EMOTIONAL CYCLES MAINTAINING TRICHOTILLOMANIA (HAIR-PULLING DISORDER) ACROSS SUBTYPES

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Dedication

To those with trichotillomania who still suffer in silence.

Abstract

The emotions associated with initiating, maintaining, and reinforcing hairpulling disorder (trichotillomania) were studied. Studies conducted have only looked at small community or inpatient samples, and little is known about the interplay of hairpulling subtypes and emotions. For this study, 427 participants completed an online questionnaire around their hairpulling subtype, severity, emotions experienced by hairpulling, and comorbid anxiety and depression. Using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner, Woods, Franklin, Cashin, & Keuthen, 2008), this is the first study to address the regulation of emotions across subtypes. Participants were divided as either high- or low-focused and either high- or low automatic. Significant differences between hairpulling subtypes and hairpulling severity were reported. Subtypes differed in the severity they experienced emotions; individuals with high-focused pulling reported more intense negative emotions, and a greater number of emotions regulated by pulling. Positive emotions—happiness, relief, and calm—were also found to play a significant role in reinforcing hairpulling. For high-focused subtypes, negative emotions before- and after-pulling were associated with greater severity, indicating that altering negative emotions via pulling plays an important role for high-focused subtypes. High-focused subtypes also reported higher stress, depression and anxiety than either automatic subtypes or the general population, and were found to have anxiety and depression significantly associated with hairpulling severity and experiencing negative emotions that initiated hairpulling. Clinical and treatment implications, study limitations, and areas of future research are discussed.

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To those with trichotillomania, thank you.

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Chapter 1: Introduction

Overview

The intent of this chapter is to provide the reader with introductory background and context surrounding trichotillomania and the questions under investigation to facilitate the reading of subsequent chapters in this thesis. Specifically, I will begin this chapter by highlighting the problem under investigation and provide a brief overview detailing the topic of trichotillomania. The reader will also be provided with my rationale for pursing this thesis topic. A list of some key terms is also included in this chapter to better acquaint the reader with the language used when describing trichotillomania. A statement of my personal interest will follow, which explains my passion for the topic and why I am completing a thesis. Finally, an overview of the succeeding chapters will be provided to help the reader become familiar with the sequence, structure, and content of the upcoming chapters, followed by a summary to transition the reader to the literature review on trichotillomania.

Statement of the Problem

Research completed to date has not comprehensively studied the role emotions play in the maintenance of trichotillomania. Studies designed to understand trichotillomania have consistently shown that distinct patterns of hairpulling exist, but until recently no instrument was available to conceptualize what these distinct pulling patterns were and how they are represented in the population (Flessner, Woods, Franklin, Cashin, & Keuthen, 2008). Similarly, it has been known for nearly two decades that various cognitive, affective, and situational variables may be promoting and maintaining trichotillomania in individuals, but no study has since teased out what affective qualities

may be maintaining hairpulling across these several distinct groups of individuals with TTM (Mansueto, Townsley-Stemberger, Thomas, & Golomb, 1997).

In this thesis I address these gaps in the literature by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner, Woods, Franklin, Cashin et al., 2008), to parse trichotillomania into four hairpulling profiles that will be studied to understand how emotions cue, maintain, and reinforce hairpulling across these distinct profiles. In order to accomplish this, this thesis will also be using the Hair Pulling Survey (HPS; Stanley, Borden, Mouton, & Breckenridge, 1995) to look at the role affect plays in starting, maintaining, and reinforcing the behaviour across different profiles of hairpulling.

Overview of the Topic

Trichotillomania is defined as chronic, uncontrollable, and repetitive hairpulling that results in noticeable hair loss (American Psychiatric Association, 2000). The social perception of trichotillomania as both a rare and benign condition is challenged by research demonstrating the prevalence and distress this condition presents with. Prevalence rates appear to range from 0.6% to 3.4% of the general population (Christenson, Pyle, & Mitchell, 1991), with many reporting significant social, psychological, economic, and academic distress (Woods, Flessner, Franklin, Keuthen et al., 2006). Using the most conservative prevalence rate and estimating to the general North American population, at least 5 million Americans and 450,000 Canadians could be suffering from chronic hairpulling (Statistics Canada, 2011). Despite continued research beginning to suggest potential genetic and neuroanatomical factors that trigger the behaviour, trichotillomania currently has no known cause or cure; although continued

efforts to understand the phenomenology of the disorder has the potential to aid in the construction of more efficacious treatment programs that aid in managing the condition (Duke, Keeley, Geffken, & Storch, 2010).

