be due to not reading, remembering, or understanding the instructions, and unrelated to the anxiety or avoidance that the participant might imagine themselves to face. Participants may also have had difficulty imagining themselves in scenarios for reasons unrelated to anxiety or avoidance. In these case, the data would be considered missing at random (MAR; Rubin, 1976). Alternatively, participants may have such a high level of anxiety and avoidance that they are unable to even consider the situation let alone experience it. Data would be considered not missing at random (NMAR) in this situation and cannot be ignored (Bennett, 2001).

Listwise or pairwise deletions of incomplete cases was ruled out as a method for dealing with missing values as these are likely to produce biased results and some form of value replacement is considered superior (Pigott, 2001). Cold deck imputation methods, such as mean replacement or replacement with a specific value, produce biased results when managing missing values, including
responses being marked not applicable (Golino & Gomes, 2016; Holman, Glas, Lindeboom, Zwinder, & Haan, 2004), and were consequently also ruled out as a potential techniques to use. Random forests are a non-parametric imputation method that does not make any assumptions about the underlying functional form of the data (Stehoven, 2013). They outperform other forms of imputation, including hot deck imputation in MNAR conditions, (Misztal, 2013; Munguía & Armando, 2014) and continue to perform well when the different mechanisms of missing data are present in a single data set (Golino & Gomes, 2016). A random forest imputation method, using the missForest package in R, was therefore utilised, which provided an estimate of imputation error, without needing to set aside test data or perform a cross-validation, and did not require potentially questionable assumptions about underlying distributions, linearity, or the use of tuning parameters (Stehoven & Bühlmann, 2012).

**Ordinal Data.** Items in the TSAS are responded to using a 4 point Likert scale and participants need to pick one of four ordered categories. This kind of data is categorical in nature and was treated as such during the imputation process for missing data. The missForest package provides an estimate of out-of-bag imputation error by calculating the proportion of falsely classified entries (PFC) for categorical variables: \( \text{PFC}_{\text{anxiety}} = 0.39, \text{PFC}_{\text{avoidance}} = 0.46 \). These can be considered an upper estimate for the imputation error (M. W. Mitchell, 2011).

The categorical nature of the Likert scales also have implications for the analyses since treating Likert scales as continuous data violates the assumptions of multivariate normality (Lubke & Muthén, 2004). Polychoric correlations are more suitable than Pearson correlations for analysing ordinal data (Holgado-Tello, Chacón-Moscoso, Barbero-García, & Vila-Abad, 2009) and have therefore
been used in these analyses for both checking for multicollinearity as well as during factor analysis. As shown in Table 9 to Table 12, the correlation between items 12 and 23 is particularly high ($r = 0.82$ for avoidance, $r = 0.86$ for fear/anxiety), which may suggest problems with multicollinearity.

\[
\begin{array}{|c|c|}
\hline
\text{Quadrant 1} & \text{Quadrant 2} \\
\text{Table 10} & \text{Table 11} \\
\hline
\text{Quadrant 3} & \text{Quadrant 4} \\
\text{Table 11} & \text{Table 12} \\
\hline
\end{array}
\]

*Figure 10.* Polychoric correlation table split into four quadrants/tables.
Table 9.

Polychoric correlations, quadrant 1. Correlations for anxiety/fear in upper diagonal, avoidance in lower diagonal.

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Table 10.

*Polychoric correlations, quadrant 2. Correlations for anxiety/fear in upper diagonal, avoidance in lower diagonal.*

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Table 11.

Polychroric correlations, quadrant 3. Correlations for anxiety/fear in upper diagonal, avoidance in lower diagonal.

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Table 12.

**Polychoric correlations, quadrant 4. Correlations for avoidance in anxiety/fear, avoidance in lower diagonal.**

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<tr>
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<td>0.35</td>
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<td>0.45</td>
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<td>0.33</td>
<td>0.44</td>
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<td>0.40</td>
<td>0.60</td>
<td><strong>1.00</strong></td>
<td>0.67</td>
<td>0.59</td>
<td>0.67</td>
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<tr>
<td>35</td>
<td>0.59</td>
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<td>0.49</td>
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<td>0.50</td>
<td>0.30</td>
<td>0.43</td>
<td>0.30</td>
<td>0.39</td>
<td>0.47</td>
<td>0.28</td>
<td>0.49</td>
<td>0.65</td>
<td>0.68</td>
<td><strong>1.00</strong></td>
<td>0.63</td>
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</tr>
<tr>
<td>36</td>
<td>0.70</td>
<td>0.48</td>
<td>0.51</td>
<td>0.60</td>
<td>0.49</td>
<td>0.64</td>
<td>0.52</td>
<td>0.65</td>
<td>0.34</td>
<td>0.48</td>
<td>0.45</td>
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<td>0.50</td>
<td>0.61</td>
<td>0.63</td>
<td>0.52</td>
<td>0.59</td>
<td><strong>1.00</strong></td>
</tr>
</tbody>
</table>
To determine which out of items 12 and 23 to delete, an item response theory (IRT) analysis was conducted. IRT techniques are useful in the structural validity phase of scale construction as they allow the evaluation of a scale’s capability to assess all levels of an underlying trait (Simms, 2008) and allow comparisons between items to see how they may assess the underlying trait differently (Rizopoulos, 2006). This allows the comparison of items that have been identified as multi-collinear to determine which item is more useful to retain.

A graded response model (GRM) was chosen to analyse the data as there are more than two possible responses to items on the TSAS (which means that the use of a polytomous model was necessary), all the items have the same number of responses, and the responses have an order with higher responses indicating greater anxiety or avoidance. Data were fitted to both a constrained version of the GRM, which assumes that the discrimination parameters are the same across items (Rizopoulos, 2006), as well as an unconstrained GRM. Analysis of the two and three way margins to check the fit of the model revealed potential lack of fit with the unconstrained model. In particular, item pairs 6 and 15; 12 and 23; and, 14 and 28 demonstrated lack of fit using the TSAS anxiety responses. Item pairs 12 and 23, 14 and 19, 14 and 28, 21 and 22, and 28 and 29 demonstrated lack of fit when using avoidance responses. Using a constrained GRM model, the anxiety responses demonstrated a lack of fit with item pair 12 and 23, and the avoidance responses demonstrated lack of fit with item pairs 11 and 30, 12 and 23, and 21 and 22. Problems with items 12 and 23 were expected, but the additional fit difficulties with the unconstrained anxiety models and both the avoidance models meant that only the constrained GRM model using the anxiety data was used. Furthermore, the constrained model was utilised despite the
unconstrained anxiety model demonstrating a better overall goodness of fit 
\( F(1,35) = 125.61, p < 0.001 \).

Items 12 and 23 both appeared to have very similar behaviours in their item characteristic curves (ICC) as shown in Figure 11. Both items also appeared to capture similar amounts of information except that item 23 captures information at higher levels of the underlying trait. The TSAS appeared to be well balanced in its ability to gather information across the various levels of the underlying trait, with a slight bias towards information at the lower end. Therefore, item 23 was retained and item 12 was discarded.

*Figure 11. Item Characteristic Curves (ICC) and Item Information Curves (IIC) for items 12 and 23, and overall test information function.*
Figure 12. Wright Map for TSAS anxiety items. Item numbers are on labelled on the x-axes.
The Wright Map for the TSAS anxiety items, as seen in Figure 12, showed the items are well spread to gather information at different levels of the underlying trait. Some questions require very high levels of the underlying trait for an endorsement of the highest response option, while others require very low levels of the underlying trait for an endorsement of the lowest response option. Other items appear to be well positioned to discriminate between average levels of the underlying trait.

The squared multiple correlations, and the resultant Variance Inflation Factors (VIF), were calculated after the removal of item 12. O’Brien (2007) notes that VIF values used to indicate excessive or serious multi-collinearity can be as low as 4 but that 10 is an often used value. Caution is then advised against using these values by themselves as evidence to remove variables from analysis. As shown in Table 13 only one anxiety variable and five avoidance variables exceeded the strict cutoff of VIF being greater than 4 and none of them exceed the value of 10.

While running the analyses, a Heywood case was detected in the avoidance data. A possible cause of Heywood cases is multicollinearity, which is solved by removal of a collinear variable (T A Brown, 2015). In this case, the Heywood case was resolved by removal of item 2 from the analyses of the avoidance data, even though it did not have a high VIF. All the other variables were retained for the factor analyses.
Table 13.
Squared Multiple Correlations (SMC) and Variance Inflation Factors (VIF) for TSAS Anxiety and Avoidance items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Anxiety</th>
<th>Avoidance</th>
<th>Item</th>
<th>Anxiety</th>
<th>Avoidance</th>
</tr>
</thead>
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<td></td>
<td>SMC</td>
<td>VIF</td>
<td></td>
<td>SMC</td>
<td>VIF</td>
</tr>
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<td>19</td>
<td>0.79</td>
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<tr>
<td>2</td>
<td>0.69</td>
<td>1.89</td>
<td>20</td>
<td>0.84</td>
<td>3.39</td>
</tr>
<tr>
<td>3</td>
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<td>0.74</td>
<td>2.23</td>
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<tr>
<td>4</td>
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<td>2.59</td>
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<td>0.85</td>
<td>3.64</td>
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<td>23</td>
<td>0.76</td>
<td>2.35</td>
</tr>
<tr>
<td>6</td>
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<td>0.80</td>
<td>2.75</td>
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<td>7</td>
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<td>1.66</td>
<td>25</td>
<td>0.84</td>
<td>3.39</td>
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<td>8</td>
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<td>2.41</td>
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<td>0.85</td>
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<td>-</td>
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<td>0.75</td>
<td>2.30</td>
<td>36</td>
<td>0.90</td>
<td>5.15</td>
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</table>
**Confirmatory Factor Analysis**

Given that the TSAS was developed with a hypothetical structure in mind, the use of a CFA prior to an EFA is justified (Fabrigar et al., 1999). In conducting the CFA, choice of estimator type is important. Estimation of parameters in structural equation models (SEM), including CFAs, is traditionally done using maximum likelihood (ML) estimators that assume continuous, multivariate normal observed variables (Muthén & Kaplan, 1985). Ordinal data may treated as continuous without problems with fit indices when there are at least five ordered categories and the data is approximately normal (Muthén & Kaplan, 1985). The Likert scales used in the TSAS only have four categories and, given that they have already failed that criteria, their normality has not been assessed. Use of ML estimators in this case would therefore likely result in inflated $\chi^2$ estimations; underestimation in fit indices, root meant square residuals, and parameter estimates; and, underestimation of standard errors that result in Type I errors (Babakus, Carl E Ferguson, & Jöreskog, 1987).

The diagonally weighted least squares with adjusted means and variances (WLMSV) estimator was designed specifically for categorical data and makes no distributional assumptions about observed variables (Li, 2016). The WLSMV estimator has been shown to be more accurate and less biased than the ML estimator when analysing categorical data (Li, 2016). The WLSMV estimator was recommended by Zhao (2015) over the diagonally weighted least squares (DWLS) estimator, which was also designed to accommodate categorical variables, as it provides more trustworthy fit measures and is less influenced by small sample size to estimated parameters ($N:t$) ratios. Myers, Ahn, and Jin (2011) and Zhao recommended a sample size of at least 200, and Zhao further
recommends an $N: t$ ratio of at least 2:1 to obtain satisfactory convergence rates and trustworthy fit measures. Both of those criteria were met in this study.

The result of the CFAs, shown in Table 14, showed potentially acceptable fit for the proposed bifactor model. The $\chi^2$ values, which were corrected for the WLSMV estimator as described by Asparouhov and Muthén (2010; Rosseel, 2016), did not reach non-significance for any of the models, although the $\chi^2 / \text{df}$ ratio is in the range of acceptance ($\leq 2$). CFI and TLI fit statistics reached acceptance ($\geq 0.95$), as had the RMSEA (RMSEA $\leq 0.06$, confidence interval $\leq 0.06$ to 0.08) which also reached non-significance. Zhao (2015) recommended not using the SRMR statistic with categorical variables due to unpredictable changes from model misspecification and systematic changes with model and sample size. The SRMR is therefore not reported.

Table 14.

<p>| CFA results of hypothesized structure. |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$ min</th>
<th>df</th>
<th>$\chi^2 / \text{df}$</th>
<th>p value</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>RMSEA p value</th>
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<td>1.55</td>
<td>&lt; .001</td>
<td>0.97</td>
<td>0.97</td>
<td>0.05</td>
<td>[0.04, 0.06]</td>
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<tr>
<td>Avoidance</td>
<td>774.42</td>
<td>493</td>
<td>1.57</td>
<td>&lt; .001</td>
<td>0.95</td>
<td>0.95</td>
<td>0.05</td>
<td>[0.05, 0.06]</td>
</tr>
</tbody>
</table>

As shown in Figure 13 and Figure 14, all the items loaded well onto the general factor but some items have loadings onto the specific factors that are negative or smaller than 0.2 (Jennrich & Bentler, 2011). An EFA can be used to evaluate the possibility of cross-loadings or potential misspecification (Schmitt, 2011). The overall factor structure appeared reasonable for the anxiety data, so an EFA with a bifactor rotation (Jennrich & Bentler, 2011) was performed to extract 5 factors from the anxiety data.
Figure 13. CFA results of hypothesized bifactor TSAS model using anxiety data
Figure 14. CFA results of hypothesized bifactor TSAS model using avoidance data
The results of the EFA, as shown in Table 15, were generally consistent with the hypothesized factor structure. Of the nine items in the CFA that had factor loadings less than 0.2, two items (5, 36) appeared to be correctly specified according to the EFA; four items (13, 14, 19, 20) appeared to cross load but their loadings were not improved by re-specification; one item (18) did not load onto any specific factors; and, one item (26) did not have a theoretical reasoning to be re-specified. In a bifactor structure, these items could be removed from loading onto specific factors while still loading onto the general factor. Such a model could not be reasonably compared against the alternative oblique and second-order models and therefore these items were retained in their original hypothesized factors.

The remaining item (15) appeared to cross load with potential current misspecification and was re-specified to load onto factor 4. Loading item 15 (Making friends) onto factor 4 (Interaction with the LGBT community) suggests that many of the participants may attempt to make friends within the LGBT community. Community belonging is an important resilience strategy for TGD people (Pflum, Testa, Balsam, Goldblum, & Bongar, 2015) and rejection from the queer community can be a concern (Levitt & Ippolito, 2013). This re-specification is therefore compatible with existing theory. As shown in Figure 15, the specific factor loading for item 15 is larger than in the previous model, but is still less than 0.2.
Table 15.

Results of bifactor EFA for anxiety data for loadings with an absolute value greater than 0.2

<table>
<thead>
<tr>
<th>Item</th>
<th>g</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
<th>F5</th>
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<td></td>
<td>0.24</td>
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</tr>
<tr>
<td>2</td>
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<td>-0.30</td>
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</tr>
<tr>
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<td></td>
<td></td>
<td></td>
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<td>0.49</td>
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</tr>
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<tr>
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Figure 15. CFA of re-specified bifactor TSAS model using anxiety data
The avoidance data appeared to indicate the presence of two factors within factor 3. Items 21 to 23, which loaded well on factor 3, appeared to be worded to represent explicit interactions with people who are specifically appointed to enforce law and order, which includes moral or religious law. Items 24 to 27, which did not load well onto factor 3, appeared to be worded to represent broader situations involving people that have some kind of authoritative power. An EFA with a bifactor rotation (Jennrich & Bentler, 2011) was therefore performed to extract 6 factors from the anxiety data.

The results of the EFA, as shown in Table 16, were generally consistent with the hypothesized factor structure, including the separation of factor 3 into two factors. Of the eight items in the CFA that had factor loadings less than 0.2 or that were negative, four items (19, 20, 27, 36) appeared to cross load but their loadings were not improved by re-specification. The same reasoning was used as with the anxiety data to retain these items in their original hypothesized factors. Consistent with the anxiety data, item 15 was re-specified to load onto factor 4.
Table 16.
Results of bifactor EFA for avoidance data for loadings with an absolute value greater than 0.2

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</table>
Item 13 (going to bars or clubs not advertised as being LGBTI friendly) was re-specified to load onto factor 3. Avoidance of these situations may be due to fear of interacting with the security personnel at these venues, which would be similar to item 22, and the re-specification would therefore be theoretically consistent. Items 14 (catching public transport) and 16 (attending a job interview) were re-specified to load onto factor 3b. Item 14 may be representative of the avoidance of being in situations where authority figures may be present but interaction is not necessarily required, similar to item 25, and would therefore be theoretically consistent with the re-specification. Item 16 involves situations with a power differential, but that does not involve specific law enforcement, and so would be also be theoretically consistent with the re-specification. As shown in Figure 16, the re-specified items have more acceptable specific factor loadings than in the previous model.
Figure 16. CFA of re-specified bifactor TSAS model using avoidance data
Structural Comparisons

Three more CFAs were conducted as comparisons for alternative factor models. As shown in Table 17 to Table 19, all except the single factor model had fit statistics that reached acceptance. Only the bifactor model had a non-significant RMSEA for the anxiety data and had the best fit statistics for both the anxiety and avoidance data.

Comparison of different factor models can be conducted using $\chi^2$ difference tests if the models are nested (Schermelleh-Engel, Moosbrugger, & Müller, 2003). A model is nested within a less restrictive model if it can be derived by placing at least one constraint on the less restrictive model (Schermelleh-Engel et al., 2003). The use of $\chi^2$ difference tests allows for clear significance tests to determine which model is to be preferred, which is advantageous over comparisons of descriptive goodness-of-fit measures.

In this study, it can be seen that the single factor model is nested within the oblique model. The single factor model can be derived by constraining all of the correlations between the latent factors in the oblique model to 1, which will collapse all the factors into a single factor (Rindskopf & Rose, 1988). Similarly, the second order model is nested within the oblique model (and therefore the single factor model) because the second order factor is enforcing a pattern of correlations amongst the first order factors. Constraining the correlations to enforce that same structure in the oblique model allows us to derive the second order model from the oblique model (Rindskopf & Rose, 1988).

A second order model can be seen to be nested within the bifactor model by the application of a Schmid-Leiman Solution (SLS; J. Schmid & Leiman, 1957) to the bifactor model. This transforms the model into an equivalent full
second order factor model that is similar to the second order model but with the addition of direct effects from the second order factor to all the observed variables except for those that are constrained to the first order factors (Yung, Thissen, & McLeod, 1999). By constraining these additional paths to 0, the second order model can be derived.

Table 17.

Factors Analysis Key

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<th>Model</th>
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<td>2</td>
<td>Oblique model</td>
</tr>
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<td>3</td>
<td>Second order model</td>
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<td>Bifactor model</td>
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Table 18.

CFA results using anxiety data.

<table>
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<tr>
<th>Model</th>
<th>$\chi^2$ min</th>
<th>df</th>
<th>$\chi^2 / df$</th>
<th>p value</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
<th>RMSEA p value</th>
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<td>0.96</td>
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<td>0.97</td>
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<td>[0.04, 0.06]</td>
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Table 19.

CFA results using avoidance data

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<th>df</th>
<th>$\chi^2 / df$</th>
<th>$p$ value</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
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</table>

Neither the original bifactor model nor its SLS transformed full second order form can be constrained to derive an oblique model. The oblique model is therefore not nested within the bifactor model. Given that it can sometimes be difficult to determine if a model is nested inside another, Bentler & Satorra (2010) described a procedure to determine whether two models are equivalent or if one model is nested inside another. This nesting and equivalence testing (NET) procedure is available in R through the semTools package (semTools Contributors, 2016) and the results of the procedure confirms that: the oblique model is not nested within the bifactor model; the single factor model is nested within second order model; and, that the second order model is nested within both the bifactor and the oblique models. The $\chi^2$ difference test will therefore need to compare the second order model with the bifactor and the oblique models separately.