Regarding the distress of trichotillomania, individuals can experience significant shame, fear, anger, and isolation engaging in the behaviour. These can all have a strong negative impact on the self-esteem, social life, quality of life, and body image of these individuals, while at the same time leave them feeling helpless to control and resist the impulses to pull out their own hair (Casati, Toner, & Yu, 2000). The personal, physical, psychological, and social consequences of hairpulling will be amply expanded on throughout Chapter 2.

Styles and profiles of hairpulling. Trichotillomania is still often conceptualized as a homogenous condition, but emerging research supports the idea that individuals exhibit distinct "styles" or behaviour patterns of hairpulling: labelled as "automatic" and "focused" pulling (Christenson & Mackenzie, as cited in Christenson & Mansueto, 1999). Individuals showing an "automatic" style of pulling often pull while engaged in sedentary activities (driving, watching TV, reading, etc.), and are often unaware of their pulling until it has been ongoing for a period of time (Christenson & Mackenzie, as cited in Christenson & Mansueto, 1999). Individuals exhibiting a more "focused" style of pulling are fully conscious of the activity, often engaging in it intentionally (Christenson & Mackenzie, as cited in Christenson & Mansueto, 1999). This intentionality can be directed towards removing a certain hair or areas of hair, or can be in response to a specific antecedent trigger - including cognitions (i.e., negative thoughts), affective

states, or environmental cues (Christenson & Mansueto, 1999; Flessner, Woods, Franklin, Cashin et al., 2008; Mansueto et al., 1997).

The development of the MIST-A, which will be used in this thesis, has provided researchers with the first validated tool to assess and differentiate between these different styles of pulling (Flessner, Woods, Franklin, Cashin et al., 2008). The MIST-A has endorsed the idea that trichotillomania is not homogenous, and that the distinct patterns of behaviour are associated with each subtype of pulling (Flessner, Woods, Franklin, Cashin et al., 2008). The MIST-A has helped identify that individuals do not display one style in isolation of the other (i.e., purely focused or purely automatic pulling) but that their pulling profile often incorporates both styles to a varying degree of severity and impairment experienced in each style (Flessner, Conelea, Woods, Franklin, Keuthen, & Cashin, 2008). An extensive development of how the hairpulling profiles will be created and developed for this thesis is included in Chapter 2.

Understanding trichotillomania through a behavioural model. The Comprehensive Model for Behavioural Treatment (ComB), developed by Mansueto et al. (1997), provides this thesis with a framework for understanding the role that affect plays in initiating, maintaining, and reinforcing hairpulling behaviour. Studies conducted on trichotillomania samples that did not differentiate between focused and automatic pulling have still found key emotions (i.e., anger, anxiousness, boredom, calm, embarrassment, frustration, guilt, happiness, indifference, loneliness, relief, sadness, and tension) producing affective cycles that, according to the ComB model, play an important in reinforcing the behaviour (Diefenbach, Mouton-Odum, & Stanley, 2002; Diefenbach, Tolin, Meunier, & Worhunsky, 2008; Duke, Bodzin, Tavares, Geffken, & Storch, 2009;

Duke, Keeley, Ricketts, Geffken, & Storch, 2010; Stanley et al., 1995). For example, an individual with trichotillomania may be in an environment where a specific antecedent cue (e.g., studying) produces an increasing sense of anxiety. As the anxiety builds, the individual may begin to pull, which can serve as an effective, albeit maladaptive, response to regulate the anxiety (Shusterman, Feld, Baer, & Keuthen, 2009). According to the behaviour model, although hair pulling may cause a drop in the anxiety during the actual hairpulling behaviour, when the individual stops pulling, the anxiety will show a rebound to pre-pulling levels, and can also generate new negative emotions (e.g., guilt, shame) that further increase the distress. This cycle can then prompt the individual to return to pulling as a means of decreasing the increased level of discomfort (Duke, Keeley, Ricketts et al., 2010; Mansueto et al., 1997; Shusterman et al., 2009). Mansueto et al. reported that this cycling of emotions reinforces pulling behaviour because individuals learn to associate hairpulling as an effective short-term modulator for negative affect.

Purpose of the thesis. Through my research, I intend to develop a greater understanding of how emotions play a role across the various trichotillomania profiles first developed by Flessner, Woods, Franklin, Cashin et al. (2008). Initially, focused pulling was believed to be the only style of pulling associated with any form of emotional regulation (Begotka, Woods, & Wetterneck, 2004). However, Shusterman et al. (2009) reported that while focused pulling may be more associated with emotional regulation, automatic pulling may also be associated to affect regulation, particularly in the case of emotions like boredom. However, without using any means to differentiate focused and automatic pulling, their results remained purely speculative. By being able to create and

measure differences with respect to the emotions experienced by each group, as will be done in this proposed research, a further understanding will occur with respect to how different emotional states interact across the varies severities and profiles of trichotillomania.

Rationale for studying trichotillomania online. The method being used in this thesis entails using an online survey to reach participants. Internet studies have proven invaluable to trichotillomania research, which until the middle of the last decade have relied on small, in-person, clinical or college samples that provided limited generalizability. While online studies are not without unique considerations (e.g., how to control for repeat responding), research has supported that online studies produce larger, more diverse, and more representative participant pools, with responses that are equally reliable to traditional research (Gosling, Vazire, Srivastava, & John, 2004). Online studies are especially valuable in an area like trichotillomania research because they provide individuals with trichotillomania the ability to contribute to research without the embarrassment or apprehension of facing a clinician or researcher and discussing this very sensitive topic face-to-face, and they provide the participant pool sizes required for high-power studies.

Overview of research questions. I suggest that pulling as a means to regulate affect is not exclusive to focused hairpulling as has been previously suggested. Although regulation of negative affect is believed to play a more significant role among those with a focused hair pulling profile, the regulation of affective states (most notably boredom) is also believed to play an important role in maintaining pulling in individuals with a more automatic style of pulling. In this thesis, I will also explore the idea that as the number

and intensity of emotional cycles maintaining hairpulling increases, so too will the severity of trichotillomania, such that individuals who show a high-focused and high-automatic pulling profile would be expected to have the most emotional cycles driving their behaviour and would show the highest trichotillomania severity. A full elaboration of each of the four research questions will be presented in greater detail in Chapter 2.

Contribution of this Thesis

By conducting a thesis to understand the affective cycles driving trichotillomania, I will encourage the endorsement of measures like the MIST-A that are able to identify and classify distinct profiles and behaviours of trichotillomania. Previously, trichotillomania has often been studied homogeneously, without looking at the variations that exist between individuals. Through this proposed thesis, I will move away from the view that a "one size fits all" conceptualization of trichotillomania is responsive enough for studying and treating the complexity and variation in the condition, and in doing so, I hope to provide a rationale that may encourage focusing and designing treatments to take into account different profiles of trichotillomania. While I hope, through this thesis research, to contribute to those who research and study trichotillomania, the resultant research may also serve as an important reference to the majority of physicians and therapists who are often poorly versed in the condition (Marcks, Wetterneck, & Woods, 2006; Woods, Flessner, Franklin, Keuthen et al., 2006). One of the barriers to trichotillomania treatment has been the lack of provider knowledge of the condition (Woods, Flessner, Franklin, Keuthen et al., 2006). As treatment providers often serve the front line in responding to individuals with trichotillomania, it is essential that they be provided with an understanding of trichotillomania, the emotional antecedents, the

existence of various pulling profiles, and a way of deriving emotions that may maintain the disorder to facilitate treatment planning.