The $\chi^2$ difference test is usually calculated using the difference between the $\chi^2$ fit for the two models and the difference between the degrees of freedom for the two models (Schermelleh-Engel et al., 2003). When scaled $\chi^2$ test statistics
are used (as is the case for the WLSMV estimator), the difference between the
two scaled statistics is not the correct way to obtain the scaled difference test
statistic and a different method was proposed by Satorra and Bentler (2001). The
results using this method, displayed in Table 20 and Table 21, indicated that the
constraints imposed by the single factor model make the model fit significantly
worse than the second order model. The null hypothesis of equal fit is rejected
and therefore the less restricted second order model is favoured over the single
factor model. Similarly, the second order model has a significantly worse fit than
the bifactor model and hence the bifactor model is preferred over the second order
model.

The comparison of the oblique factor model to the second order model
shows that the constraints imposed by second order model does not make the fit
of the model significantly worse than the oblique model. The null hypothesis of
equal fit cannot be rejected and therefore the more restricted second order model
is favoured over the oblique model. Given that the bifactor model has already
been shown to be preferred over the second order model, this suggests that the
bifactor model is to also be preferred over the oblique model for both the anxiety
and avoidance data. The factor loadings for the alternative models are shown in
Figure 17 to Figure 21.
Table 20.
Anxiety $\chi^2$ difference tests showing scaled $\chi^2$ and $\chi^2$ difference using Satorra and Bentler (2001).

<table>
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<th>$\chi^2$ diff</th>
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</table>

*** $p < .001$

Table 21.
Avoidance $\chi^2$ difference tests showing scaled $\chi^2$ and $\chi^2$ difference using Satorra and Bentler (2001).

<table>
<thead>
<tr>
<th>Model</th>
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<th>$\chi^2$ diff</th>
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<td>4</td>
<td>493</td>
<td>562.69</td>
<td></td>
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<td></td>
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<tr>
<td>3</td>
<td>521</td>
<td>697.17</td>
<td>46.37</td>
<td>28</td>
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<tr>
<td>1</td>
<td>527</td>
<td>1278.98</td>
<td>104.53</td>
<td>6</td>
<td>***</td>
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<tr>
<td>2</td>
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<td>3</td>
<td>521</td>
<td>697.17</td>
<td>7.01</td>
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</tr>
</tbody>
</table>

* $p < .05$  ** $p < .01$  *** $p < .001$
Figure 17. Results of CFA of TSAS anxiety and avoidance using a single factor model
Figure 18. Results of CFA of TSAS anxiety using a correlated traits / oblique factor model
Figure 19. Results of CFA of TSAS avoidance using a correlated traits / oblique factor model
Figure 20. Results of CFA of TSAS anxiety using a second-order factor model
Figure 21. Results of CFA of TSAS avoidance using a second-order factor model
Generalisability

If the scale is to be used to compare different groups of people, then it is important that items on the scale have the same meaning across different groups, that people in different groups respond to the items in conceptually similar ways, and similar composite scores are indicative of similar levels of TSA across people in different groups. Tests of measurement invariance are designed to answer these questions by testing the assumption that the latent variable is conceptually equivalent in each group, that the association between items and the latent variable are similar across groups, and that explanation of item variances by unique factors are similar across different groups (Vandenberg & Lance, 2000).

Two tests of measurement invariance were conducted to determine if the TSAS was invariant across genders and across geographical boundaries. Groups for gender were based upon responses to the GIS. A binary category \( (n = 137) \) was defined as people who identified with only the male/man/boy gender (GIS score of 100/0/0) or the female/woman/girl gender (GIS score of 0/100/0). A leeway of 20 points was granted on each gender scale. Participants who were outside of that range were assigned to the non-binary category \( (n = 78) \).

Geographical groupings were based upon the country that people reported currently residing in. Only two countries had sufficient participants to enable comparison: Australia \( (n = 120) \) and United States of America \( (n = 70) \).

Dividing the sample into groups meant that insufficient participants in some of the groups had endorsed the highest levels of fear for item 28 (Interacting with cisgender gay, lesbian, or bisexual people). This item was therefore removed from the factor structure when conducting the analysis of measurement.
invariance. The bifactor model without item 28 was therefore used as the configural model.

The TSAS was tested for weak measurement invariance by constraining factor loadings, and for strong measurement invariance by constraining factor loadings and item thresholds, which are the ordinal equivalent of item intercepts (Hirschfeld & Von Brachel, 2014). Strict measurement variance requires testing of residual variances, which is only possible when theta-parameterisation is used (Muthén & Asparouhov, 2002). Lavaan uses delta-parameterisation and strict invariance therefore cannot be tested as the residuals are not estimated (Hirschfeld & Von Brachel, 2014).

The Satorra and Bentler (2001) scaled difference test was used to assess significance of $\chi^2$ change in model fit. A difference of .01 was utilised as the change criteria in the comparative fit index (CFI) to determine if the more constrained model had a substantial decrease in model fit (Hirschfeld & Von Brachel, 2014). As shown in Table 22 and Table 23, the assumption of weak and strong invariance holds across groups differentiated by gender or by country of residence.
Table 22.

_Model comparisons for measurement invariance when grouped by gender_

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$ (Δ $\chi^2$)</th>
<th>df (Δdf)</th>
<th>p (Δp)</th>
<th>CFI (ΔCFI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Configural</td>
<td>529.41</td>
<td>493</td>
<td>&lt; .001</td>
<td>.973</td>
</tr>
<tr>
<td>M2 Weak (loadings)</td>
<td>(215.38)</td>
<td>(555)</td>
<td>(1)</td>
<td>(.003)</td>
</tr>
<tr>
<td>M3 Strong (loadings and thresholds)</td>
<td>(253.93)</td>
<td>(617)</td>
<td>(1)</td>
<td>(.004)</td>
</tr>
<tr>
<td>Avoidance model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Configural</td>
<td>472.24</td>
<td>462</td>
<td>&lt; .001</td>
<td>.968</td>
</tr>
<tr>
<td>M2 Weak (loadings)</td>
<td>(181.43)</td>
<td>(521)</td>
<td>(1)</td>
<td>(-.007)</td>
</tr>
<tr>
<td>M3 Strong (loadings and thresholds)</td>
<td>(195.89)</td>
<td>(580)</td>
<td>(1)</td>
<td>(-.008)</td>
</tr>
</tbody>
</table>

Table 23.

_Model comparisons for measurement invariance when grouped by country of residence_

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$ (Δ $\chi^2$)</th>
<th>df (Δdf)</th>
<th>p (Δp)</th>
<th>CFI (ΔCFI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Configural</td>
<td>563.45</td>
<td>525</td>
<td>&lt; .001</td>
<td>.973</td>
</tr>
<tr>
<td>M2 Weak (loadings)</td>
<td>(177.03)</td>
<td>(589)</td>
<td>(1)</td>
<td>(-.008)</td>
</tr>
<tr>
<td>M3 Strong (loadings and thresholds)</td>
<td>(202.13)</td>
<td>(653)</td>
<td>(1)</td>
<td>(.002)</td>
</tr>
<tr>
<td>Avoidance model</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1 Configural</td>
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<td>.971</td>
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<tr>
<td>M2 Weak (loadings)</td>
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<td>(-.001)</td>
</tr>
<tr>
<td>M3 Strong (loadings and thresholds)</td>
<td>(191.95)</td>
<td>(580)</td>
<td>(1)</td>
<td>(-.002)</td>
</tr>
</tbody>
</table>
Discussion

As expected, a bifactor factor structure models the TSAS well and is superior to unidimensional, oblique, or second-order factor structures. This supports the idea that psychological measures are often consistent with both a unidimensional and multidimensional latent factor structure (Reise et al., 2010). In this case, the unidimensional latent factor is TSA and the multidimensional factors are the hypothesised domains of close personal relationships, general social interactions, authoritarian interactions, interactions with the LGBT community, and accessing health services. Although the avoidance data was best modelled with a sixth factor, this was achieved by separating the authoritarian interaction factor into two related factors: interaction with representatives of law and order, and situations involving power differentials. The multidimensional factor structure was therefore still consistent with the original factor structure.

How TSA relates to the multidimensional factors differs depending on the model used, and the bifactor model provides some clarity to the relationships that is lacking in the other models. TSA is conceptualised, in the bifactor model, as a general source of anxiety for TGD people, onto which all the items loaded well, and the specific factors are domain specific sources of anxiety that occur in addition to general TSA. This allows the contributions to explanation of variance for each item to be more clearly assessed. It is clear from the factor loadings, for example, that the fear of attending LGBTI events (item 31) is almost equally explained by the anxiety from general TSA as well anxiety from interactions with the LGBTI community. On the other hand, avoidance of revealing trans or gender diversity (item 3) is better explained by avoidance in close personal relationships than by avoidance from general TSA, although general TSA still
provides a medium amount of explanation. Avoidance of walking alone in public (item 19) is almost totally explained by the avoidance from general TSA and has practically no explanation from avoidance of general social interactions.

Contributions to the explanation of item variance are confounded in the oblique and second-order factor models, where the multidimensional factors are conceptualised to be the only source of explanation of item variance. The previously mentioned three items (3, 19, 31) all load equally well on their individual factors in the oblique and second-order models. This may possibly lead to the erroneous conclusion that the items load well due to the explanation provided by the multidimensional latent factors, when the real reason is a shared common underlying TSA. Items will therefore load well if they can be explained by a specific factor and/or general underlying TSA. Only a bifactor model allows items to load separately on general or specific factors.

The inter-factor covariances in the oblique model or the loadings onto the second-order factor in the second-order model may give the impression that all the factors are measurements of the same thing and that the TSAS is therefore only a measure of unidimensional anxiety. The bifactor model shows, however, that this is true only to the extent that the factors in these models are also measurements of the general underlying TSA or cross-load onto other factors. Separating out the variance due to general TSA allows the contribution of the specific factors to be accurately assessed. If the assumptions of the oblique or second-order factor model were accepted, then variations in a person’s score across different factors would be due to measurement error. In a bifactor model, however, variations across the specific factors are acceptable and can occur independently of the underlying TSA.
Many of the items had a loading magnitude smaller than 0.2 (Jennrich & Bentler, 2011), and these would be ignored when exploring difficulties with specific situational domains. Retaining all the items, beyond providing a good indication of underlying TSA, may be useful in a clinical setting where the TSAS could assist in exploring the specific situations that clients have difficulty with. In this case, the broad range of situations is more important than only keeping situations that fit the factor structure.

General scoring is also only just one way to use the TSAS. The IRT of the TSAS shows that endorsement of severe anxiety is indicative of different levels of underlying TSA depending on the particular item. Severe fear of interacting with cisgender gay, lesbian, or bisexual people (item 28) indicates an unusually high level of TSA, whilst severe fear of coming out or transitioning at work or school (item 10) is consistent with a relatively average level of TSA. Similarly, a mild level of fear of attending an LGBTI event (item 30) indicates a relatively average level of TSA, whilst it would be extremely unusual not to have at least a mild level of fear of coming out or transitioning at work or school (item 10). Responses to items that are inconsistent with suspected overall level of TSA may therefore provide clinically useful information and be a point for further exploring their anxiety in that situation. These comparisons can be conducted with confidence given that evidence has been provided to show that the meaning of the levels of the underlying items, in terms of item thresholds, is equal across different groups of people.

The aim of this study, to create a typology of situations which TGD people may have difficulties with, appears to have been achieved. Evidence has been provided that the list of items identified is consistent with an underlying
latent construct, and a subset of these items is consistent with—what is intended and appears to be—specific situational domains. Strong evidence has been provided that the latent constructs have the same meaning attributed to them across different groups of people. The TSAS shows promise, therefore, in being a tool that can aid in the understanding of the severity and specificity of the difficulties that TGD people face in social situations. It is also able to do this without the stigma attached to pathology, unlike the LSAS where TGD people might feel stigmatised for implying that they have a social anxiety disorder.

The TSAS was constructed with the intention that the latent construct is TSA, but this is currently only hypothesised. Further work will need to confirm that this construct is representative of TSA and not some other construct. Further work also needs to be done to further validate the TSAS. The predictive capability of the TSAS is yet to be tested. It is expected that endorsing high levels of avoidance of fear or anxiety for many of these items would be indicative of stress or distress, but this remains to be shown.

**Limitations**

During the substantive validity phase, several people who identified as genderqueer or non-binary were invited to review and contribute to the items on the TSAS. Unfortunately, none of those people responded to the invitation and there was therefore a lack of representation from the gender diverse community during the initial development of the TSAS. The items on the list may therefore be biased towards the experiences of the transgender community. Many of the participants in this study did not identify with a binary gender however, and assumptions of measurement invariance across gender groups were shown to hold. This suggests that the factor structure and meanings of items was the same
for both people who identify with binary genders (e.g. man/woman) and gender diverse/non-binary people. Non-representation by the gender diverse community may mean, however, that some situations or social domains that are particularly salient for that community did not have a chance to be part of the TSAS.

Items in the first factor of close personal relationships assume some level of sexual or romantic interest. Participants who identify as asexual or aromantic may have difficulty answering these questions which may account for the higher level of missing values for these items. Any answers that are provided by aromantic or asexual people may be more influenced by sexuality and romantic attraction than by TSA. Sexuality and romantic attraction were not assessed for in this study and it is therefore unknown if the factor structure is valid for asexual and aromantic people. Given the assumptions of the bifactor model, it would be reasonable to expect that the items for that factor could be totally excluded without severely affecting the rest of the factor structure. However, this remains to be confirmed by future work.

The LSAS was used as the inspiration for the TSAS and the participant instructions were therefore modified from the LSAS. This may have resulted in conflating different constructs within the minority stress framework (Meyer, 2003). Anxiety anticipated for an imagined event may reflect vigilance or expectation of stigma, which is a minority stressor. Anxiety may also result from events that actually happened, which is a different minority stressor. Future research may therefore examine how the instructions may affect the validity of the TSAS and its ability to measure the effect of different minority stressors.
Conclusion

The TSAS shows potential in being a scale that is indicative of overall TSA as well as being able to understand how specific that anxiety might be to situational domains. Initial evidence for the validity of the TSAS has been provided by confirming that its factor structure is consistent with the proposed situational domains, however further evidence for validity needs to be provided to confirm that the TSAS is indeed a measure of anxiety and not of some other type of construct. Evidence of its capability to predict mental stress and distress also needs to be provided. With this evidence, however, the TSAS is positioned to be a tool that is useful for measuring the social anxiety of TGD people in social situations that are specific and salient to them.
Chapter 4

Validation of the Trans and gender-diverse Social Anxiety Scale

The factor structure of the trans and gender-diverse social anxiety scale (TSAS) provides clinicians with the opportunity to understand what domains a client may struggle with, and it provides researchers with the opportunity to investigate how domains may interact differently with variables of interest. The bifactor structure allows this while also providing an overall measure of trans and gender-diverse social anxiety (TSA). The utility of the TSAS is predicated, however, on its construct validity being adequate. The purpose of this study is to examine the construct validity of the TSAS to determine if the evidence may support a claim for construct validity.

Current standards for validating psychological tests are influenced by Messick’s view of validity as a unitary concept (E. K. H. Chan, 2014). Messick (1995) argues that a claim for validity cannot rely on any single type of evidence and neither does it require any one form of evidence. It requires, rather, a compelling argument that utilizes available evidence to justify the use of the psychological test. Messick describes six sources of validity that can function as sources of evidence when addressing issues of validity.

Four of the aspects of construct validity were addressed during the construction of the scale. These are the content, substantive, structural, and generalisability aspects. A theoretical approach was used to create the factors in the scale and to generate items in those factors. The evidence for the substantive theories and relevance of content items is therefore provided by the argument justifying the appropriateness of the scale factors and for the inclusion of particular items. Evidence for content relevance and representativeness is further
strengthened by the review of scale items by members of the TGD community and by professionals working with the community. Structural evidence is provided by the level of fit for the proposed factor analysis in the previous study. Given that the structure of the scale is supported by a theoretical understanding of the domain, there is also evidence for structural fidelity (Messick, 1995). The generalisability aspect examines whether the scale can be interpreted in the same way across different groups, which is the same question that is asked by tests of measurement invariance (Vandenberg & Lance, 2000). Strong evidence for measurement invariance was provided by comparing responses from participants in the United States and Australia and finding that metric and scalar invariance was achieved, as was full uniqueness measurement invariance. Having provided evidence for the first four aspects of construct validity, two aspects of construct validity remain to be addressed.

The TSAS has been conceptualized as a measure of social anxiety. Convergent and discriminant validity would refer to the extent to which the relationship of the TSAS with other measures reflect that concept and discount potential interpretations for the scale (Messick, 1995). The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) is an accepted measure of social anxiety that the TSAS was modelled after. It is expected therefore, that the TSAS would have a high relationship with the LSAS. It is not, however, conceptualized as, for example, a measure of stigma, social support, hardiness, general distress or personal wellbeing. The relationship between measures of those constructs and the TSAS would therefore need to be lower to provide evidence of discriminant validity, even though there is likely to be a significant relationship with those
constructs (Budge et al., 2012, 2014; Dargie et al., 2014; Ho & Mussap, 2016; Pitts et al., 2009).

The LSAS is an established scale and the TSAS would need to demonstrate some form of extra utility for it to be considered in place of the LSAS. The TSAS has been constructed as a measure specific to TGD people and the extra utility may be in the form of extra explanatory power or unique explanation of anxiety amongst the TGD population. It may also be in the form of its ability to explain the relationships between social factors and mental health outcomes.

Much research has been previously conducted on the mental health outcomes of TGD people, and associated risk and protective factors, although the focus tends to be on depression, suicide, or a measure of general psychological distress (e.g. Bariola et al., 2015; Bockting et al., 2013; Clements-Nolle et al., 2006; Dargie et al., 2014; Pitts et al., 2009). Where anxiety has been examined, the focus has been on general anxiety (e.g. Budge, Adelson, et al., 2013; Pflum et al., 2015) even though social anxiety disorders are much more prevalent in the TGD community compared to the general population (Bergero-Miguel et al., 2016; Meyer, Dietrich, & Schwartz, 2008). Evidence supports the minority stress theory as an explanation for the poor mental health outcomes of TGD people (Bockting et al., 2013; Budge et al., 2014) and minority stress has also been shown to predict social anxiety in gay men (Burns, Kamen, Lehman, & Beach, 2012).

There is clear evidence for the widespread experience of discrimination amongst TGD people and its effect on their mental health (Bockting et al., 2013; Grant et al., 2011b; Hyde et al., 2014; Pitts et al., 2009; Rotondi, 2011; Testa et
al., 2012). Given the level of stigma experienced, it would not be unreasonable to expect anxiety to develop around the situations in which stigma is experienced. Social anxiety may, therefore, mediate the relationship between stigma and psychological distress.

A moderating factor may be social support, which has been found to interact with stigma (Bockting et al., 2013) in predicting psychological distress. People with higher levels of social support are able to draw upon that support as a buffer against stigma, which results in a smaller increase in psychological distress. The direct relationship of social support to psychological distress is unclear however, with Dargie et al. (2014) finding that it was not a significant predictor of depression and other evidence suggesting that there is a significant direct relationship (Budge et al., 2014; Pflum et al., 2015). Dargie et al. (2014) did find a direct relationship from social support to anxiety however, and suggested that social support may create a sense of acceptance that reduced anxiety. This suggests that social anxiety may therefore mediate a relationship between social support and psychological distress.