Key terms

Trichotillomania research, like any area of study, uses a specific vocabulary that facilitates communication of the condition. While I have done my best to clarify the language used to describe trichotillomania throughout the literature review (i.e., Chapter 2), it may be useful to introduce a couple key phrases and terminology that will persist throughout the thesis.

Trichotillomania (TTM). Often referred to colloquially as trich, hair-pulling disorder, or throughout this thesis, TTM. TTM is a diagnostic label listed in the DSM-IV-TR (312.39) as an impulse control disorder (American Psychiatric Association, 2000).

Criteria B/C. In order to obtain a clinical diagnosis of TTM, individuals need to satisfy five diagnostic criteria. The criteria that TTM must be preceded by an increasing sense of tension immediately before pulling out the hair or when attempting to resist the behaviour (Criteria B), and pleasure, gratification, or relief when pulling out the hair (Criteria C), has been a source of controversy amongst those who study the condition (Lochner et al., 2011). In this thesis I will recognize individuals with and without an endorsement of Criteria B/C as having TTM if they satisfy all other DSM-IV-TR criteria for the condition.

Automatic pulling. Hairpulling that occurs outside of conscious awareness. Individuals with an automatic style of pulling often show a lack of insight about the behaviour, and often perform the behaviour while in a very dissociated or trance-like

state. This form of pulling is often associated with sedentary activities. For more information, please see the work of Christenson and Mansueto (1999).

Focused pulling. Hairpulling that occurs in the conscious awareness of the individual. Individuals with this style of pulling are aware of the behaviour and pull intentionally. The use of implements (e.g., mirrors, tweezers) can also be associated with this style of pulling. Focused pulling has traditionally been associated as a way to regulate emotional states.

Pulling profile. Refers to the composite makeup of automatic and focused pulling behaviours, derived from the MIST-A, which an individual with TTM may engage in. For this thesis research, I will divide participants into four such profiles: (a) a high-focused, high-automatic pulling pattern (HFHA); (b) high-focused, low-automatic pulling (HFLA); (c) low-focused, high-automatic pulling (LFHA); and (d) low-focused, low-automatic pulling (LFLA). See Appendix A for a chart of these four hairpulling profiles.

Affective cycles. Also referred to as emotional cycles. Affective cycles refer to the fluctuations of emotions that occur before, during, and after the hairpulling behaviour.

Statement of Interest

My primary interest mainly stems from having family members with TTM. I have experienced the distress of TTM in a way that few clinicians and researchers have privilege to, and this has served to ignite my passion to research and aid in progressing an understanding of the disorder in any way that I am capable of.

In May, I attended the 19th Annual Conference on Hair Pulling & Skin Picking Disorder in Chicago, Illinois, hosted by the Trichotillomania Learning Center (TLC). As

a registered member of the TLC, this three-day conference provided me the chance to interact with leading researchers in the field of TTM research. I attended sessions to see first-hand what were the latest findings emerging in understanding the etiology of TTM, along with emerging treatment findings. Hoping to apply much of this thesis research to my future work as a psychologist, I also had a chance to speak with individuals who currently have TTM. I heard stories about the struggles these individual face: how "defective", "weak", "terrified", and "alone" they often felt. However, I also saw the support, optimism, hope, and resiliency these individuals held onto to have answers to a condition they have struggled with for so long. Personal reasons have fuelled my personal and professional interest in the topic, and I hope that my thesis will make a significant contribution in educating professionals about TTM.

Overview of the Thesis

This thesis is divided into five chapters. This section, Chapter 1, was intended to provide the reader with breadth of the topic under investigation, and provide them with a rationale and problem statement this thesis is addressing. The contributions of this work, my personal interest in the topic, and a short list of key terms for TTM have also been provided.

Chapter 2 provides the reader with literature review of adult TTM. Chapter 2 begins by providing a rich background on the disorder, and then introduce the various components (e.g., styles of pulling, online research, ComB model, etc.) essential to understanding the depth of the topic under study. Full elaborations of the research aims are also outlined in Chapter 2.

Chapter 3 provides details surrounding the methods and procedure of the thesis. Discussion surrounding recruitment, inclusion and exclusion criteria, and data collection and analysis methods are provided. The purpose, psychometrics, and use of each scale used in the study are also explained.

Chapter 4 outlines the data preparation. Steps for how the data was thinned and grouped for analysis are presented in this chapter.

Chapter 5 reports the results from the study for each of the questions under investigation. Tables and figures are used to enhance the presentation of the data.

Chapter 6 concludes the thesis by providing a general discussion of the research findings and general trends in the data. The strength this study, limitations that arose during the running of this project, and a report on the implications and future directions subsequent studies can take for expanding TTM research will also be described in Chapter 6.

Summary

To summarize, Chapter 1 was intended to introduce and familiarize the reader to the breadth of information that will be covered by this thesis. The reader was introduced to the problem under investigation—understanding how affective cycles operate across different hairpulling profiles—and was provided with a brief overview of trichotillomania and some of the key components to understanding the topic. An overview of the contributions this thesis hopes to make, along with my personal interest in pursuing this thesis, was outlined. Finally, to assist the reader, this chapter included a brief section covering some key terms and provided a brief chapter-by-chapter overview that were intended to help the reader move fluidly through the body of the thesis.

In the upcoming chapter, I present a full literature review of trichotillomania and all components relevant to this thesis are provided. These components will be integrated to justify the importance of the topic under investigation and identify the gaps in the research this thesis will address.

Chapter 2: Literature Review

Overview

My purpose in this chapter is threefold. First, I will explain the topic of trichotillomania, providing a breath of information about the characteristics and severity of this condition. Second, I will provide an in-depth exploration of the three major components essential to this thesis: (a) conceptualizing the different pulling behaviours, (b) understanding the role of emotions in maintaining the condition, and (c) discussing how to approach studying trichotillomania online. Finally, I conclude this literature review by compiling what this research may mean for treatment and outline the four key research questions I hope to answer through this thesis research.

Trichotillomania

History. Greek for "hair-pulling madness", the label trichotillomania was first recorded by the French dermatologist François Hallopeau in 1889 (Rothbaum & Ninan, 1994, p. 651). According to Hallopeau, trichotillomania was characterized as a severe itching (i.e., pruritus) extending to all areas of the skin, which was identified as a "type of insanity" to relieve this pruritus through uncontrollable hairpulling, the normal appearance of the hair and skin, lengthy duration of the disorder, and no known cure (as cited in Christenson, & Mansueto, 1999).

A century later, trichotillomania (TTM) first became formalized in the revised third edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-III-R; American Psychiatric Association, 1987). With the release of the DSM-IV in 1994 and DSM-IV-TR in 2000; revisions to Hallopeau's original case-conceptualization and the

DSM-III-R definition have led to the five-criterion definition of TTM in use today (American Psychiatric Association, 1994, 2000).

TTM is listed in the DSM-IV-TR as an "Impulse Control Disorder" (American Psychiatric Association, 2000, p. 663). In order to obtain a diagnosis of the condition, all five criteria need to be satisfied. An individual needs to (a) engage in the recurrent pulling of their own hair, resulting in noticeable hair loss (i.e., alopecia); (b) experience an increasing sense of tension before pulling or in attempting to resist pulling; (c) report pleasure, gratification, or relief when pulling; (d) ensure that the condition is not better accounted for by another mental or medical condition; and (e) report that the disorder causes significant distress or impairment in important areas of the life (American Psychiatric Association, 2000, p. 677). A further discussion about some of the debate surrounding these current diagnostic criteria is discussed later in a section titled Revising the DSM Criteria for TTM.

Prevalence. The most commonly cited statistic for the prevalence of TTM and the one reported in the DSM-IV-TR comes from a questionnaire study by Christenson, Pyle, and Mitchell (1991). In their study, 2,579 students across several post-secondary institutions were asked to complete a general questionnaire inquiring about concerns and habits of college students. Of the 2,524 students who responded to the survey, eight females (0.6%) and seven males (0.6%) met the full DSM-III-R criterion for TTM, which is very similar to the current DSM-IV-TR criteria. When the criteria were expanded to include hairpulling with visible hair loss occurring without the individual experiencing pre-pulling tension (criterion B of the DSM-IV-TR), or post-pulling gratification (criterion C of the DSM-IV-TR), the prevalence rates rose to 3.4% among females and