Another moderating factor may be hardiness, which has been found to moderate the effects of stigma on mental health outcomes amongst lesbian, gay, and bisexual people (Figueroa & Zoccola, 2015). Hardiness allows people to cope with stressful situations and utilize those situations as opportunities for personal growth (Maddi, 2006). It has been shown to predict mental health outcomes and the use of problem focused coping styles in both college students (Moosavi & Ahadi, 2011) as well as people in the military (Dryman & Heimberg, 2015; Florian, Mikulincer, & Taubman, 1995). Hardiness is equally important for TGD people and predicts their ability to make changes in their life to validate
their identity and feel genuine, authentic, and comfortable with their identity, and also predict psychological distress (Ho & Mussap, 2016). The overall importance of hardiness is therefore like to be displayed by it both moderating the effects of stigma as well as having direct contributions to social anxiety and psychological distress.

If TSA is able to offer insight into the relationships between stigma and psychological distress, then the potential consequences of score interpretation and use, which is the final aspect of validity described by Messick (1995), would need to be discussed. This present study therefore aims to add to the validity of the TSAS, by exploring its convergent and divergent validity, and it is hypothesized that: (1) the TSAS will be highly related to constructs of social anxiety, but not to constructs of stigma, social support, hardiness, general distress, or personal wellbeing; (2) the TSAS will provide greater explanation of psychological distress than the LSAS; (3) social support and hardiness will moderate the relationship between stigma and TSA; and (4) TSA will mediate the relationship between measures of stigma, social support, and hardiness, and measures of psychological distress and personal well-being.

**Method**

**Participants**

The 186 participants who completed the surveys for this study were aged between 18 and 78 years ($M = 38.99$, $SD = 15.24$), with 103 participants being assigned male at birth (AMAB), 80 participants being assigned female at birth (AFAB), and 3 participants reporting being intersex/other. The distribution of their gender identity is shown in Figure 22. Participants were recruited via posts in online support forums, social media, and websites. Physical notices were
placed in the clubrooms of university clubs and associations that had been formed for sex and gender diverse students. Chain sampling was also encouraged and the study was advertised as being open to anyone over the age of 18 who was trans or gender diverse.

Figure 22. Self-reported gender identity of participants with colour key indicating number of participants with that identity

**Measures**

The Trans and gender diverse Social Anxiety Scale (TSAS) is a 35 item measure of the level of anxiety across a number of social situation and was developed specifically for TGD people. Items are responded to twice: once for the level of anxiety in that situation, using a 4-point Likert scale (0 = None, 3 = Severe); and once for the level of avoidance of that situation, using a 4-point Likert scale (0 = Never, 3 = Usually). Separate ratings can therefore be given for
anxiety and avoidance. It has five subscales for anxiety in different domains: (a) close personal relationships, (b) general social interactions, (c) authoritarian interactions, (d) interactions with the LGBT community, and (e) accessing health services.

The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) is a 24-item scale that was designed to assess the level of difficulty that people with social anxiety disorder experience across a broad range of situations. Items are responded to twice: once for the level of anxiety in that situation, using a 4-point Likert scale (0 = None, 3 = Severe); and once for the level of avoidance of that situation, using a 4-point Likert scale (0 = Never, 3 = Usually). Separate ratings can therefore be given for anxiety and avoidance. The LSAS was developed as a clinician administered scale, but has been shown to be valid as a self-report measure (Fresco et al., 2001) with good test-retest reliability, internal consistency, and convergent and discriminant validity (Baker et al., 2002). It has a factor structure proposed by Liebowitz (1987) which has been questioned with alternative factor structures proposed (Baker et al., 2002; Holt et al., 1992; Levin et al., 2002; Safren et al., 1999).

The 21-item short form version of the Depression, Anxiety, and Stress Scale (DASS-21; S. H. Lovibond & Lovibond, 1996) was utilised as a measure of psychological distress (Henry & Crawford, 2005) with three subscales that measure depression, anxiety, and stress. Items are scored on a 4-point Likert scale (0 = Did not apply to me at all, 3 = Applies to me very much, or most of the time) with higher scores indicating higher distress. It has evidence of adequate construct validity, high internal consistency, good convergent and discriminant

The Personal Wellbeing Index Scale (PWI; The International Well Being Group, 2013) is an 7-item scale that measures satisfaction across 7 domains of life. A separate item queries satisfaction with life as a whole and can be used to test the validity of the PWI. Items are scored on a 10-point scale (0 = No satisfaction, 10 = completely satisfied). There is evidence for construct validity, convergent validity, reliability, and sensitivity between demographic groups.

The Stigma Scale is a 14-item scale designed to measure stigma amongst TGD people. Items are scored on a 4-point Likert scale based on how often each item has occurred (0 = Never, 3 = Many times). It was adapted from the 12-item scale created by Logie and Earnshaw (2015) to measure sexual stigma among lesbian, bisexual, and queer women. Their scale had two factors indicating perceived and enacted sexual stigma. They defined perceived stigma as awareness and fear of experiencing negative attitudes and treatment, and enacted stigma as overt experiences of discrimination. Logie and Earnshaw provided evidence for internal reliability, test-retest reliability, and construct validity. Two extra items were added to the scale in this study due to the evidence for stigma in medical care (G. R. Bauer et al., 2009) and the pathologisation of self-designated gender (Ansara & Hegarty, 2012; Lim & Browne, 2009). It was expected that experiences of denial of medical care would load onto the enacted stigma factor and that hearing that TGD people were mentally ill would load onto the perceived stigma factor. This was consistent with the existing scale items and would be confirmed via a confirmatory factor analysis (CFA).
The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988) is a 12-item scale that measures the subjective experience of social support. Items are responded to on a 7-point Likert scale (1 = Very strongly disagree, 7 = Very strongly agree) with higher scores indicating greater perceived social support. It was shown to have good reliability, factorial validity and adequate construct validity. Three subscales measure sources of perceived support: significant other, family, and friends.

The Courage To Challenge (CTC; M. S. Smith & Gray, 2009) is an 18-item scale that measures hardiness in LGBT people. Items are scored on a 7-point Likert scale (0 = Strongly Disagree, 6 = Strongly Agree) with higher scores indicating greater personal hardiness. Smith & Gray (2009) provided evidence for high internal consistency, and adequate content and construct validity.

**Procedure**

The study was approved by the Deakin University Human Research Ethics Committee. Participants were directed to an online survey which they could complete after: (a) reading the plain language statement, (b) providing consent, (c) confirming that they were over the age of 18 years, and (d) confirming that they identify as trans or gender diverse. The survey, containing the previously outlined measures, was expected to take approximately 30 minutes to complete. Statistical analysis was performed using R (Version 3.2.5; R Core Team, 2016) with packages missForest (Version 1.4; Stekhoven, 2013) and psych (Version 1.6.12; Revelle, 2016).

**Results**

Items were checked for anomalous and missing values. Missing values accounted for 1.03% of overall values. The majority of the missing values were
from the LSAS, with 2.40% of LSAS data missing. Missing values were imputed using the missForest package, which is a random forest imputation method. Upper estimates of imputation error are shown in Table 24. Items for each scale were internally consistent (inter-item correlations > 0.3) and had good internal consistency as shown in Table 25. Skew and kurtosis were acceptable for all variables.

Participant’s scores for the PWI were related to ($r = 0.74$, $p < .001$) but significantly lower than their satisfaction with life as a whole ($M = 5.72$, $SD = 2.32$); $t(185) = -3.56$, $p < .001$. The mean PWI score for the group was lower than the normative Western range of 70-80 points (The International Well Being Group, 2013). For the 105 participants living in Australia, 44% had a PWI score that was lower than the Australian normative range of 50-100 (The International Well Being Group, 2013).

Participants were over-represented in the higher range of DASS scores, with 18% of participants scoring higher than the 98th percentile in the normative data (Henry & Crawford, 2005). The mean score was in the 91st percentile of the normative data.
Table 24.

*Upper estimate of proportion of falsely classified (PFC) entries for random forest imputation.*

<table>
<thead>
<tr>
<th>Measure</th>
<th>PFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liebowitz Social Anxiety Scale</td>
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<tr>
<td>Stigma Scale</td>
<td>0.04</td>
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<tr>
<td>Multidimensional Scale of Perceived Social Support</td>
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<tr>
<td>Courage to Challenge</td>
<td>0.24</td>
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<tr>
<td>Depression, Anxiety, and Stress Scale 21-item</td>
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<tr>
<td>Personal Wellbeing Index</td>
<td>0.10</td>
</tr>
</tbody>
</table>
Table 25.
Bivariate Correlations, Means, Standard Deviation, Cronbach's Alpha, Skew, and Kurtosis

<table>
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<tr>
<th></th>
<th>1</th>
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<tbody>
<tr>
<td>1. TSAS - Anxiety</td>
<td>-</td>
<td>0.84***</td>
<td>0.86***</td>
<td>0.75***</td>
<td>0.43***</td>
<td>-0.14</td>
<td>-0.31***</td>
<td>0.60***</td>
<td>-0.35***</td>
</tr>
<tr>
<td>2. TSAS - Avoidance</td>
<td>-</td>
<td>0.77***</td>
<td>0.84***</td>
<td>0.39***</td>
<td>-0.18*</td>
<td>-0.31***</td>
<td>0.58***</td>
<td>-0.37***</td>
<td></td>
</tr>
<tr>
<td>3. LSAS - Anxiety</td>
<td>-</td>
<td>0.88***</td>
<td>0.34***</td>
<td>-0.14</td>
<td>-0.33***</td>
<td>0.58***</td>
<td>-0.35***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. LSAS - Avoidance</td>
<td>-</td>
<td>0.26***</td>
<td>-0.14</td>
<td>-0.34***</td>
<td>0.56***</td>
<td>-0.37***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Stigma - Total</td>
<td>-</td>
<td>-</td>
<td>-0.33***</td>
<td>-0.08</td>
<td>0.38***</td>
<td>-0.33***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. MSPSS - Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.27***</td>
<td>-0.24*</td>
<td>0.42***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. CTC</td>
<td>-</td>
<td>-</td>
<td>-0.42***</td>
<td>0.50***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. DASS-21 - Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.55***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. PWI</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Total Mean | 86.62 | 74.19 | 56.05 | 49.85 | 31.27 | 55.70 | 85.43 | 23.85 | 37.06 |
| Total Standard Deviation | 25.05 | 23.08 | 17.38 | 17.08 | 7.68  | 16.33 | 12.85 | 14.53 | 14.60 |
| Item Mean     | 2.50  | 2.10  | 2.40  | 2.20  | 2.20  | 4.60  | 5.10  | 1.14  | 5.29  |
| Item Standard Deviation | 0.72  | 0.66  | 0.75  | 0.74  | 0.55  | 1.40  | 0.90  | 0.69  | 2.09  |
| Cronbach’s Alpha | 0.97  | 0.95  | -0.96 | 0.95  | 0.85  | 0.92  | 0.89  | 0.95  | 0.87  |
| zSkew         | -0.32 | 0.29  | -0.10 | 0.27  | 0.46  | -0.62 | -0.47 | 0.29  | -0.25 |
| zKurtosis     | -0.81 | -0.22 | -0.82 | -0.61 | -0.19 | -0.23 | -0.13 | -0.78 | -0.56 |

*p < .05 **p < .01 ***p < .001
**Confirmation of Stigma Scale with additional items.**

A CFA was conducted on the stigma scale, which showed acceptable relative fit. All items also had acceptable factor loadings onto their latent factor, as shown in Figure 23. Adding the items for hearing that TGD people are mentally ill (item 13) and refusal of medical service (item 14) resulted in a model that also had acceptable fit. If someone felt that their family was hurt and embarrassed because of their gender identity, it would be understandable if they also felt that they might have to stop associating with their family. Item 4 (feeling that your family was hurt and embarrassed) and item 5 (feeling that you had to stop associating with your family) were therefore allowed to co-vary, which further improved the model fit as shown in Figure 24.

The Cronbach’s alpha of the stigma scale with the original number of items was lower than reported in Table 25 ($\alpha = 0.81$). Items 13 and 14 showed good correlations ($r_{13} = 0.71$, $r_{14} = 0.60$) with the items in the rest of the scale. This suggests that the two new items are congruent with the stigma scale and that they fit well with the existing factor structure.
Figure 23. CFA of Stigma Scale with original number of items with 95% confidence interval of RMSEA reported in brackets.
Figure 24. CFA of Stigma Scale with two new items with 95% confidence interval of RMSEA reported in brackets


**TSAS Convergent Validity**

Convergent validity of the TSAS was assessed using a maximum-likelihood CFA for a multitrait-monomethod design (Cole, 1987). The TSAS and LSAS purportedly a measure different construct to the DASS, but they all utilise a single method for measurement: self-report scales. The subscales of the DASS measure depression, anxiety, and stress, but together measure psychological distress (Henry & Crawford, 2005). A CFA model (model 1) was assessed with the DASS scales loading onto a distress factor, and the TSAS and LSAS scales loading onto a social anxiety factor. As shown in Table 26, the fit of this model was questionable with a particularly high RMSEA, and GFI and AGFI lower than the 0.9 and 0.8 suggested by Cole (1987). Model fit was improved beyond the suggested cutoffs (model 2) by allowing for correlated errors between the Liebowitz avoidance scale and both the Liebowitz anxiety scale and TSAS avoidance scale. All factor loadings were high and were greatly significant from zero, as shown in Figure 25.

The social anxiety latent factor might be questioned as a general construct of self-reported anxiety. If this were the case, then the anxiety scale from the DASS might be considered to load onto the anxiety latent factor also. A CFA was conducted for this modification (model 3) and, although the fit indices improved as shown in Table 26, the DASS anxiety scale did not load well on the anxiety latent (loading = 0.16, $p = 0.02$). The latent anxiety variable may therefore be better conceptualised as social anxiety rather than general anxiety.
Table 26.

Fit indices for CFA models testing convergent validity of the TSAS with 95% confidence interval of RMSEA reported in brackets.

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>GFI</th>
<th>AGFI</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>135.69***</td>
<td>0.88</td>
<td>0.74</td>
<td>0.23 [0.19, 0.26]</td>
<td>0.90</td>
<td>0.84</td>
</tr>
<tr>
<td>2</td>
<td>19.06</td>
<td>0.97</td>
<td>0.93</td>
<td>0.06 [0.00, 0.11]</td>
<td>0.99</td>
<td>0.99</td>
</tr>
<tr>
<td>3</td>
<td>14.42</td>
<td>0.98</td>
<td>0.94</td>
<td>0.05 [0.00, 0.10]</td>
<td>1.00</td>
<td>0.99</td>
</tr>
<tr>
<td>4</td>
<td>181.00***</td>
<td>0.78</td>
<td>0.48</td>
<td>0.27 [0.24, 0.31]</td>
<td>0.86</td>
<td>0.76</td>
</tr>
</tbody>
</table>

*** $p < .001$

---

*Figure 25.* Two factors CFA model (model 2) for the convergent validity of the TSAS.
An alternative model might be a single factor model that might represent some sort of overall psychological distress (model 4). Although the results of a CFA for such model show good factor loadings onto the single general factor, as shown in Figure 26, the fit indices are very poor, as shown in Table 26. A single factor model is therefore questionable.

**TSAS Discriminant Validity**

The discriminant validity of the TSAS was assessed using the heterotrait-monotrait ratio of correlations as proposed by Henseler, Ringle, and Sarstedt (2014). The criterion method was used, which suggests a problem with discriminant validity if the HTMT value is greater than 0.85 (Kline, 2011). The results shown in Table 27 indicate no problems with the discriminant validity of the TSAS compared to other measures. Interestingly, confidence intervals for the HTMT value indicate the possibility of problems with discriminant validity between MSPSS and PWI.
Table 27.

HTMT ratio of correlations to assess discriminant validity with 95% confidence interval reported in brackets. Confidence intervals based on 5000 bootstrap samples.

<table>
<thead>
<tr>
<th></th>
<th>TSAS</th>
<th>LSAS</th>
<th>DASS-21</th>
<th>Stigma</th>
<th>MSPSS</th>
<th>CTC</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSAS</td>
<td>0.89</td>
<td>-</td>
<td>-</td>
<td>0.54</td>
<td>0.24</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>[0.85, 0.94]</td>
<td></td>
<td></td>
<td>[0.39, 0.68]</td>
<td>[0.08, 0.38]</td>
<td>[0.25, 0.55]</td>
</tr>
<tr>
<td>DASS-21</td>
<td>0.69</td>
<td>0.66</td>
<td>-</td>
<td>0.43</td>
<td>0.36</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>[0.60, 0.78]</td>
<td>[0.56, 0.76]</td>
<td></td>
<td>[0.30, 0.56]</td>
<td>[0.05, 0.29]</td>
<td>[0.22, 0.49]</td>
</tr>
<tr>
<td>Stigma</td>
<td>0.54</td>
<td>0.43</td>
<td>0.49</td>
<td>-</td>
<td>0.49</td>
<td>0.48</td>
</tr>
<tr>
<td></td>
<td>[0.39, 0.68]</td>
<td>[0.30, 0.56]</td>
<td>[0.35, 0.64]</td>
<td></td>
<td>[0.13, 0.42]</td>
<td>[0.29, 0.68]</td>
</tr>
<tr>
<td>MSPSS</td>
<td>0.24</td>
<td>0.20</td>
<td>0.29</td>
<td>0.49</td>
<td>-</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>[0.08, 0.38]</td>
<td>[0.05, 0.29]</td>
<td>[0.13, 0.42]</td>
<td>[0.29, 0.68]</td>
<td></td>
<td>[0.00, 0.21]</td>
</tr>
<tr>
<td>CTC</td>
<td>0.40</td>
<td>0.36</td>
<td>0.48</td>
<td>0.11</td>
<td>0.37</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>[0.25, 0.55]</td>
<td>[0.22, 0.49]</td>
<td>[0.34, 0.63]</td>
<td>[0.00, 0.21]</td>
<td>[0.18, 0.57]</td>
<td></td>
</tr>
<tr>
<td>PWI</td>
<td>0.47</td>
<td>0.45</td>
<td>0.65</td>
<td>0.58</td>
<td>0.75</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>[0.31, 0.63]</td>
<td>[0.30, 0.60]</td>
<td>[0.53, 0.77]</td>
<td>[0.43, 0.73]</td>
<td>[0.61, 0.89]</td>
<td>[0.40, 0.69]</td>
</tr>
</tbody>
</table>

Hierarchical regressions

Hierarchical regressions were conducted to assess if measurements from the TSAS provided any unique or further explanation of variance for the distress experienced by participants given that already provided by the LSAS.

Regressions were performed using fear scales only, avoidance scales only, and both scales combined. In all cases, the VIF between the TSAS and LSAS was low (VIF ≤ 4.07) suggesting no problems with collinearity. The results in Table 28 to Table 30 show that inclusion of the TSAS always increased the explanation of variance by a significant amount, and the TSAS always had a larger unique explanation of variance than the LSAS, with a low to moderate effect size.
Table 28.
Hierarchical regression showing effect of TSAS on DASS given LSAS (fear scales only).