1.5% among males, with a general population prevalence rate of 2.5% (Christenson, Pyle, & Mitchell, 1991). To support the aforementioned 1991 findings, in a recent phenomenological study, Duke et al. (2009) found the same 0.6% (n = 5) prevalence rate of TTM after reaching 830 respondents. When criteria B and C were dropped, the prevalence rate doubled to 10 individuals (1.2%) with clinically significant hairpulling (Duke et al., 2009). Similarly, in a more recent study by Duke, Keeley and Ricketts et al. (2010) performed with 527 college students, 0.76% (n = 4) met the full DSM criteria for TTM.

While these three prevalence reports remain the only studies that have sampled TTM in the general population, they remain the best estimates of TTM available today. With respect to sex differences, while Christenson, Pyle, and Mitchell (1991) reported a generally equal sex distribution for TTM, these results have not been found in other studies. Specifically, researchers noted that females tend to outnumber males from 3 to 1 up to 9 to 1 (Chamberlain, Menzies, Sahakian, & Fineberg, 2007; Wetterneck, Woods, Norberg, & Begotka, 2006).

General hairpulling characteristics. Contrary to the initial conceptualization proposed by Hallopeau, researchers found TTM frequently occurs independently of pruritus (Christenson, & Mansueto, 1999). In a sample of 60 TTM patients, only 8% reported that they occasionally pull when cued by any itching or burning (Christenson, Mackenzie, & Mitchell, 1991). Additionally, unlike Hallopeau's descriptions that TTM extends to "all parts of the body" (Christenson & Mansueto, 1999, p. 3), TTM hairpulling is now understood to be highly selective in terms of the sites hair is pulled from, which hairs the individual removes from these sites, and the rituals, if any, that accompany

extraction (Christenson, Mackenzie, & Mitchell, 1991; Christenson, & Mansueto, 1999; Flessner, Woods, Franklin, Keuthen, & Piacentini, 2008).

Hairpulling sites. Ninety percent of TTM patients have only one to three specific hairpulling sites that they consistently target (Christenson, Mackenzie, & Mitchell, 1991; Flessner, Woods, Franklin, Keuthen et al., 2008). The number of hairpulling sites has been found to increase from early childhood (one site), to adolescence (two sites), and stabilizing at two to three sites in adulthood (Flessner, Woods, Franklin, Keuthen, et al., 2008). The scalp, which divided into the crown, left temporal, right temporal, front, and occipital areas—commonly broken down into these five independent sites, is generally found to be the most frequent area of hair pulling across studies (72–84%; Christenson, Mackenzie, & Mitchell, 1991; Lochner, Seedat, & Stein, 2010); followed by the eyebrows (21–65%; du Toit, van Kradenburg, Niehaus, & Stein, 2001; Flessner, Lochner et al., 2010), and eyelashes (17–61%; du Toit et al., 2001; Flessner, Lochner et al., 2010). The fourth most commonly targeted hairpulling site is often the genital area (17–51%; Christenson, Mackenzie, & Mitchell, 1991; Woods, Flessner, Franklin, Keuthen et al., 2006), with areas like the legs or arms (19%) stomach (6%), and mustache or beard (4%) being reported far less frequently (Woods, Flessner, Franklin, Keuthen et al., 2006). Lower reported rates in areas like the stomach, legs, and facial hair is often accounted for by gender differences in hair distribution and the clinical prevalence of TTM in females, who account for over 90% of respondents to clinical studies (du Toit et al., 2001; Woods, Flessner, Franklin, Keuthen et al., 2006). Du Toit et al. (2001) also suggested that these lower rates can be explained because of the ease that hair in areas like the legs or stomach can be managed to prevent pulling (e.g., shaving).