<table>
<thead>
<tr>
<th></th>
<th>$\Delta R^2$</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>$p$</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>17.50</td>
<td>2.94</td>
<td>&lt; .001</td>
<td></td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>LSAS - Fear</td>
<td>0.49</td>
<td>0.05</td>
<td>0.58</td>
<td>&lt; .001</td>
<td>0.49</td>
</tr>
<tr>
<td>Step 2</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
<td>&lt; .01</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>13.96</td>
<td>3.06</td>
<td></td>
<td></td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>LSAS - Fear</td>
<td>0.22</td>
<td>0.10</td>
<td>0.27</td>
<td>&lt; .05</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>TSAS - Fear</td>
<td>0.23</td>
<td>0.07</td>
<td>0.37</td>
<td>&lt; .001</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Table 29.
Hierarchical regression showing effect of TSAS on DASS given LSAS (avoidance scales only).

<table>
<thead>
<tr>
<th></th>
<th>$\Delta R^2$</th>
<th>$B$</th>
<th>SE $B$</th>
<th>$\beta$</th>
<th>$p$</th>
<th>$\eta^2_p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>0.31</td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>21.22</td>
<td>2.74</td>
<td>&lt; .001</td>
<td></td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td>LSAS – Avoid</td>
<td>0.47</td>
<td>0.05</td>
<td>0.56</td>
<td>&lt; .001</td>
<td>0.31</td>
</tr>
<tr>
<td>Step 2</td>
<td>0.35</td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>Constant</td>
<td>16.95</td>
<td>2.93</td>
<td></td>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>LSAS – Avoid</td>
<td>0.20</td>
<td>0.09</td>
<td>0.24</td>
<td>&lt; .05</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>TSAS – Avoid</td>
<td>0.24</td>
<td>0.07</td>
<td>0.38</td>
<td>&lt; .001</td>
<td>0.06</td>
</tr>
</tbody>
</table>
Table 30.
Hierarchical regression showing effect of TSAS on DASS given LSAS (combined fear and avoidance scales).

<table>
<thead>
<tr>
<th></th>
<th>$\Delta R^2$</th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>$p$</th>
<th>$\eta_p^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.35</td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td></td>
<td>0.17</td>
</tr>
<tr>
<td>LSAS - Total</td>
<td>0.26</td>
<td>0.03</td>
<td>0.59</td>
<td>&lt; .001</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>0.39</td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>13.04</td>
<td>3.04</td>
<td></td>
<td>0.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS - Total</td>
<td>0.09</td>
<td>0.05</td>
<td>0.20</td>
<td>&gt; .05</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>TSAS - Total</td>
<td>0.14</td>
<td>0.04</td>
<td>0.44</td>
<td>&lt; .001</td>
<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

Moderation Analysis

The model shown in Figure 27 was used to test if social support or hardiness moderated the effects of either perceived stigma or enacted stigma. Results indicate that perceived stigma and hardiness have significant main effect on TSA but enacted stigma and social support do not. The effects of perceived stigma are not moderated by either social support or hardiness. There are significant two way interactions with enacted stigma and both social support and hardiness.

All the interactions were examined by probing the moderators at their mean value as well as one standard deviation above and below the mean (Cohen, Cohen, West, & Aiken, 2003). The plots for perceived stigma, shown in Figure 28, confirm that TSA appears to increase with perceived stigma and is not affected by the level of social support. Hardiness does appear to have a potential interaction however, with higher levels of hardiness corresponding to lower levels of TSA. For people with average and high levels of hardiness, TSA increases as perceived stigma increases, but TSA always remains lower for people with high
hardiness. People with low levels of hardiness appear to have high levels of TSA at low levels of perceived stigma and it does not appear to change significantly as levels of perceived stigma increase. This interaction was not found to be significant however, and this may be a power problem from the difficulty of detecting interactions and moderator effects, especially for two continuous variables (McClelland & Judd, 1993).

The significant interactions were also probed using the Johnson-Neyman technique as described in Bauer and Curran (2005) and the implementation shown by Bachl (2015). Figure 29 shows that the effect of enacted stigma on TSA decreases as social support increases, but that this interaction is only significant until higher levels of social support ($z = 0.73$ for anxiety and $z = 0.49$ for avoidance). People tend to endorse similar levels of TSA related fear or avoidance at lower levels of enacted stigma. As enacted stigma increases, people with average or lower levels of social support report increased levels of fear and avoidance. People with higher levels of social report appear to experience potentially no increase in fear and less avoidance.

Figure 30 shows that the effect of enacted stigma on TSA decreases as hardiness decreases, but that this interaction is only significant above low levels of social hardiness ($z = -1.43$ for anxiety and $z = -1.06$ for avoidance). Increase in hardiness appears to be associated with increases in stigma. As enacted stigma increases, people with average or high levels of hardiness report increased levels of fear and avoidance. People with low levels of hardiness appear to experience potentially no change in fear or avoidance.
Figure 27. Model to test the interaction between the two components of stigma and either social support (MSPSS) or hardiness (CTC).
Figure 28. Interaction plots for perceived sigma and social support or hardiness at +/- 1 standard deviations and 95% confidence intervals shaded in grey.
Figure 29. Interaction plots for enacted sigma and social support at +/- 1 standard deviations, and Johnson-Neyman plots showing conditional effect of stigma as a function of social support. 95% confidence intervals shaded in grey.
Figure 30. Interaction plots for enacted sigma and hardness at +/- 1 standard deviations, and Johnson-Neyman plots showing conditional effect of stigma as a function of social support. 95% confidence intervals shaded in grey.
**Path Model**

The TSAS was tested as a mediator from stigma, social support, hardiness, and their interactions, to DASS and personal well-being. Enacted stigma did not make a significant contribution to the explanation of TSAS, DASS or PWI and was removed from both models. Non-significant paths were also removed from the final model and the removal of those paths did not significantly decrease the amount variance explained ($\chi^2_{\text{Fear}}(7) = 13.42, p > .05; \chi^2_{\text{Avoidance}}(7) = 11.90, p > .05$).

The path models in Figure 31 and Figure 32 show, for both the avoidance and fear scales of the TSAS, that TSA fully mediates the effects of perceived stigma and the moderated effects of enacted stigma to psychological distress. TSA partially mediates the effect of perceived stigma and onto personal well-being and partially mediates the effects of hardiness to both distress and well-being. Indirect effects are shown in Table 31. Fit statistics are excellent for both of the models.

When the fear and avoidance scales of the TSAS are placed in the model together, neither of them are individually significant in predicting DASS or PWI in the presence of the other predictors. Given that this likely due to the high correlation between the avoidance and fear scales, a multiple regression was conducted to examine the unique contributions of the fear and avoidance scales on DASS. As shown in Table 32, the fear scale has a greater standardized coefficient and provides a greater unique contribution to the explanation of variance.
Figure 31. Path model for TSAS Fear as a mediator to DASS and PWI and enacted stigma moderating the effect of social support and courage to challenge.
Figure 32. Path model for TSAS Avoidance as a mediator to DASS and PWI and enacted stigma moderating the effect of social support and courage to challenge.
Table 31.

*Indirect effect for mediations in path models via TSAS to DASS and PWI.*

<table>
<thead>
<tr>
<th></th>
<th>via Fear</th>
<th></th>
<th>via Avoidance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DASS</td>
<td>PWI</td>
<td>DASS</td>
<td>PWI</td>
</tr>
<tr>
<td>Perceived Stigma</td>
<td>0.23***</td>
<td>-0.09**</td>
<td>0.21***</td>
<td>-0.08**</td>
</tr>
<tr>
<td>CTC</td>
<td>-0.14***</td>
<td>0.05*</td>
<td>-0.13***</td>
<td>0.05*</td>
</tr>
<tr>
<td>ESxMSPSS</td>
<td>-0.10*</td>
<td>0.04</td>
<td>-0.10*</td>
<td>0.04</td>
</tr>
<tr>
<td>ESxCTC</td>
<td>0.09*</td>
<td>-0.03</td>
<td>0.10*</td>
<td>-0.04*</td>
</tr>
</tbody>
</table>

*p < .05  **p < .01  ***p < .001

Table 32.

*Multiple regression showing contribution of TSAS scales on DASS.*

<table>
<thead>
<tr>
<th></th>
<th>ΔR²</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>p</th>
<th>η²p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Constant</td>
<td>13.27</td>
<td>3.07</td>
<td>0.09</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSAS - Fear</td>
<td>0.23</td>
<td>0.06</td>
<td>0.40</td>
<td>&lt; .001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSAS - Avoidance</td>
<td>0.16</td>
<td>0.07</td>
<td>0.25</td>
<td>&lt; .05</td>
</tr>
</tbody>
</table>

**Discussion**

The results confirmed the hypothesis that the TSAS would be highly related to constructs of social anxiety, as measured by the LSAS, and not to constructs of stigma, social support, hardiness, general distress, or personal wellbeing. These results provide evidence for the convergent and divergent validity of the TSAS as a measure of a type of social anxiety and not something else. The TSAS does appear to be highly correlated with the LSAS, however the correlation is not to the point of being collinear.
The results also confirm the hypothesis that the TSAS would provide greater explanation of psychological distress than the LSAS. The TSAS was design to query situations that are unique to TGD people, such as revealing one’s gender identity. Revelation of identity is often viewed as being a precipitant for discrimination (Moolchaem, Liamputong, O’Halloran, & Muhamad, 2015) and therefore a strong source of anxiety. These questions are therefore likely to have contributed to its unique explanation of variance in the DASS above that of the LSAS. The aim of creating a tool that provides a measure of social anxiety, but tailored towards TGD people, appears to have therefore been achieved as its unique explanatory power makes it more attractive as a tool when working with TGD people.

The results only partially confirm the moderation hypotheses. Social support and hardiness did not moderate the effect of perceived stigma, although perceived stigma had a main effect. The converse was found with enacted stigma that did not have a main effect but which was moderated by social support and hardiness.

The results also only partially confirm the mediation hypotheses. In the presence of the other variables, social support did not have a significant relationship with DASS or TSA. Social support had a direct effect to PWI which was not mediated by TSA. TSA fully mediated the relationship between perceived stigma and DASS with a medium size indirect effect. TSA fully mediated the between the relationship between the interaction terms for enacted stigma and DASS, but with small indirect effects. TSA partially mediated the relationship between CTC and DASS with a small to medium indirect effect, but
CTC retains a medium sized direct effect to DASS. TSA only partially mediated the relationships from perceived stigma and CTC to PWI with small effect sizes. The indirect effects from the interaction terms for enacted stigma to PWI were not significant except for one which barely reached significance and still only had a very small effect size.

These findings provide some nuance in understanding how minority stress may affect TGD people. Social support has previously been found to be an effective coping mechanism for trauma with suggestions that it may help people interpret and appraise events more favourably (Prati & Pietrantoni, 2009). Social support appears to have a significant covariant relationship with perceived stigma and hardiness, which suggests that social support could be a potential buffer such that those with higher levels of social support are able to better cope with stigmatising events and not experience as much TSA. Social support appears to important for subjective wellbeing and this is likely because a key part of subjective wellbeing is satisfaction with relationships and community connection (The International Well Being Group, 2013) but does not have a direct effect on TSA or DASS. Any potential buffering from social support for mental health would therefore need to be through indirect mechanisms that either reduce the perceptions of stigma or increase hardiness.

Given that neither enacted stigma nor social support have a main effect in predicting TSA and that the interaction is only significant for higher levels of social support, there may be a type of floor effect where the average amount of TSA experienced is the same when faced with low levels of enacted stigma, regardless of the amount of perceived social support. As the amount of enacted
stigma increases, those with access to social support are able to utilise it to prevent any increase in TSA. Those with higher levels of social support may have more options and/or be physically or financially less impacted by the effects of enacted stigma. For example, someone who loses a job because of their gender identity, but is well connected, may be able to find another job very quickly, or they may even be able to have themselves reinstated and the offender punished. Someone who is with their friends and is being assaulted or insulted in public may find their friends acting as a literal buffer against verbal or physical violence.

High levels of social support may even create an environment where people are less likely to experience high levels of enacted stigma. Social support, or “safety in numbers”, may create options and situations where enacted stigma is less likely to occur or occurs in with lower severity, e.g. limited verbal abuse rather than intense physical assault. This in turn may result in less anxiety about social interaction.

The differences between perceived stigma and enacted stigma provide further evidence for the minority stress theory in suggesting that difficult situations, the external distal stressors, do not directly result in poor mental health (Meyer, 2003). According to the minority stress theory, distal stressors lead to a build-up of internal proximal stressors that, together with the distal stressors, result in poor mental health outcomes. Enacted stigma could be considered an external or distal process and its lack of a simple effect on TSA, distress, or subjective well-being, is consistent with the minority stress theory. The effect sizes of interactions between enacted stigma with social support and hardiness are
small compared to perceived stigma which reinforces the importance of perceptions in anxiety.

The enacted stigma items in the stigma scale query how often an eternally initiated event (a distal process) has occurred due to the participant’s gender identity. This requires that the participant has experienced that event, and it also requires an attribution for the cause of that event. Recognising the occurrence of the events listed can be considered objective; it is clear if someone has been assaulted or has lost their job. In some cases, causes can be clearly attributed to the perpetrator’s dislike for the participant’s gender identity. In other cases, the reasons may be less clear and perceptions of cause may be more subjective.

Perceived stigma items have much greater emphasis on the proximal processes and query participant initiated action, interpretations, and feelings. The reasons for some of these feelings or actions may be due to prior objective events, but the focus of the questions is the result of proximal processes. Some items query how often a potentially hurtful comment has been heard, which might be viewed as a distal process. However, these are verbal comments that, although potentially hurtful, may be defended against with one’s own interpretations, beliefs, and thought processes.

Cognitive theorists have long held that the personal beliefs and interpretations about an event have great influence over how we feel afterwards, with the ABC model of emotions stating that it is the thoughts and beliefs about an antecedent event that lead to the consequences for emotions (Beck, 2011; Ellis, 1962). For example, one of questions in the perceived stigma scale asks, “How often have you heard that trans or gender diverse people aren’t normal?” This
may be interpreted as a derogatory statement with the implication being that anything outside of defined norms is negative. Some TGD people challenge what normal means however, and may assert that they are normal or celebrate being individual and not like other people (Perkett, n.d.). Internalising negative beliefs about being outside of the norms is likely to lead to greater distress over such a comment. Alternatively, adaptive beliefs and interpretations about normality may enable people to more easily dismiss any potentially intended insults or make interpretations that are different from the intended implications. In this situation, the difference in beliefs would mean a lower level of proximal stress resulting in lower overall distress.

Perceptions about discrimination may also increase the anticipation of discrimination. Quinn, Williams, and Wiesz (2015) found that experiences of discrimination may lead to increased anticipation of future discrimination and anticipation of social stigma. This is consistent with findings that discrimination is a traumatizing event that can result in PTSD symptoms including hyper-vigilance (Flores, Tschann, Dimas, Pasch, & de Groat, 2010). Victims of discrimination may understandably become hypervigilant and more wary of their surroundings to protect themselves from further discrimination, which would mean an increased anticipation of discrimination and stigma, and an increase in TSA.

Increased attention to potential discrimination may also mean a biased interpretation of situations. For example, experiencing discrimination and social rejection may result in a person mistakenly believing that they need to pretend to be cisgender in order to be accepted in other situations, which would result in a
higher response to that question on the perceived stigma scale. One reason for lower scores on that question may be more accurate perceptions of situations, which would also mean lower levels of TSA. Interpretations, beliefs, and attitudes towards discrimination may, therefore, affect the perception of events as being discriminatory as well as affect the level of anxiety measured by the TSAS.

Hardiness and resilience have been linked with higher self-esteem and better mental health outcomes (Grossman et al., 2011; Ho & Mussap, 2016) and, unlike social support, is directly predictive of TSA. People with the capacity and strategies to cope therefore tend to experience lower levels of TSA, but TSA still increases as enacted stigma increases. There appears to be a ceiling level, however, where people with low levels of hardiness have high levels of anxiety that tends not to change significantly with different levels of enacted stigma. People with low levels of hardiness may therefore see lower levels of enacted stigma as being as threatening as higher levels of enacted stigma. Avoidance may even decrease in response to increasing levels of enacted stigma for people with low hardiness. This may be an example of learned helplessness (Seligman, 1972) in which they feel they have no control over what happens to them. People with high or average levels of hardiness still have that sense of control and as they experience stigma, they attempt to control their exposure to it through avoidance. If people with low levels of hardiness have lost that sense of control, they may see no reason to avoid any particular situation as they may expect to be stigmatised no matter what they do. This may then result in them placing themselves in hazardous situations, which other people may have avoided, that then results in receiving more enacted stigma.
Helping people to increase their hardiness and resilience appears to be beneficial beyond potentially assisting those with learned helplessness. It is directly and indirectly (via TSA) predictive of both psychological distress and perceived well-being. Hardiness may therefore reduce the anxiety that people experience, as measured by the TSAS, but it also reduced overall psychological distress independently of their level of anxiety. This suggests that increasing resilience is likely to assist people to cope more effectively independently of the situations they are in so that they have increased mental health outcomes and have higher levels of subjective well-being.

Interventions to build resilience tend to be based around Cognitive Behavioural Therapy (CBT; VicHealth, 2015). The main focus of CBT is traditionally not, however, the improvement of resilience, but is the treatment of psychopathology by modifying cognitions with behavioural experiments (Beck, 2011). Interestingly, CBT has been found to increase perceived social support (Marian & Filimon, 2010), and this may occur by modifying cognitions to recognise support that is already available, or by behaving in ways to increase actual support, e.g. utilising problem-solving skills to generate more support or improving social skills that increase social support (Dour et al., 2014). This may be a possible explanation for the covariant relationship between perceived social support, hardiness, and stigma.

It is important to remember that TSA was not conceptualised as a psychopathology given that TGD people do experience discriminatory events (Bockting et al., 2013; Grant et al., 2011b; Hyde et al., 2014; Pitts et al., 2009; Rotondi, 2011; Testa et al., 2012) and that fear and anxiety are primarily part of a
functional defence system that protects us from danger (Misslin, 2003). The path model does show, however, that TSA is highly predictive of psychological distress which may be indicative of or may lead to psychological disorder. The model suggests that there may be two areas for intervention: altering perceptions of stigma to reduce levels of TSA; or, changing the relationship between the TSAS and DASS by potentially helping people to cope with what may be adaptive levels of fear and avoidance, and process it in a way that does not lead to psychological distress.

The first of these options relies on the relationship between perceived stigma and TSA being stable across time and population. The second option relies on the relationship between TSA and DASS being reflective of the current sample at the current time but otherwise being malleable rather than being a fixed, true representation of the relationship. Further research would be required to explore the stability or malleability of these relationships.

Fear is an emotional state that can lead to defensive behaviours such as avoidance (Rosen & Schulkin, 1998). Differentiating between a subjective emotional state and outcome behaviour for the TSAS appears to have little utility in predicting or explaining further distress. Once subjective fear has been measured, the measure of avoidance does not provide any further information. The correlation between the avoidance and fear scales is higher than the common multicollinearity cut-off of 0.8 but lower than the stricter cut-off of 0.9 (Midi, Sarkar, Rana, & Rana, 2010), which suggests that they may not be separate constructs. The LSAS displays similar levels of collinearity and is consistent with the findings of Heimberg et. al (1999) whose results were above the 0.9 cut-off.
Heimberg et. al also suggested some alternative explanations for the high correlation: the format of the rating scales may have increased the correlations; the collection of avoidance ratings after fear ratings may have spuriously increased the correlation; or, fear and avoidance may be more strongly related amongst clinical subjects.

In this study, the LSAS and TSAS were formatted in three columns with the scale item, fear response, and avoidance response side by side to allow participants to quickly provide both responses without having to re-read the items again. This was done to assist with survey completion as there were seven measures in the survey and the LSAS and the TSAS were the longest. Prompting participants to consider responses to both fear and avoidance for an item in this short space of time may have increased the correlations between the fear and avoidance scales. The alternative would be to separate the responses for fear and avoidance.

The second possibility mentioned by Heimberg et. al (1999) would mean that if the fear and avoidance scales were separated, they would need to be positioned away from each other in the survey so that the responses and items for one weren’t still salient whilst the other was being responded to. For a study such as this with seven different measures, it would be feasible to interleave or create chronological distance between the measures. In clinical settings where only a single measure is used, this would be unfeasible. If the difference between fear and avoidance cannot be measured reliably in clinical settings, then they may not be clinically relevant differences even if they are theoretically different. This would imply that only the fear or the avoidance scale would need to be
administered. The fear scale would be the preferred option as it has greater explanatory power to the DASS and a stronger relationship from Perceived Stigma.

Potential increase of correlations due to saliency of prior scales has another implication for this study with the placement of the TSAS in relation to the LSAS. Responses to the LSAS were collected immediately after responses to the TSAS. After considering all the ways in which they may experience discrimination, participants may have completed the LSAS with a focus on how they are being judged at all times for their gender identity. This would differ from the usual conception of social anxiety in which focus is on both external threats and internal focus of physiological responses and negative self-imagery. Raising the awareness of external judgement and discrimination may therefore result in participants rating their fear of situations higher than they normally would.

Alternatively, if TSA is also dependent on negative self-imagery, then it may be dependent on comfort with presentation, ability and/or desire to “pass” in presentation, level of outness, and state of transition. The steps taken in transition can differ between people, but those who complete more of the steps they intend to take tend to be more resilient and have higher self-esteem, which leads to lower psychological distress (Ho & Mussap, 2016). This may the result of a greater feeling of congruence and authenticity, or, especially in the case of people who identify and present with the gender binary, it may be related to the comfort in being able to blend in with society and be unnoticed.
Similar to the solution for differentiating between fear and avoidance, collecting responses to the LSAS when thoughts of discrimination have not been cued may assist in teasing out the differences between the LSAS and the TSAS. If the TSAS and LSAS were measuring the same construct, and fear and avoidance were the same construct, then it would be expected that TSAS fear would be collinear with LSAS avoidance and that TSAS avoidance would be collinear than LSAS fear. However, this is not consistent with the results that show a high relationship between those constructs but below the 0.8 cut-off for collinearity. This suggests that there is a large overlap and only a small difference between TSAS and LSAS and between fear and avoidance, and the difference is only perceived when the two constructs are measured together. From a clinical view, this again suggests that only one scale would need to be administered, and the TSAS fear scale would be preferred given its greater explanatory power psychological distress over the LSAS.

The amount of psychological distress may be a key factor. The amount of discrimination experienced by TGD people may warrant a certain level of fear. Avoidance serves to preserve beliefs about threats and dangers however (P. F. Lovibond et al., 2009) which helps to generalise and preserve anxiety in social situations. People who do not have clinical anxiety may be able to hold a healthy relationship towards the fear without avoiding situations in their daily life. Participants in this study weren’t screened for clinical levels of psychopathology and more distressed people may have been more motivated to complete a survey regarding anxiety in TGD people. This may explain the high mean value for the DASS which appears to have been shifted rather than skewed towards higher levels of distress.
The ability of the TSAS to predict PWI is much smaller than its predictive ability for the DASS. The DASS is sensitive to changes in clinical populations (Page, Hooke, & Morrison, 2007) and specifically asks for feelings over the past week (S. H. Lovibond & Lovibond, 1996). In contrast, the PWI is believed to be much more stable, with deeper roots in personality, and is much less sensitive to variations in life (Cummins, Eckersley, Pallant, Van Vugt, & Misajon, 2003). Perceived social support is the main predictor of PWI in this study, and that has also been found to be stable over time (Sarason, Sarason, & Shearin, 1986). The mean PWI score for this sample was much lower than the normative Western range. Cummins et al. (2003) suggest three possible explanations: that TGD people are willing to express lower levels of satisfaction than the rest of the population; that TGD people are constitutionally less satisfied than the rest of the population; or that there is a negative influence driving down TGD wellbeing in general. Research to date describing the discriminatory experiences of TGD people provides some clear evidence of homeostatic threats in support of the third explanation.

The first two possibilities cannot be fully discounted at this stage. TGD people face challenges with social acceptance, and their willingness to be true to themselves may also reflect a willingness to express lower levels of satisfaction than might be seen to be socially acceptable. Willingness to live according to their identified gender may also be reflective of a constitutionally lower satisfaction than the rest of the population. There may be people in the rest of the population, for example, who have similar feelings about their gender but have constitutionally higher levels of satisfaction with life and therefore do not feel a need to transition or acknowledge those feelings. These explanations are
currently conjecture however, and would require further research or evidence for them to be considered further.

**Limitations**

Participants in the survey were recruited via convenience sampling, mainly utilising online forums, support groups, and peer recruitment. Results may therefore not be reflective of the general TGD population, but may only reflect those who are connected to support groups or other TGD people, and those who are motivated to complete the survey. People who satisfied and engaged with others and with life may feel that they don’t need to be connected support groups or other trans and diverse people. They may also feel that a study on TGD social anxiety is not applicable. Both of these groups could therefore be under-represented in this study which would skew the data towards those who are showing more distress.

Alternatively, those with extremely high levels of distress or depression may lack the motivation to complete an online survey which would mean that the most severe cases are not represented. People who may benefit from community support but who are disconnected or disenfranchised with the TGD community may also be under-represented. Participants who have been in the community for a while may also have research fatigue and be less motivated to participate in this study. The study may therefore be more representative of people who have been in the community for shorter periods of time. The difference in time of lived-experience may also skew the results.

The convenience sample appears to have lacked power in examining some of the hypotheses. The interaction between perceived stigma and CTC was found
to be statistically non-significant in predicting TSA. The interactions plots do show a trend of people with low hardiness having a consistently high level of TSA regardless of the level of perceived stigma. The lack of significance appears to be due to a lack of participants who report both low perceived stigma and low hardiness. The relationship between perception and hardiness as discussed previously makes it understandable that there would be few participants in this category. Research stratifying participants using these criteria would therefore not be representative of the population, but would allow stronger conclusions to be drawn about the interaction between perceived stigma and hardiness.

The correlational nature of this study does not permit conclusions about causation. For example, the cognitive behavioural model of social anxiety sees fear and avoidance reinforcing each other (Hofmann, 2007) which would require a longitudinal analysis to observe the pattern of change. The relationship and difference between fear and avoidance could be clearer when viewed across time where it may be possible to observe one lag the other after situational encounters if the right time period is chosen for sampling.

**Conclusion**

This study provides further evidence for the construct validity of the TSAS with strong evidence for convergent and divergent validity. The TSAS has potential to be a more useful clinical tool than the LSAS, for exploring the anxiety that TGD people experience in social situations, due to its greater explanatory power over psychological distress and its inclusion of situations that TGD people find specifically difficult. The ability to measure TSA and provide evidence for its role in mediating from stigma and hardiness to psychological distress and perceived well-being also makes it a potentially useful tool when assisting TGD
people cope with distress or discrimination. The efficacy of interventions, such as CBT, can be monitored without potentially pathologising or blaming TGD people for anxiety they may experience due to stigma and discrimination.
Chapter 5

Feasibility trial of an online intervention

Social anxiety is a common experience for trans and gender diverse (TGD) people. This was evidenced in the relevant literature reviewed in the introductory chapter and confirmed empirically in the validation of the TSAS. The creation and validation of the TSAS demonstrated that this social anxiety can be measured as a function of the felt fear and/or avoidance associated with specific social situations. It has been argued that trans and gender diverse social anxiety (TSA) arises from the fear of being discriminated against because of gender identity. This study focuses on the development and feasibility trial of an e-health program that aims to assist TGD people in Australia cope with TSA.

The need for clinical intervention

The minority stress theory (Meyer, 2003) suggests that hostile environments contribute to the stress and poor mental health outcomes of TGD people. Fear of negative outcomes contributes to vigilance in and avoidance of social situations. Avoidant coping strategies can be dysfunctional and are a strong predictor for anxiety (Budge, Katz-Wise, et al., 2013), while sensitivity to feared stimuli increases the likelihood of avoidant behaviour (Sheynin, Beck, Servatius, & Myers, 2014). Ongoing fear and avoidance of social situations can lead to social anxiety which is one of the common anxiety subtypes found in the TGD community (Millet, Longworth, & Arcelus, 2017). This suggests that clinical intervention is important in assisting TGD people to utilise adaptive coping strategies to prevent the development of social anxiety symptomology and to overcome existing symptoms.
Interventions that are effective for reducing social anxiety in the general population may not necessarily be efficacious in the context TSA. Taking an ahistorical view of the problem to promote responsibility within the client for personal growth and change (Overholser, 2005), for example, runs counter to the importance of awareness of social oppression and engagement in social activism as adaptive resilience building strategies (Singh et al., 2011). It is important therefore, that an intervention for TGD people is not only sensitive to their needs but also recognises the oppression and discrimination which they experience.

Although the discrimination that TGD people experience may be ongoing, there is evidence that programs based on cognitive behaviour therapy (CBT) can reduce distress and improve mental health in the context of ongoing violence (Barron, Abdallah, & Smith, 2012). CBT has previously been adapted for use with sexual minority individuals (Glassgold, 2009) and there is evidence that it is efficacious by: contextualising maladaptive behaviours as learned responses to environmental stress; promoting self-efficacy in coping with the environment; developing adaptive responses; and targeting risk factors that disproportionately affect sexual minorities (Pachankis, Hatzenbuehler, Rendina, & Safren, 2016). A CBT program for TGD people may therefore be able to provide similar benefits without the social context needing to change for participants.

The AFFIRM program (Craig & Austin, 2016) is a CBT based group intervention for sexual and gender minority youth that integrates affirmative practice into CBT. It recognizes and validates the impact of discrimination, whilst maintaining the basics of CBT in restructuring cognitions to adaptively cope with both internal and external stressors. There is evidence for the efficacy of the
program with participants responding positively to it and showing reductions in
depression and in appraisal of stress as threat (Craig & Austin, 2016). The
AFFIRM pilot did not measure outcomes for anxiety, however the positive
outcomes for depression and stress appraisal suggest that an online program
specifically created to address TSA may be able to achieve similar results. The
response to the AFFIRM program also provides hope that the TGD community
would also positively respond to a program created specifically to target TSA.

**Challenges for clinical intervention.** A challenge in reaching the TGD
community in order to provide mental health interventions is a distrust of mental
health practitioners. Poor experiences or hearing about other people’s poor
experiences can lead to fears of seeking mental health care and is a common
reason for TGD people deciding not to seek treatment (Shipherd et al., 2010).
Contributing to this may be views of the mental health profession as transphobic
gatekeepers for transition services, and that information provided by clients may
be used to deny them access to services such as hormones or surgery (Ho &
Mussap, 2016). Other contributors may be experiences of harassment or
discrimination during sessions (Couch et al., 2007; Poteat, German, & Kerrigan,
2013) with mental health issues being blamed on gender identity (G. R. Bauer et
al., 2009). Others may have had care denied altogether because of either the
clinician’s personal attitude, which results in ambivalence towards the
appropriateness of treatment, or because of lack of training and experience (Grant
et al., 2011a; Poteat et al., 2013). People seeking care may therefore feel like they
are a novelty or a training case for the clinician, which increases discomfort in the
situation (Couch et al., 2007). This can result in a view that health services do not
really exist for TGD people (Couch et al., 2007) and a subsequent reluctance to
engage in mental health programs. Financial barriers to accessing mental health services may also impact disproportionately on the TGD community.

TGD people experience greater rates of unemployment, poverty, or underemployment than the rest of the population (Grant et al., 2011a). The financial burden of mental health care is a barrier that reduces utilization of services (Marrone, 2007) and is a major reason for TGD people deciding not to access mental health care (Shipherd et al., 2010). There is, therefore, a need to make a program accessible so that those in need have a better opportunity to complete it.

E-health may overcome the potential barriers to traditional healthcare by the delivery of an online self-help program. A program that does not rely on contact with a clinician for efficacy could reduce the fears of direct discrimination or harassment. Providing a program that promotes a sense of inclusivity may mean that it has a low perceived risk of stigma and felt-discrimination, which makes online self-help programs attractive (Marks & Cavanagh, 2009) and is consistent with findings that people with social anxiety may prefer unguided self-help programs (Furmark et al., 2009). Provision of a program that is tailored to the specific needs of the TGD community could therefore allow people to gain access to help that they might otherwise balk at.

Distrust of how mental health clinicians will utilise client data could be addressed by the anonymity of online programs. The anonymity of an online program could enable people to access help without fear of information being in a health record and/or information being used to deny them of other services, and this greater level of confidentiality is appealing to potential clients (Marks &
Cavanagh, 2009). Potential clients may have doubts about the security and misuse of any collected information online (Wallin, Mattsson, & Olsson, 2016) but fears may be allayed if the program is run or endorsed by a trusted offline brand such as a health service or university (Todkill & Powell, 2013). With this level of trust, people may have greater confidence that the online program was there to help them rather than being part of a gatekeeping exercise, and this may mean a greater likelihood of them choosing to undertake the program.

The financial barrier to traditional psychotherapy could also be addressed with the provision of an online program. The ease and low financial cost with which potential users can begin, and also stop, means that less effort and money is at stake compared to the effort of finding a therapist, making appointments, and attending an hour long session. Fears about finding the right therapist or treatment may still be present, but the relatively low level of investment and ease of accessing a self-help program reduces those fears, which translates to a lower risk and further increases the attractiveness of online programs (Marks & Cavanagh, 2009). People would therefore be able to access help, which might otherwise be unattainable due to financial constraints, and would therefore be more likely to do so due to the lower risk compared with traditional face to face therapy.

The provision of CBT via online programs has good evidence for efficacy. A meta-analysis comparing CBT-based guided self-help programs to face-to-face treatments for depression and anxiety found no significant difference in efficacy following program completion, in 1 year follow-up, or in drop-out rates (Cuijpers, Donker, Van Straten, Li, & Andersson, 2010). Unguided self-help programs have
been found to be similarly efficacious, with no significant differences in symptom reduction, dropout, or adherence when compared with guided self-help programs (Berger et al., 2011). Treatment adherence appears to be related to how credible participants perceive the logic of a program to be, and reliable change in symptoms is related to baseline severity with more severe cases being more likely to have reliable change (Nordgreen et al., 2012). The lack of human contact in an unguided program is advantageous for the TGD community due to the previously discussed lower cost, increased confidentiality, and decreased perceived risk of stigma and discrimination. An unguided self-help program may therefore be able to overcome the barriers of traditional face-to-face therapy, whilst being efficacious in addressing the needs of the TGD community.

The need for a feasibility trial. This study therefore focuses on the development and feasibility trial of a tailored online unguided self-help program to address TSA. The development of a program is in response to the needs of the TGD target population that require sensitive consideration. There has not been a previous online intervention to address these needs, which indicate the need for a feasibility trial prior to more intensive testing for efficacy (Bowen et al., 2009). The feasibility trial will explore whether an online self-guided CBT program adapted to the needs of TGD people is acceptable, suitable, shows promise of being a successful intervention, and whether there is demand for such a program.

TSA was conceptualised to be non-pathological, and therefore recruitment and eligibility for the program shall be open.

Conducting an intensive trial for efficacy prior to a feasibility trial poses an unacceptable risk to the wellbeing of participants. Offense may be taken to the
contents despite best efforts to be respectful or it may be unsuitable in unforeseen ways. Acceptability and suitability queries how participants react to the program (Bowen et al., 2009), program retention, and whether participants have the time, capacity, and understanding to engage with the program (Orsmond & Cohn, 2015). These will be assessed using both quantitative and qualitative measures. Quantitative measures include tracking attrition, and the use of Google Analytics (Google.com, 2017) to quantify participant engagement with the program. Potential as a clinical intervention will be based on reliable decrease of TSA as well as general psychological distress via the DASS-21 (Henry & Crawford, 2005), but testing efficacy is not the main focus in a feasibility trial (Bowen et al., 2009). Qualitative methods include follow-up surveys to query participant reactions to the program as well as the reasons for attrition for those who stopped engaging with the program.

**Creation of the TSAP**

Permission was gained to adapt the Anxiety Online (AO) program as a basis for adaptation in creating the Trans and gender-diverse Social Anxiety Program (TSAP). The AO program is a suite of five fully automated online self-help CBT interventions, each addressing particular anxiety disorders, including social anxiety disorder, and has evidence for reducing distress, increasing quality of life, and overall treatment satisfaction (Klein et al., 2011). Standard CBT content, strategies, and homework is used by AO in its online delivery of the program. Given that evidence has been provided for the efficacy of online delivery of treatment, the feasibility study can therefore focus on the adaptation of the program to the needs of TGD people.
One adaptation was a reduction in the length of the program from 12 weeks to 8 weeks. Program length is one of the factors predicting attrition in online interventions (Christensen, Griffiths, & Farrer, 2009). Given that participants for the TSAP are not diagnosed as having a specific disorder, it was therefore reasoned that a shorter program would be more likely to be completed.

The main adaptation of the TSAP was the integration of affirmative practice into CBT to validate TGD identities and recognise the effects of discrimination on the lives of TGD people (Austin & Craig, 2015). The aim was to help people to live fulfilling lives in spite of the discrimination they may experience. In each week, examples were provided that are specifically relevant to the experiences of TGD people to help make the presented techniques more applicable and clear for the intended audience. A short video at the start of each week introduced the content for that week and attempted to encourage and remind participants to complete homework tasks from the previous week. The remainder of the content was in a mix of text, interactive animations, and static pictures. At the end of each week, a checklist was provided to highlight the key learnings from the week that participants could focus on, as well as a reminder to continue using content learned from previous weeks.
Feasibility Study

TSAP Protocol

Week 1: Introduction

Aim: Introduce participants to the program and create a foundation for success in the program.

Content: 1. Introduce the non-pathological concept of TSA, distinguish it from social anxiety disorder, and discuss and reflect on the impacts.

2. The purpose and outline of the program. Reinforce that the purpose is not to invalidate experiences of discrimination, and that participation in the TSAP will not change society.

3. How to get the most out of the program and ask participants to reflect on their perceived importance of engaging and their confidence in doing so.


Supporting Materials:

1. Introductory video

2. Illustration explaining the purpose of the program (see Figure 33)

3. Interactive animation illustrating how discrimination at various level of society can contribute to TSA and how that can lead to internalised transphobia that maintains TSA (Austin & Craig, 2015)
3. Activity sheet: Identifying and considering how to overcome barriers

![Activity sheet illustration]

Figure 33. Illustration explaining the purpose of the program

**Week 2:** The function of anxiety

**Aim:** Help participants understand the biopsychological functions of anxiety as well as providing strategies to modify the body’s response to anxiety provoking stimuli.

**Content:**
1. Introduce the adaptive purpose of fear and the fight/flight response using the context of confrontation with a transphobic bully. Discuss how it can be unhelpful using the example of avoidance due to worries about the potential for bullying. Discuss learning how to differentiate between the two.

2. Recognising tenseness. Understanding the link between the brain and the body, and the strategies to relax while engaged in everyday activities which may include anxiety provoking situations (R. G. Heimberg, 2002).
3. The practice of mindfulness to reduce anxiety by decreasing rumination, decreasing reactivity to situations, and increasing adaptive response to stressors (Davis & Hayes, 2011).

Supporting Materials:

1. Introductory video
2. Audio and script for body scans
3. Audio and script for controlled breathing
4. Audio and script for muscle relaxation
5. Audio and script for mindfulness exercise
6. Activity sheet: Previous week plus practicing body scan, controlled breathing, mindfulness, and muscle relaxation.

Week 3: Awareness of thoughts

Aim: Teach participants how thoughts can influence feelings and behaviours, and to therefore identify, be aware of, and monitor their thoughts.

Content: 1. Normalise self-talk and illustrate how different thoughts in the same situation can result in different feelings and behaviours (Beck, 2011). Context was provided by examining potential thoughts about why people might be staring at you in public.
2. The framework for monitoring and identifying these automatic thoughts, the resultant emotions, as well as evaluating the belief in the thought.
3. Differentiating accurate thoughts from inaccurate thoughts and common thinking errors.
Figure 34. Initial view of an interactive graphic showing how different thoughts in the same situation could lead to different feelings.

Supporting Materials:

1. Introductory video
2. Interactive graphic to show how different thoughts in the same situation could lead to different feelings (see Figure 34).
3. Interactive graphic to illustrate the relationship between thoughts, feelings, and behaviour.
4. Downloadable thought monitoring worksheet.
5. Downloadable inaccurate thoughts checklist.
6. Interactive table showing how some of the thinking errors might apply to situations in a hypothetical thought record.
7. Activity sheet: Previous week plus monitoring thoughts and identifying inaccurate thoughts.
Week 4: Challenging inaccurate thoughts
Aim: Teach participants how to teach participants how to evaluate the accuracy of their thoughts and create more balanced thoughts to replace inaccurate ones.
Content: 1. Examining evidence both for and against a thought. The thought used throughout this exercise was “I don’t belong in this world.”
2. Ways of disputing inaccurate thoughts.
3. Creating more balanced thoughts.
Supporting Materials:
1. Introductory video
2. Interactive table showing how to utilise these strategies with thoughts from the same hypothetical thought record as used in the previous week.
3. Downloadable thought worksheet
4. Activity sheet: Previous week plus challenging and reframing inaccurate thoughts

Week 5: Social interaction
Aim: Help participants to do the things that are important to them by stepping through the practice of graded exposure to identify tasks they would like to do, and engaging in real life exposure
Content: 1. The role of avoidance in perpetuating anxiety.
2. Identifying the risks in a particular situation utilising the skills learned about accurate/inaccurate thoughts.
3. Developing a list of important situations that trigger anxiety.
4. Using the Subjective Units of Distress Scale (SUDS) to rank
listed situations.

5. Selecting an appropriate situation to work on.

6. Breaking the selected situation into smaller tasks and using visual imagery to cope with potential threats. An example of going to buy groceries was used for this step and the next.

7. Carrying out the task in real life.

8. Determining readiness to move onto the next task.

9. Coping with common problems and issues.

Supporting Materials:

1. Introductory video

2. Interactive graphics explaining the SUDS.

3. Activity sheet: Previous week plus identifying and practicing social interaction.

**Week 6: Problem Solving**

**Aim:** Help participants cope more effectively by changing or improving situations with a problem solving framework. An example situation was used of someone being misgendered and not being allowed to remove their title from their bank card.

**Content:**

1. Defining the problem.

2. Assertively communicating the problem.


4. Evaluate possible options.

5. Choosing a solution.

6. Plan and carry out the solution.
7. Evaluating how it went.

8. Coping with common problems and issues.

Supporting Materials:

1. Introductory video
2. Downloadable worksheet for using the problem solving technique
2. Activity sheet: Previous week plus using the problem solving technique.

**Week 7:** Internalised transphobia

**Aim:** Help participants challenge any internalised transphobia they might be experiencing. An example of “Trans people aren’t normal” was used to guide participants.

**Content:**
1. The effects of internalised transphobia.
2. Identifying beliefs.
4. Creating more balanced beliefs.

Supporting Materials:

1. Introductory video
2. Activity sheet: Previous week plus monitoring and challenging internalised transphobia.

**Week 8:** Maintaining gains

**Aim:** Help participants maintain any gains they have made over the course of the program.
Content: 
1. Ups and downs of progress.
2. Coping with and learning from setbacks.
3. Troubleshooting skills learned.

Supporting Materials:
1. Introductory video

Evaluation: 
1. DASS and TSAS

**Measures**

The Trans and gender diverse Social Anxiety Scale (TSAS) is a 35 item measure of the level of anxiety across a number of social situations and was developed specifically for TGD people. Items are responded to twice: once for the level of anxiety in that situation, using a 4-point Likert scale (0 = *None*, 3 = *Severe*); and once for the level of avoidance of that situation, using a 4-point Likert scale (0 = *Never*, 3 = *Usually*). Separate ratings can therefore be given for anxiety and avoidance. It has five subscales for anxiety in different domains: (a) close personal relationships, (b) general social interactions, (c) authoritarian interactions, (d) interactions with the LGBT community, and (e) accessing health services.

The 21-item short form version of the Depression, Anxiety, and Stress Scale (DASS-21; S. H. Lovibond & Lovibond, 1996) was utilised as a measure of psychological distress (Henry & Crawford, 2005) with three subscales that measure depression, anxiety, and stress. Items are scored on a 4-point Likert scale (0 = *Did not apply to me at all*, 3 = *Applies to me very much, or most of the time*) with higher scores indicating higher distress. It has evidence of adequate construct validity, high internal consistency, good convergent and discriminant

Participants

The 58 participants who signed up for the program and completed the baseline survey were aged between 18 and 68 years ($M = 34.67$, $SD = 13.04$), although 15 participants declined to disclose their age. Distribution of gender identities is shown in Figure 35, with 31 participants being assigned male at birth (AMAB), 26 participants being assigned female at birth (AFAB), and 1 participants reporting being intersex/other.

Figure 35. Gender distribution of participants

Depression and anxiety were the most common disorders reported amongst the 36 participants that reported current diagnoses of mental disorder and
the 17 participants who reported prior diagnoses that were no longer current. The reported diagnoses, listed in Table 33, indicate that 40% of participants reported a diagnosis of depression and 52% reported an anxiety related diagnosis.

Table 33.
Mental disorder diagnoses reported by participants. Participants could report more than one diagnosis.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>n current diagnosis</th>
<th>dx not current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>23</td>
<td>5</td>
</tr>
<tr>
<td>Anxiety disorders (total)</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>Anxiety (did not specify)</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Generalised anxiety disorder</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Social anxiety disorder</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Agoraphobia</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>PTSD (inc complex PTSD)</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Gender dysphoria</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Borderline Personality Disorder</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Bipolar disorders (total)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Bipolar II</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Bipolar (did not specify)</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Autism spectrum disorder</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Bulimia Nervosa</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>ADHD</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Obsessive-compulsive disorder</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Body dysmorphia</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Adjustment disorder</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Anorexia</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Intermittent explosive disorder</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>
Participants were recruited via posts in online support forums, social media, and websites. Physical notices were placed in the clubrooms of university clubs and associations that had been formed for sex and gender diverse students. Chain sampling was also encouraged and the program was advertised as being open to anyone over the age of 18, who identified as trans or gender diverse, and who currently resided in Australia.

**Procedure**

The study was approved by the Deakin University Human Research Ethics Committee. Participants were directed to the TSAP website where they could sign up for the program using an email addresses for subsequent logins and for reminder emails and follow-up surveys. A password also needed to be created by the participant during the sign-up procedure. Emails and passwords were stored on an administrative database that the researchers did not have access to and were separate to the survey data.

After signing up, participants were asked to complete a survey to provide demographic and baseline data. The program was laid out as previously described in eight weekly modules and was therefore expected to take 8 weeks to complete. Participants had the freedom, however, to explore all the content at any point. At the end of that time, participants were asked to complete a post-program survey with the TSAS and DASS. Participants were also asked whether they thought this program was useful or helpful, which modules were most helpful, if there were any topics that they thought needed to be covered, and what the program did or did not do well. Space was provided to allow as much feedback as the participants wished to provide.
If participants did not log into the program website for two weeks, an email was sent reminding them about the program and encouraging them to continue working on the weekly modules. If participants did not log in for a further two weeks, then an email was sent directing them to an exit survey asking what contributed to them not completing the program. Several options were provided and participants could select as many as applied. They were then asked about what specific things they would change in the program. Participants were also asked to complete the DASS and TSAS.

Statistical analysis was performed using R (Version 3.2.5; R Core Team, 2016) with package psych (Version 1.6.12; Revelle, 2016).

Results

As shown in Figure 36, only 2 participants provided post-program data. After analysing participant engagement with the program contents, it was clear that neither of those participants would have followed the protocol for the program. Only one participant completed all the contents in the program, and that was done over two sessions in a single day – the first session being 55 minutes long, and the second being 30 minutes long. Sessions lasted an average of 16.25 minutes, but this was extremely variable ($SD = 19.38$) with some people not interacting at all (recording a time of 0 seconds) and the longest session being 103.6 minutes.
Most of the participants were unable to complete a single week worth of content as shown in Table 34. As shown in Figure 37, the majority of participants only logged in to the program once and very few logged in more than five times. Amongst the 24 participants who completed some content, the majority only completed a single week worth. Only four of the participants (the two who completed weeks 1 and 2, and the two who completed up to week 5) attempted to follow the program protocol by completing the content in order and over multiple sessions. It was also common for participants to browse with 7 of the 24 participants exploring, but not completing, the content in other weeks.
Table 34.
*Participant progress through program*

<table>
<thead>
<tr>
<th>Completed weeks</th>
<th>n</th>
<th>n sub-total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Didn’t reach first page</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Exit after intro video</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Exit after three pages or less</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Partial completion (&gt; 50%)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Watched all intro videos only</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 1</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 1 and 2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 2, 7, and 8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 1 to 5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeks 1 to 8</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Only one of the participants who completed the program provided qualitative feedback. This participant thought that the program did well in “[introducing] a variety of techniques”, with the “relaxation and thought management modules” being the most useful.

Twelve of the participants who dropped out of the program provided qualitative feedback, either via email or via the exit survey. Only one participant was critical of the program by saying, “The program was encouraging participants to be complacent with their harassment as ‘Social change took time’”. This

*Figure 37. Bar plot of how many times participants logged in*
participant was the same person who endorsed that the “program didn’t seem useful” as shown in Table 35. Setting aside the time and remembering to do the program was common in the feedback with five participants saying they “haven’t had time” or “#LifeHappens [sic]”. One participant therefore requested “more reminders”. This is consistent with the results of Table 35, which shows that forgetting to do the program and not having enough time were the two main reasons for not completing the program. One participant also appeared to forget about the program totally by responding to the reminder email with “I don't even know who you are or what you are”. Not included in Table 35 are the three participants who withdrew from the study due to having insufficient time to complete it. It was unknown whether these participants completed the exit survey in addition to sending an email.

There appeared to be a few technical barriers as one participant reported that they “couldn't find the website to log in to again” and another reported that “the website was a bit clunky upon sign on”. One participant reported that the way the behaviour of the login screen and the lack of a secure http connection meant that the website “seems a bit dodgy” and that they therefore did not continue. Adaptation for mobile use was a potential issue as one participant reported that “it wasn't mobile friendly” whilst another said “I would 1000% use these modules in app form”. As shown in Table 36, almost half of the participants were using a mobile device to access the program.
Table 35.

*Number of participants endorsing a reason for not completing the program in the exit survey. Participants were able to select more than one response.*

<table>
<thead>
<tr>
<th>Reasons for not completing the program</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didn’t have time</td>
<td>6</td>
</tr>
<tr>
<td>Forgot</td>
<td>6</td>
</tr>
<tr>
<td>I already knew the content being provided</td>
<td>3</td>
</tr>
<tr>
<td>Problems with motivation</td>
<td>2</td>
</tr>
<tr>
<td>Program not applicable to me</td>
<td>2†</td>
</tr>
<tr>
<td>I got what I needed</td>
<td>1</td>
</tr>
<tr>
<td>Program didn’t seem useful</td>
<td>1</td>
</tr>
<tr>
<td>Was able to access help in-person</td>
<td>1</td>
</tr>
<tr>
<td>Realised I prefer face-to-face assistance</td>
<td>1</td>
</tr>
<tr>
<td>Screen was too hard to read</td>
<td>1</td>
</tr>
<tr>
<td>I was curious about the program but wasn’t planning to do it</td>
<td>1</td>
</tr>
<tr>
<td>Difficulties with disability accessibility</td>
<td>1</td>
</tr>
</tbody>
</table>

† These participants provided the feedback via email.
Table 36.  
*Type of technology (operating system) used by participants*

<table>
<thead>
<tr>
<th>Operating System</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop</td>
<td>32</td>
</tr>
<tr>
<td>Windows</td>
<td>18</td>
</tr>
<tr>
<td>Macintosh</td>
<td>13</td>
</tr>
<tr>
<td>Linux</td>
<td>1</td>
</tr>
<tr>
<td>Mobile</td>
<td>29</td>
</tr>
<tr>
<td>Android</td>
<td>20</td>
</tr>
<tr>
<td>iOS</td>
<td>9</td>
</tr>
</tbody>
</table>

The responses to the program were positive overall, with people appreciating the attention and resources being directed towards the problem of TSA. This was reflected in comments such as the following.

“...thank you for caring and your substantive efforts with this. I do think you should run this all again, but with a broader message that such exists. I am sure there are persons who would very much benefit for [sic] this.”

“I absolutely LOVE this, the fact that it exists and honestly just everything about it.”

“Keep up the good work” (3 participants)
As shown in Table 37, participants had an average pre-program DASS score that was in the 94th percentile compared to an Australian normative sample (Crawford, Cayley, Lovibond, Wilson, & Hartley, 2011). There appeared to be a small difference in pre-program DASS scores between participants who provided post data and those who did not, but it was not significant for the sample size ($d = 0.33; t(18.3) = 1.05; p > .05$). The difference in pre-program TGAS scores between these two groups of participants was negligible and not significant ($d = 0.15; t(15.3) = 0.46; p > .05$).

The primary reason for conducting the feasibility trial was to gauge the acceptability and suitability of the TSAP rather than to test the efficacy of the program. It is worth noting, however, that the potential efficacy of the intervention cannot be determined as none of the participants completed the program according to protocol and only 11 participants provided both pre and post program data, To assess potential efficacy of what had been completed of the program, paired samples t-tests found a negligible non-significant difference between pre and post TGAS scores ($d = -0.06; t(10) = -0.21; p > .05$) and a small non-significant difference between pre and post DASS scores ($d = -0.22; t(10) = -0.76; p > .05$).
Table 37.

Pre and post scores for DASS and TGAS

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DASS (pre)</td>
<td>56</td>
<td>25.18</td>
<td>13.83</td>
</tr>
<tr>
<td>DASS (pre) for lost contacts</td>
<td>45</td>
<td>26.02</td>
<td>14.31</td>
</tr>
<tr>
<td>DASS (pre) for Ps providing post data</td>
<td>11</td>
<td>21.73</td>
<td>11.57</td>
</tr>
<tr>
<td>TGAS (pre)</td>
<td>57</td>
<td>90.56</td>
<td>21.38</td>
</tr>
<tr>
<td>TGAS (pre) for lost contacts</td>
<td>46</td>
<td>91.20</td>
<td>21.57</td>
</tr>
<tr>
<td>TGAS (pre) for Ps providing post data</td>
<td>11</td>
<td>87.91</td>
<td>21.36</td>
</tr>
<tr>
<td>DASS (post)</td>
<td>11</td>
<td>24.55</td>
<td>14.79</td>
</tr>
<tr>
<td>TGAS (post)</td>
<td>11</td>
<td>88.64</td>
<td>22.23</td>
</tr>
</tbody>
</table>

**Discussion**

The results of this study provided mixed evidence for the acceptability and suitability of the TSAP. Importantly, there was a reasonable amount of initial interest in the program and comments from participants expressed gratitude and explicit (and implicit) recognition that a resource such as the TSAP was valuable and useful to TGD people. This, together with the mainly overwhelmingly positive feedback, suggests that the TSAP was well positioned to meet the needs of TGD people. The gratitude, encouragement and support for the program also suggest that the content was well adapted to TGD people and the TSAP appears to be acceptable and well received by the community.

Despite the general positive feedback to the program, there was a major problem with attrition. The tendency for participants to not progress beyond one or two modules is similar however to the adherence for public registrants to the
MoodGYM online CBT program (Christensen, Griffiths, Groves, & Korten, 2006). The low adherence, while disappointing, is therefore not totally unsurprising and the potential reasons for the low adherence is worth discussing.

**Mobile device users**

The content for the program appears to be generally acceptable, but the platform for delivery may be less so. Slightly less than half of the users were accessing the site via a mobile device which is consistent with current usage trends in Australia (statcounter GlobalStats, 2018). Pages in the TSAP were compatible with mobile devices, but they were not optimised for mobile devices or fully compliant with responsive design (Patel et al., 2015). That is, rather than reorganising the layout and re-flowing the content to meet the limitations of smaller screen sizes, pages were rendered to look the same overall on a mobile device as on a desktop device. Horizontal scrolling was therefore not necessary but the size of text and menus may have been smaller than comfortable, which may explain why one participant remarked on the unfriendliness of the site to mobile devices. Another participant’s comment that they would use the modules in app form further suggests that they did find the content useful but that the current web presentation was not suitable for their needs. This reinforces the acceptability of the content but lower acceptance of the technological platform. A recent systematic review of predictors of adherence for online interventions (Beatty & Binnion, 2016) found that computer factors or technological difficulties are a predictor of decreased adherence. The large and growing proportion of mobile users means that attention would need to be paid to delivering the content in a robust format that is suitable for the mobile market; otherwise half of the target audience will have difficulty engaging with and adhering to the program.
Time and motivation

The two most common reasons endorsed for not completing the program were a lack of time and forgetfulness. Participants do appear to forget that they have enrolled in online programs (Copeland, Rooke, Rodriquez, Norberg, & Gibson, 2017; S. C. Smith & O’Hagan, 2014) and the comment requesting more frequent reminders is consistent with the findings of Donkin and Glozier (2012) that many participants may be reliant on reminders from the system rather than personal initiative. Busyness and lack of time are common reasons for attrition (Beatty & Binnion, 2016) and Donkin and Glozier also found that other demands on time may result in participants forgetting to complete the program or forgetting about their intention to return when they had more time to focus. This suggests that forgetfulness may be a function of time pressure and an indication of the lower priority or motivation to complete the program.

The first week of the program contained content from the Anxiety Online program (Klein et al., 2011) to assist participants in planning their time to help them complete the program successfully. It is uncertain how many participants (if any) attempted to utilise these techniques, but they appeared to be ineffective. This is consistent with research on perceived time use that suggests that time management strategies, on their own, can be quickly discontinued if the people are not enjoying the activities in which they are engaged, or if the activities are misaligned with their values and they do not fully understand the reasons for taking part (Boniwell, 2005). Future versions of the program would therefore need to modify the content to either make it more enjoyable or to invest time in reflecting on participant’s values and reasons for participating.
The need for TGD participants to comprehend and be aligned with the rationale for the TSAP may be extremely important since participants have not been diagnosed with a formal disorder. They may therefore be less motivated to undertake psychotherapeutic work in the belief that it is not something they should have to do and/or that improving their mental state is not possible without social change. While the effect of initial motivation on attrition is unclear (Beatty & Binnion, 2016), externalisation of responsibility that results in less motivation for psychotherapy (Overholser, 2005) may make it difficult to sustain the effort to complete a program that is not aligned with the participant’s beliefs and values. It may therefore be necessary to spend more time working on why and how participants are able to improve their own situation prior to presenting the strategies for change.

**Credibility**

If participants do not understand the rationale of the TSAP and externalise responsibilities for change, then they may not find the content of the program believable, convincing or logical and they may have a low belief that the program will work. The cognitive beliefs about an intervention is known as credibility and the relatively more affective beliefs is known as expectancy (Devilly & Borkovec, 2000), and both are predictors of adherence to online interventions (Beatty & Binnion, 2016). The participant who reported not finding the program useful and criticised the program for encouraging participants to be complacent with harassment is likely to have not understood the rationale of the program and therefore thought it lacked credibility and had low expectancy. Christensen et al. suggest that the ease of engagement (and disengagement) in internet interventions, which was argued as a potential strength for this study, may attract
participants with low commitment and low expectancy. This suggests that the rationale and the applicability of the program may need to be refined, explicitly stated, and more clearly explained.

The premise of the program was that anxiety from experienced or anticipated discrimination may result in the fear and avoidance of tasks. Although discrimination is not the fault of participants, they are still responsible for how they respond to the situation. The program would therefore help participants take an active role to overcome anxiety to live a fulfilling life rather than to wait for society to change around them. Attempts to change attitudes can be unsuccessful and people need to utilise adaptive coping strategies as part of their self-care and so that they don’t become overwhelmed by slow or unsuccessful attempts to create social change (W. B. Hagen, Hoover, & Morrow, 2018). Acceptance of the slow pace of change is therefore not an endorsement of complacency with harassment, but is an adaptive strategy that helps participants avoid being overcome by present day realities.

The criticism of complacency may be directed at not explicitly encouraging activism or direct action against harassment and discrimination. Activism can be empowering when change is observed, can help build social connection, and can help people understand that discrimination is not their fault (W. B. Hagen et al., 2018). It is therefore a useful strategy in developing resilience (Singh et al., 2011), but it is not necessarily for everyone. There are costs – in time, energy or negative experiences – as well as risks in terms of the anticipation or expectation of costs (Wiltfang & McAdam, 1991). For those experiencing discrimination, high levels of collective action heighten the risk of
psychological distress (Breslow et al., 2015). The risks of negative career consequences, harassment, and intimidation was high for activists of sexual identity (V. Taylor & Raeburn, 1995) and TGD activists currently face the same difficult choices (W. B. Hagen et al., 2018). This may explain why activism is inversely related to values of personal security and conformity (Vecchione et al., 2015). The use of education or some form of activism were utilised as possible solutions in the section about problem solving (week 6), but it is important for individuals to balance the potential positives and negatives to decide if it is an appropriate course of action for them. The strategies presented in the TSAP can also assist participants develop adaptive coping strategies to maintain good mental health while being agents for social change.

The rationale was not presented as formally or in as much detail in the program due to concerns for the length of the initial week’s content. Credibility of e-health information is reduced when the full argument, including references, to support an assertion is not included (Dutta-Bergman, 2004; Rains & Karmikel, 2009). Reducing the information presented in the rationale may have therefore lowered the credibility of the program and in turn reduced adherence to the program. Given that the length of interventions may also be a predictor of attrition (Christensen et al., 2009), there appears to be tension between providing complete information and keeping the intervention brief.

**Interpersonal relationships**

Maintaining adherence to a program over more than a few sessions may difficult without the interpersonal relationship that is considered important to psychotherapy (Norcross & Wampold, 2011a). Some of the elements that an
interpersonal relationship brings may be addressed relatively easily in an online program. For example, the initial bond that is formed when clients quickly evaluate personal aspects of therapists (Wampold, 2015) may be equivalent to participants looking for personal content on e-health websites, such as photographs of the program creators or physical addresses and phone numbers (Beatty & Binnion, 2016). In the same way that clients might utilise biographies of face-to-face therapists to form impressions about the potential trustworthiness or match (Norcross & Wampold, 2011a), information about TSAP creators and photographs may help in creating credibility and trust in the TSAP.

Importantly, clients wish to feel heard, understood and accepted (Norcross & Wampold, 2011a; Noyce & Simpson, 2018). Therapists traditionally demonstrate this through individual case conceptualisation and the subsequent adaptation of therapy to suit (Cronin, Lawrence, Taylor, Norton, & Kazantzis, 2015; Norcross & Wampold, 2011a), as well as collaboration with the client to design the homework to be done between sessions (Cronin et al., 2015). Some of this can be implanted in online programs by utilising automated systems that can tailor the program to individual participants or provide personalised feedback on progress (Beatty & Binnion, 2016). These features could also manage the size of the program by directing the participants to specific modules that are relevant rather than requiring participants to complete all modules. The difficulty with this approach is that the program would cease to be the same for each participant, which would result in a potential confound with differential treatment.

Beyond tailoring however, guidance also provides task and emotion related support (Scholten, Kelders, & Van Gemert-Pijnen, 2017). For example,
therapists can provide task related support by reviewing homework, clarifying tasks, or correcting errors that the client might be making (Cronin et al., 2015; Scholten et al., 2017); or, they can provide emotion related support by being attuned to the negative feelings that clients have about psychotherapy and repairing these subtle ruptures in the relationship (Safran, Muran, & Eubanks-Carter, 2011). Embedding the TSAP within a guided program is a possibility although it increases the resource requirements and also removes the anonymity that some participants like in self-guided online interventions (Donkin & Glozier, 2012), both of which were drivers for the creation of the TSAP. Responsive embedded conversational agents are a promising technology that may be able to provide many of the task and emotion based needs for participants of online programs (Scholten et al., 2017). Scholten et al. (2017) recommend that deep personal issues are still be handled by human therapists, however, as the technology is currently unable to handle the complexity within them.

Limitations

During the recruitment period for this study, the Australian government announced and held the postal survey or plebiscite for marriage equality in Australia (Australian Bureau of Statistics, 2017a). Peer reviewed research of the effect of the plebiscite, and the preceding campaigns, on the mental health of the LGBTI community is not currently available but anecdotal evidence suggests that the plebiscite had a negative impact (Aged Care Guide, 2017; J. Butler, 2017; Parnell, 2017) with an increase in people accessing LGBTI support services (ABC News, 2017). TGD people were explicitly targeted and their existence and identity used as the justification against marriage equality (Australian Family Association, 2017). The lack of representation of TGD people in the campaigns
for marriage equality left TGD people demonised yet excluded from the debate (“What It’s Like Coming Out As Trans During The Postal Survey,” 2017). Even after the *Marriage Amendment (Definition and Religious Freedoms) Bill 2017* (Austl.) was passed, differences between state and federal legislation meant that the bill allowed up to a 12 month delay before TGD people would be able to access the same equality in marriage.

The events of this period are therefore consistent with an abnormal increase in felt discrimination and stigma for TGD people that may have resulted in an increase in anxiety and distress. Participant’s scores on the TSAS and DASS may therefore have been higher on post measures than they would have otherwise been had the participants not been exposed to the increased level of discrimination during the course of the study. The importance of the plebiscite may also have meant that many participants or potential participants were otherwise focused on this important issue and participation in this program may have been a lower priority. This may therefore be a contributor to the poor adherence to the program, and recruitment to the program may have also been negatively affected.

The rate of depression in this study’s sample is in line with (but not greater than) the rate of depression reported in other studies with TGD people (Budge et al., 2012; Pitts et al., 2009). Estimates of the prevalence of anxiety in TGD people varies greatly according to the systematic review by Millet et al. (2017). The rate of anxiety amongst participants of this study is between the lowest and highest prevalence found by Millet et al. It is possible, therefore, that participants in this study were self-selected based upon their anxiety symptoms, but it is uncertain due to the large variations in estimations.
Conclusion

This feasibility study was successful in confirming that the content of the TSAP was acceptable, suitable, and well received by the TGD community. Feedback from some of the participants indicated that not only was it well received, but that there was need for such a program. The issue of attrition remains a difficult problem, which is consistent with the current literature. Adherence may be increased with some changes to the method of delivery, the structure of the program, and automated systems for tailoring and individualized feedback to participants. The guidance and therapeutic relationship provided through human contact may be difficult to replicate however, although there is promising technology being developed in this area.
Chapter 6

General Discussion

The purpose of this thesis was to understand the social anxiety that TGD people experience. This anxiety, which was termed TGD social anxiety (TSA), was likely attributable to Minority stress processes (Meyer, 2003) stemming from actual experiences of discrimination (G. R. Bauer et al., 2009; Couch et al., 2007) rather than reflective of underlying mental health issues. It was argued that the expectations of rejection, accompanying vigilance, and resultant avoidance were still consistent however with the models and theories proposed for social anxiety disorder (SAD).

Prior to conducting empirical research on TSA, it was identified that existing methods of capturing of gender information relied on categorical label that were prone to misinterpretation due to the nature of language, and made summarization and quantitative analysis difficult. The Gender Identity Scale (GIS) was therefore created to overcome these limitations.

The need to capture the specific situations in which TGD people experience TSA was then identified as a gap in research. Current tools, such as the Liebowitz Social Anxiety Scale (LSAS), were potentially unsuitable due to association with pathology and the potentially different contexts in which TSA is experienced. The Trans and gender diverse Social Anxiety Scale (TSAS) was therefore created to overcome these limitations.

It was then argued that CBT based interventions that were effective for SAD could also be efficacious for TSA. Adaptive strategies that have been utilised by TGD people, such as awareness of oppression (Singh et al., 2011),
could also be integrated into the proposed intervention. It was further argued that
the responses may not be disproportionate to stressors, but that assistance was still
warranted without a clinical diagnosis. A non-pathological stance was therefore
taken in the development of the Trans and gender diverse Social Anxiety Program
(TSAP).

The findings from the development of the GIS and TSAS have
implications for research beyond their use in the TSAP. They will therefore be
discussed prior to examining the greater implications of the feasibility trial of the
TSAP on future e-health programs.

The Gender Identity Scale

The GIS was created as a way of measuring the diversity of gender
identities without reliance on labels. This was done by operationalising the
gender identity component of a community developed infographic—the Gender
Unicorn. The results of a latent class analysis were found to be consistent with
the way that participants self-identified. The results also found that different
classes within groups of participants who used umbrella labels that were
otherwise imprecise in communicating gender information. This suggested that
the GIS was able to distinguish between participants who use similar labels to
self-identify but had a quantitatively different gender. The results supported the
utility and usefulness for the GIS as a way to measure and report the full diversity
of gender identities while still allowing quantitative analyses without problematic
assumptions. A clear and consistent method of capturing gender identity is
important in research with TGD people (Moradi et al., 2016) and the GIS may be
able to provide this clarity and consistency.
An important consideration, when utilising the GIS, is the purpose for collection and classification. If the self-designated label was the measure of importance then classification according to the GIS may be unnecessary. For example, if a study was to explore how people with different identities experience stigma differently, researchers would need to identify whether the focus is on the communicative use and consequences of the labels themselves or whether gender identity, and potentially gender expression, according to the GIS was more appropriate. Similarly, if the only aim is descriptive demographic information, then classification of GIS results may not be necessary and a 3D plot may be sufficient in illustrating the range of genders present and their relative representation. The GIS was utilised in this way to measure and report on the gender composition of participant samples in this thesis. How representative the samples are of the TGD community or the general population is currently unknown and future research would need to be conducted to collect this demographic information.

When categorisation is important for quantitative analysis, the groupings utilised are likely to affect results of analyses. Researchers could conduct a latent class analysis on their own data, but the classes may change according to the composition of their participants. This is not to imply that the classification groups presented in this work are a definitive list of the correct groups. Rather, this study illustrates that it is possible to classify responses to the GIS into groups that are internally consistent with respect to the self-designated labels of the participants in each class, and that are externally consistent with the understood interpretations of the labels. The implication is that although gender might be
conceptualised as a spectrum (at least for any single dimension) overall identities tend to be clustered in this sample.

One of the reasons for clustering may be cultural bias. In non-binary spaces, for example, masculine-of-centre identities tend to be preferred over feminine-of-centre identities, with transmasculine people outnumbering transfeminine people by 3:1 (Harrison et al., 2012; Serano, 2013). This was clearly evident in the responses to the GIS study and cultural biases may contribute to the different ways in which AFAB and AMAB people explore and identify with their gender.

Cultural influences may mean that some participants may not conceptualise or use the scales in the GIS as independent items, even though that is how they are presented and conceptualised in the Gender Unicorn (Pan & Moore, 2014) and the Genderbread Person v2.0 (Killerman, 2012b). Some participants, for example, identified completely with both the other gender(s) dimension and either the male/man/boy or female/woman/girl dimensions. Nobody, however, identified completely with both male/man/boy and female/woman/girl. The pattern of responding suggests that these two categories may still be seen as opposites amongst many participants.

If the dichotomy between man and woman is culturally influenced, then it may change as culture and both social and personal understanding changes. This implies that gender, as measured by the GIS, may not be stable over time. This is consistent with the argument that gender is not fixed, but is malleable, fluid, something that people do, and that changes with context and time (West & Zimmermn, 1987).
The clustering of gender may be an artefact of social influence and the labels used by people to self-designate. When exploring gender, people may utilise those in their community as exemplars and begin to identify with particular labels in that way. Given that labels do have definitions, even if imprecise, the labels may anchor identities to certain points or serve as a prototype to which participants compare themselves when completing the GIS. In these cases, responses to the GIS would be a subjective interpretation of and refinement of a self-designated label. If so, the GIS is a way of allowing people to clarify their identity without utilising language or labels that they do not identify with. This is a further implication that gender categories may change and/or their boundaries may shift over time.

Future research may therefore explore more deeply where these boundaries may lie and track their change with time and with culture. A large study may be useful in providing guidance for potential “cut-offs” between groups. This would allow groups to have common boundaries between different studies which would enable easier comparison and validation of research. Researchers would therefore not need to conduct their own classification analyses, which are data driven and which may result in different groups that are dependent upon the sample. That is not to imply that researchers could not conduct an LCA on their own data, for example, however the limitations of doing so would need to be acknowledged.

A current limitation of the GIS is that it was only tested on people who self-identified as TGD. It may be tempting to assume that cisgender people have total and full identification with only the gender that they were assigned at birth.
based on the definition of cisgender as being satisfied to identify with one’s birth assigned gender (ACON, 2017). There is some evidence to suggest that gender variance exists amongst the (statistically) “normative” population (Joel, Tarrasch, Berman, Mukamel, & Ziv, 2014), which calls into question the meaning of the GIS scores if a cisgender-identifying person and a TGD-identifying person both report the same scores.

A potential explanation might be that their gender is the same but that the difference with self-identification is due to preferences with labels, knowledge of terminology, readiness to self-identify, or a lack of exploration of their own gender identity. Non-binary people may, for example identify as cisgender (M. J. Barker & Richards, 2015) and some people may some people who may arguably have a TGD identity struggle with being “trans enough” (Langer, 2011). This poses a philosophical question about the definition of cisgender or TGD (and the relationship between respect for self-determination and research categorisation) and further reinforces the difficulties of working with labels.

Limitations in the study by Joel et al. (2014) might mean that the findings of diversity in “normative” individuals were inflated. Firstly, their demographic measure enquired about sex rather than sex assigned at birth. Sex can be interpreted differently by TGD people and is not necessarily equivalent to sex assigned at birth (Conron, Landers, Reisner, & Sell, 2014), which means that some TGD people may not have been accounted for. More importantly however, gender was used to define the “normative” sample, where normative were the people who identified as man or woman and not as transgender or other. Many people who might be conceptualised as TGD do not self-identify in that way and
only identify as man or woman (Ansara & Hegarty, 2014), which was also reflected in the terminology utilised by participants in this present research of the GIS. Reliance on that self-identification may also have included many TGD people which would increase the diversity in the “normative” sample. Gender identity was also operationalised as a frequency of how often someone thought of themselves as a particular gender. Frequency and intensity are different components in affect (Schimmack & Diener, 1997), so frequency in thinking about ones gender may be different (albeit related) to enquiring about level of identity. Having provided evidence for validity of the GIS within the TGD population, future research could therefore replicate the study by Joel et al. whilst addressing some of the limitations. Importantly, the GIS allows for gender to be conceptualised in a way that acknowledges diversity as requested by Joel et al.

This new way of quantitatively conceptualising gender also has implications for past psychological research that has utilised gender as a dichotomous independent variable. Previous research has found, for example, that there are gender differences in social anxiety with women experiencing more social fears overall and that people of different genders are more likely to report greater fear of different items (Turk et al., 1998). Similarly, there is evidence to suggest that females have higher adherence to online psychological interventions (Beatty & Binnion, 2016). A continuous measurement of gender may provide some additional insight into the effect of gender.

Use of the GIS would also help in determining if these psychological trends observed in the cisgender population also apply to the TGD population. Given the tendency of previous research to dichotomize gender, further research
may also explore whether sex assigned at birth or gender identity is a better predictor of any of these trends. Socialization has wider ranging effects on development, from gender roles (Adler, Kless, & Adler, 1992) to the metabolic effect of stress (Dedovic, Wadiwalla, Engert, & Pruessner, 2009). It is therefore a potentially important covariate and future research may need to account for the effects of past socialization as well as socialization to their present gender identity.

The conceptualization of gender in multiple dimensions also has implications for the statistical methods used currently in psychology. Common current methods can handle multivariate data but the implication is that the variables are separate and independent. This may be true of the GIS dimensions for some TGD people, but may not hold for others or for the cisgender population. The GIS conceptualises gender as a single multidimensional variable and it may not be sufficient to utilize each dimension on its own. Techniques from other disciplines, such as tridimensional regression (K. K. Schmid, Marx, & Samal, 2012), may need to be adapted to work effectively with the GIS. Until such time, classification or categorization can provide a unidimensional solution but may lose some of the information present.

The groups or classes utilised depends on the research question and may not be as subtle or as numerous as the classes presented in the development of the GIS. An example was the groupings used to show measurement invariance in the TSAS. Rather than using all seven of the groups previously derived, the GIS was utilised to classify participants into two groups: those who identified with/near the gender binary, and those who did not. This provided a way to show that the
TSAS had measurement invariance between these two groupings of gender, which is important given the different experiences, identities, and relationships to gender between these two groups (Darwin, 2017).

The Trans and gender diverse Social Anxiety Scale

The TSAS was created as a measure for social anxiety in TGD people with five factors that correspond to situational domains in which TGD people often experience anxiety: (1) close personal relationships, (2) general social interaction, (3) authoritarian interaction, (4) interaction with the LGBT community, and (5) accessing health services. Results of a confirmatory factor analysis provided evidence for a bifactor factor structure, consisting of these five specific factors and a general anxiety factory, which had measurement invariance across both gender and country of residence. There was evidence for convergent and discriminant validity that showed that the TSAS was a measure of social anxiety, similar to the LSAS, and not a measure of some other construct. Good evidence was therefore provided for the validity of the TSAS as a measure of social anxiety for TGD people.

Recent trends have moved towards TGD-affirmative research and practice with recommendations of culturally sensitive assessments (Shulman et al., 2017). This present research follows this path in its aims to provide a method to assess social anxiety in TGD people in a non-pathological way. Many TGD people frequently experience discrimination in social situations and their anxiety could therefore be considered less of a disorder and more of an understandable response to the current social environment. Existing tools such as the LSAS are associated with diagnosis of social anxiety disorder (SAD; Fresco et al., 2001), so the TSAS
provides a way to perform a more sensitive and directly relevant assessment of the difficulties that TGD people may be having.

A current weakness in the TSAS is that there is no reference for interpreting a single score. One way in which this can be provided is the collection of normative data (Kendall & Sheldrick, 2000). Normative data is not currently available for the TSAS (or any of the tools identified by Shulman et al., 2017) beyond sample means and standard deviations in the TSAS validation studies and the TSAP feasibility trial. The concept of normative data may appear somewhat perverse in an area where diversity is being embraced and affirmed. Caution would need to be exercised as there are implications of what normative data might mean in an oppressed minority population.

Normative data is often used as a basis of comparison to determine if treatments have been successful where the goal is for the person’s level of functioning to be within normal limits after treatment (Kendall & Sheldrick, 2000). The implication is that the average level of functioning is considered to be normal, but that may not be a reasonable view when transgender men and women report higher scores on the 21-item version of the Depression Anxiety and Stress Scale (DASS) compared to cisgender sexual minority individuals (Warren, Smalley, & Barefoot, 2016) and, as previously discussed, minority stress factors such as discrimination are a major contributor to poor mental health. It would therefore be tautological and systemically discriminatory to suggest that TGD people with elevated levels of distress are functioning normally because discrimination raises the average level of distress for that population.

Normative data for the DASS can be collected for the general population, but the TSAS contains items that not relevant to cisgender people. Normative
data for the TSAS could therefore only be obtained from a TGD population. Evidence, provided in the previous chapter, shows that the TSAS is predictive of the DASS, hence the TSAS scores are also likely to be elevated. Normative TSAS data would therefore be skewed and average levels of functioning are likely to be impaired to some degree. Given the role of minority stressors, the normative TSAS range is also likely to change as acceptance within society changes.

The clinical use of normative data in psychology would only be (barely) acceptable under the assumption that all of the people in the TGD population were aware of and effectively using psychological strategies and the variance in functioning attributable to variables under individual control was insignificant. Such a scenario would imply that people were individually functioning as best as they could and, while still disheartening, would mean that remedying the poor outcomes could only be done on a wider social level. This scenario is unlikely however, as research has noted the contributions in mental health outcomes due to facilitative vs avoidant coping (Budge, Katz-Wise, et al., 2013), internalized stigma (Mizock & Mueser, 2014), and the use of resilience strategies (Bockting et al., 2013). It is possible therefore, that many people respond in ways that are understandable, and perhaps even expected in their situation, but fail to use strategies that are more optimal.

Several participants had relatively low scores on the TSAS and it is possible that, rather than being expected deviations in the sample, there are potentially two groups that differ based on their utilization of psychological strategies. It might be tempting, if that were true, to label the group with lower scores as being normal and the other group as maladaptive or pathological. This
might be consistent with the medical model of normal being the absence of pathology but it would not be consistent with the concept of normal being the average level of functioning (Kendall & Sheldrick, 2000). Rather than a description in terms of pathology, it may be worth describing the groups as skilled versus unskilled users of psychological strategies. This reduces the stigma and pathologisation of persecuted minorities and recognizes that the average person may be relatively unskilled to deal with constant minority stressors. It also recognizes that being unskilled is not equivalent to pathology but that people in that situation are deserving of clinical attention to receive the skills they need to look after their mental health.

Cut-off scores based on diagnostic criteria are another way of providing a reference base for scale scores. The diagnosis of SAD provides a criterion against which the LSAS can be calibrated to create a cut-off score for diagnostic screening (Rytwinski et al., 2009), which in turn provides a reference for interpreting any single LSAS score. The use of a diagnostic criterion runs counter to the original premise in creating the TSAS, however that does not mean that no TGD person struggles with mental disorder. The post-hoc analysis of TSAS scores and diagnoses of participants in the TSAP suggests that people with trauma or stressor related disorders may score higher on the TSAS than other TGD people. In a clinical situation, the TSAS may be able to screen for trauma and stressor related disorders whilst also being used to identify situations of anxiety, and as an indicator of treatment progress. Future research could explore the sensitivity and specificity of the TSAS in screening for trauma and stressor related disorders.
If there is evidence for the screening capability, then the TSAS may be able to discriminate between three groups of people: skilled users of psychological strategies; unskilled users; and, people with trauma and stressor related disorders. The relative severity according to TSAS scores would suggest that trauma and stressor related disorders may need to be addressed prior to working on TSA.

Use of the TSAS in clinical and research settings to measure treatment progress is dependent upon the TSAS having good test-retest reliability and sensitivity to treatment change. The TSAS does not currently have evidence to support these assumptions, which is a drawback it shares with many of the current TGD affirmative tools (Shulman et al., 2017). The TSAS is based on the LSAS however, which does have good evidence for test-retest reliability and sensitivity to treatment change (R. G. Heimberg et al., 1999), and the format and content of the TSAS suggest that its psychometric properties would not be problematic. Future research would need to be undertaken, however, to confirm that.

The TSAS was utilised as an outcome measure in the feasibility trial of the TSAP despite the lack of evidence for test-retest reliability and sensitivity to treatment. It is possible, therefore, that the non-significant changes in participants are due to insensitivity of the test. It is arguably more likely, however, that the poor retention and completion rates of participants, together with greater stress due to the marriage equality debate at the time, were the reasons for lack of significant change.

**The Trans and gender diverse Social Anxiety Program**

The TSAP was developed as an intervention to help TGD people with TSA. It was created as an online self-help program to overcome many of the
barriers that TGD people face when seeking mental health care. These barriers include fear of mistreatment or denial of service by therapists, lack of available services, geographical accessibility, and financial costs. It was adapted from the CBT-based Anxiety Online program to provide a TGD context and some TGD specific strategies. A feasibility trial of the program revealed that the content was acceptable, suitable, and well received by the TGD community. Feedback indicated that a program like the TSAP was welcome and sought after. Issues that affected engagement and attrition were a major problem however, and need to be addressed.

Time and forgetfulness were the two main reasons endorsed for discontinuing with the TSAP and it was argued that forgetfulness could be a function of time pressure. The lack of time is consistent with the Model of User Engagement (Short, Rebar, Plotnikoff, & Vandelanotte, 2015), one of several theoretical perspectives of adherence and engagement (Ryan, Bergin, & Wells, 2018), that suggests that engagement and adherence is the result of the interaction of environmental, individual, and intervention characteristics. Time and accessibility to the internet are regarded as environmental factors which influence user’s expectations and self-efficacy which in turn influence perceptions of usability and persuasiveness.

Short et al. (2015) argue that engagement is characterized by positive affect, sensory and intellectual satisfaction, and a sense of mastery. Disengagement therefore occurs when users experience negative emotions such as frustration or boredom. Sustaining engagement therefore requires design characteristics that reflect the available time and internet accessibility, meet or exceed expectations, and that create a positive user experience. The need for
positive experiences and sense of mastery is also consistent with the PERMA model for adherence (Ludden, Van Rompay, Kelders, & Van Gemert-Pijnen, 2015), which is another of the perspectives reviewed by Ryan et al. (2018). PERMA stands for positive emotions, engagement, (positive) relationships, meaning, and accomplishment, which suggests that each of those elements is affected by the design of web based interventions. It criticizes, for example, the content driven and text based approach which the TSAP utilizes claiming that such designs may trigger irritation and frustration rather than positive emotions and a sense of accomplishment. Neither the Model for User Engagement nor the PERMA have been well validated (Ryan et al., 2018) but the results of the TSAP feasibility trial appear to show support for both.

One of the sources of frustration was the rendering of content on mobile devices. This was explicitly stated by only one user, but may have been a contributor to feelings of frustration and the subsequent formation of other reasons. The potential role of mobile devices as a contributor to attrition and the need to deliver a product that is compatible with mobile usage was acknowledged in the discussion of the TSAP feasibility trial. This is even more important given recent research suggests that people with lower incomes are likely to be dependent on smartphones as their only method for accessing the internet (Tsetsi & Rains, 2017). The financial barrier was one of the reasons for providing an online program, and it would therefore follow that mobile-only users are likely to be more reliant on such a program and less able to pay for psychotherapeutic help elsewhere.

Two common methods for delivering health interventions via mobile devices are mobile apps, which are programs (applications) that reside on the
mobile device, or web apps, which are web pages accessed via the internet but are optimized for mobile use (Turner-McGrievy et al., 2017). Turner-McGrievy et al. (2017) found that web apps have the advantage of being cheaper and quicker to develop, easier to provide support for different devices (e.g. Apple vs Android), and easier to update. Mobile apps have an advantage in being able to use the device’s notification system to alert the user, which may be effective in reminding the user to engage with the program regularly (Bentley & Tollmar, 2013). This advantage may soon be reduced with work being done on mechanisms to enable notifications from web apps (W3C, 2017). The ability to provide regular notifications on the device (both mobile and desktop) may assist with the reduction of attrition as many participants in the TSAP reported forgetting about the program. The evidence for current reminder methods (email, sms, or phone calls) to improve engagement is mixed (Alkhaldi et al., 2016). Future research could explore whether application notifications are more effective in improving engagement.

A previous disadvantage of web apps was that they did not work without an active internet connection. Mobile apps can download all the data required for the application at the time of installation and, barring any other need to contact external servers, can work offline without an internet connection. This could be an important consideration when considering low income people who have irregular internet connectivity for a number of reasons, including inability to pay their phone bill (Marler, 2018). Progressive Web Apps (PWA) overcome the disadvantage of traditional web apps by allowing key resources to be cached to provide uninterrupted access to the application (Google.com, n.d.). Given that internet accessibility is one of the environmental factors in the Model of User
Engagement (Short et al., 2015) and that connectivity problems contribute to attrition (Melville et al., 2010; Topolovec-Vranic et al., 2010), migration of the TSAP to a PWA platform may be worthwhile to provide a high quality program that users can continue to utilize even when internet access is unavailable.

Strazdins et al. (2011) argues that time, which is the other environmental factor in the Model of User Engagement (Short et al., 2015), is a resource that is important to health and that scarcity of time prevents people from engaging in behaviours that are important to good health. Strazdins et al. further argues that time scarcity is compounded by low income with the inability to purchase time-saving goods and services. The intersection of time and financial scarcity therefore creates further health inequities. This reinforces the need to assist potential TSAP users find ways of incorporating the time required for the program into their daily schedule.

A source of frustration in relation to time may have been in presenting the TSAP as an 8 week program with the expectation that participants would spend approximately an hour learning the content each week. This did not include the time spent in homework activities where they were expected to utilize the information they had learnt that week and in previous weeks. Although the information didn’t necessarily have to be covered in a single session, it wasn’t explicitly designed to be covered over multiple sessions and participants may have had difficulty in breaking it into smaller pieces.

It may be possible that the amount of information presented each week was too much for a single session and that some participants felt rushed to complete it, especially if they hadn’t completed the content within a week. The feeling of being rushed could have then led to a feeling of lack of time (Szollos,
This would be consistent with evidence that feeling in control and able to dictate the pace are motivators for completing online interventions (Donkin & Glozier, 2012). Given that the ability to complete interventions in your own time is a potential contributor to greater adherence of online interventions (Beatty & Binnion, 2016), it may be worthwhile to break the content into “bite sized” pieces. Combined with regular notifications, users could engage with content more frequently but each session could be of shorter duration. Evidence for or against this is currently lacking and future research is needed to determine if there are differential effects on adherence and treatment outcomes for shorter but more frequent engagement with online interventions.

An individual factor related to the presentation of information is the amount of cognitive effort that the user is willing to expend (Short et al., 2015). When tasks are not intrinsically motivated, i.e. voluntarily for fun and not out of obligation or necessity, then challenges reduce motivation (Abuhamdeh & Csikszentmihalyi, 2012). Although participants in the TSAP engaged voluntarily, it could be argued that many did so out of necessity due to their current quality of life and psychological distress. Their motivation for participating was therefore not intrinsic and content that challenged them may therefore tend to reduce their motivation.

One of the roles of the therapist in face-to-face therapy is to challenge the client appropriately with the understanding that too much of challenge may rupture the therapeutic relationship (Horvath & Luborsky, 1993). Online therapies appear to work under a different paradigm where the goal is to create positive emotions during the session so that users will enjoy using the
intervention and will want to return (Ludden et al., 2015; Short et al., 2015). The implication here is that the short term affect is more important than potential long term gains in online interventions. These different paradigms may explain why therapist contact can improve adherence in online interventions (Beatty & Binnion, 2016), especially if, like the TSAP, interventions are attempting to use an intervention created under one paradigm but delivered under another.

Users may also face challenges in creating suitable homework exercises for themselves given that, in face-to-face CBT, homework is usually tailored to the individual and a collaborative process (Beck, 2011). Users may face challenges, such as identifying exactly how to personalize homework activities for themselves, that result in greater frustration and negative affect. This may therefore result in users not engaging in homework tasks or disengaging from the program entirely. Only one out of 33 studies in Beatty and Binnion’s (2016) systematic review of online interventions measured completion of homework tasks indicating that adherence to homework is often not tracked in trials of online interventions. This is unsurprising given that quality of adherence to homework exercises is not well measured or researched in face-to-face trials either, although there are calls for it to be of greater focus (Kazantzis, Brownfield, Mosely, Usatoff, & Flighty, 2017). Adherence in online interventions is usually measured, instead, in terms of how much of the intervention has been completed (Eysenbach, 2005) even though homework is an integral part of CBT (Beck, 2011). Measuring the attitudes of users towards homework, the challenges they encounter, and their overall adherence to homework tasks would therefore be beneficial in understanding the role that homework plays in treatment efficacy as well as its effect on affect and disengagement.
All of this presents a challenge for the TSAP to present the contents in a way that immediately increases positive affect, does not present too much of a challenge, and fits in with potential time constraints of users. One possible way in which this could be done is in gamification, which is the use of game elements and mechanics to motivate and engage users (Seaborn & Fels, 2015). Two pertinent promises of gamification are the intrinsic motivational qualities of gamified systems and the ability for gamified systems to fit into existing activity (D. Johnson et al., 2016).

Gamified systems can provide rewards upon completing tasks such as points, badges, or gifts (M. Brown et al., 2016; D. Johnson et al., 2016). These rewards are intended to create a positive affect that encourages users to continue using the program. The tasks themselves may present some challenge but, rather than being a source of frustration as before, enable a sense of competence and achievement by the immediate positive feedback and by identifying and setting different levels of challenge (Zhang, 2008). Gamification may also take advantage of the expectation and appeal of challenges within games (H. L. O’Brien & Toms, 2008) and therefore change the perception of challenge by changing the context in which it appears. This assumes that people who utilize the program are attracted to the gamified components in a similar way to gamers who seek out games. It may be that the gamification components only appeal to people with gaming affinity or experience. The effectiveness of gamification as an engagement strategy and its relationship to prior gaming affinity or experience is not well known (D. Johnson et al., 2016) and remains a topic for future research.
Gamification can reduce the time requirements of the program by utilizing and reorganizing existing activity (D. Johnson et al., 2016) rather than asking users to allocate time to learn the contents. The TSAP could, for example, incorporate mindfulness activities into whatever the user was doing at the time. Alternatively, a desired activity, such as going to a doctor’s appointment, may be the actual focus of the task. The learning is therefore more experiential compared to the current content based system that asks users to dedicate time to understanding the rationale and learning the technique before applying it for homework. Adherence to homework is also no longer an issue because the traditional homework tasks are now the main method by which users engage with the program. Unfortunately, existing research has not yet assessed nor provided evidence for the life fit and time efficiency benefits of gamified health programs (D. Johnson et al., 2016).

A drawback of gamified systems may be its lack of appeal to people who are already well versed in the techniques being taught. Users who are beginners at techniques being taught tend to find gamification elements motivating whilst non-beginners may find it interrupting and obstructive to performance instead (Reynolds, Sosik, & Cosley, 2013). This highlights the differences that participant characteristics can have on the effects of motivation and engagement strategies. Tailoring of online programs is predictive of adherence (Beatty & Binnion, 2016) and these differential effects reinforce the need to consider participant characteristics during program delivery.

Adapting to client characteristics is also important in face-to-face therapy. Norcross & Wampold (2011b) recommend that psychotherapists who are unable
to adapt need to limit their practice to clients who are a good fit and refer the
other clients to colleagues. It is known that client preferences affect the
adherence and outcome of treatment in face-to-face therapy (Swift, Callahan, &
Vollmer, 2011). These preferences are similar to the issues raised in discussing
adherence to the TSAP such as: the type of behaviour and activities they would
like to engage in; the characteristics of the therapist such as experience and
expertise; and, the approach of treatment such as supportive versus behavioural.

Therapists can assess for preference through the use of interviews (Vollmer,
Grote, Lange, & Walker, 2009) or survey instruments (Cooper & Norcross, 2016;
Sandell, Clinton, Frövenholt, & Bragesjö, 2011).

Instruments could be developed for online interventions to assess
preferences for gamification, level of cognitive challenge, experiential versus
content driven learning, and time availability. The preference for assisted therapy
versus self-help may also be considered although providing therapist support may
be an expensive way to increase adherence (Ludden et al., 2015). The demand for
therapist assistance in the TSAP may be lower than other studies, however, due to
the nature and fears of the target population. Rather than trying to create a single
version of the TSAP that attempts to attract and engage all TGD people seeking
help, different versions of the TSAP could be created that clients can be guided
towards. These might be: content driven self-guided; therapist assisted; gamified
experiential; and, non-gamified experiential. Users that score highly on the TSAS
may also be recommended towards a version that focused on trauma and stressor
related work initially. Providing different versions would ideally help reduce the
problem of attrition and allow all TGD people to receive the benefits of the TSAP
program.
Concluding Remarks

The research in this thesis is an attempt to better understand, measure, and mitigate the anxiety experienced by TGD people in social situations. A review of the current literature argued that the development of anxiety due to transphobia and negative social messages was analogous to the development of social anxiety disorder. The context in which anxiety developed means, however, that TSA is not necessarily pathological, but could be a response to actual social stressors commonly faced by this vulnerable group. Hence, a new measure of social anxiety was created, in consultation with the TGD community, to enable assessment of situations specifically relevant to TGD people and without the current association to pathology. Existing methods of capturing gender information were considered to be inadequate and a new measure of gender was therefore created to enable collection of gender identity in a manner that is inclusive, comprehensive, and respectful of TGD people. Finally, a feasibility trial of an online program to assist TGD was conducted to help manage anxiety and better manage the genuinely stressful social situations that contribute to this anxiety.

Based on the results of the research, it is concluded that:

1. Gender identities can be measured, using the GIS, in a way that is congruent with potential self-designated gender labels but without the use of such labels. This means that people with similar identities can be grouped together (e.g. for analysis) without potentially misgendering participants. The identities captured are also specific and clear, as compared to umbrella labels that can cover a wide range of identities.
2. TSA can be measured using the TSAS which has evidence for structural validity, generalizability, convergent validity and, discriminant validity.

3. The TSAP was welcomed by members of the TGD community and the contents of the program appear to be suitable and acceptable to the TGD community. The current method for delivery of the contents appears not to be suitable however, as attrition was a problem in the feasibility trial and needs to be addressed.

The three products created have potential research and clinical uses but currently have limitations. Future research is needed to validate the GIS with cisgender participants while exploring peoples understanding of gender dimensions. Evidence for the test-retest properties of the TSAS and its sensitivity to treatment change also need to be provided in future research. Importantly, future research on the TSAP needs to evaluate the different methods for increasing adherence prior to a clinical trial to assess efficacy. The TGD community welcomed the TSAP and it has the potential to assist many people in the community. Just as there are several reasons for attrition however, it must be considered if the TSAP could be delivered in many forms also to live up to the promise of e-health in reaching all people that may not otherwise receive assistance.
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