Hair characteristics. The most common method of extraction was to pull out individual hairs by hand (68% of individuals; Christenson, Mackenzie, & Mitchell, 1991). Those with TTM do not pull hair as a means of cosmetic grooming, as grey hair appears to be rarely selected or specifically sought out for extraction (0–9%; Duke et al., 2009; du Toit et al., 2001; Lochner et al., 2010). Instead, individuals often select hairs for their particular texture (48%), being either too coarse, too fine, or curly relative to surrounding hairs at the particular site (Duke et al., 2009; Lochner et al., 2010). Individuals also frequently select hairs to pull based on their length (51%, Lochner et al., 2010), being either shorter or longer than surrounding hairs, or because the particular hair did not feel or did not look right (28–39%; Duke et al., 2009; du Toit et al., 2001; Lochner et al., 2010).

Hairpulling behaviours and oral habits. The majority of TTM individuals often have unique behaviours or "rituals" that involve playing with the hair prior to extraction (69%) and after extraction (61%; Lochner et al., 2010). Common rituals include to pulling out the root when removing hair (52%), rolling the hairs between the fingers (28%), pulling the hair out only with certain fingers (20%), watching hairs fall to the floor (7.4%), and saving the hair (5.6%; Duke et al., 2009). In addition to using one's fingers, individuals with TTM may also use various implements (e.g., mirrors, tweezers, etc.) to locate and extract the desired hairs (Christenson, Mackenzie, & Mitchell, 1994).

Additionally, a high percentage (70%; du Toit et al., 2001) of TTM individuals report one or more oral behaviours associated with hairpulling. The most common oral behaviours include (a) having the hair make contact with the lips (51%), teeth (47%), or tongue (34%); or (b) biting the hair into pieces (45%), biting off the root of the hair

(32%), and occasionally ingesting the hair, known as trichophagia (7.4-34.0%) (Duke et al., 2009; du Toit et al., 2001). Individuals who frequently engage in trichophagia risk developing a potentially life-threatening trichobezoar—a hair ball inside the abdominal or digestive tract of an individual—that has the potential to produce nutritional deficiencies, disruptions in the absorption of medication, vomiting, and potentially death (Bouwer & Stein, 1998).

Duration and number of pulling episodes. While a majority (82%) of individuals with TTM spend less than an hour physically hair pulling; they often can spend hours per day playing, pulling, resisting, and performing their ritualized behaviours—especially in the presence of antecedents (e.g., boredom, anxiousness) that may serve as triggers for pulling (Christenson et al., 1994; Duke et al., 2009; Mansueto et al., 1997; O'Sullivan et al., 1997; Pelissier & O'Connor, 2004). Lengthy hairpulling episodes (called hairpulling "binges") are also accompanied by shorter episodes occurring throughout the day—each with a length of about 15 minutes and occurring, on average, around 5 times a day (Christenson et al., 1994; Mansueto et al., 1997; Woods, Flessner, Franklin, Keuthen et al., 2006).

Individual with TTM spend considerable amounts of time concealing their hairpulling behaviour. It is not uncommon that those with more extensive damage to spend considerable amounts of time devoted to constructing elaborate hairstyles or applying wigs, makeup, and other disguises to hide the condition (Casati et al., 2000; Woods, Flessner, Franklin, Keuthen et al., 2006).

Onset. The widely reported age of onset for TTM is found to occur at age 13 (Duke, Keeley, Ricketts et al., 2010; Flessner, Lochner et al., 2010). Female onset of

TTM is reported to occur between the ages of 10-14, with a mean onset age of 13 (Flessner, Lochner et al., 2010; du Toit et al., 2001).

A recent study by Flessner, Lochner et al. (2010) found that 80% of individuals develop TTM between the ages 6-18, while the remaining developed late onset TTM (18+) or had a very early onset (between ages 0–6), 15% and 5% respectively. While hair-pulling in very early childhood has generally been seen to be rather transient and benign condition similar to thumb-sucking that remits before adolescence, Flessner, Lochner et al. (2010) suggested that a subset of the pediatric population may develop chronic TTM that carries over into adulthood. For a full literature review on pediatric trichotillomania, please refer to the work of Harrison and Franklin (2012). Males onset was also found, although not significantly, to occur more often in the very early or late-onset phases relative to females, with some studies reporting male onset occurring as late as 18-24, although the full phenomenological understanding of what mechanisms underlie this potential gender distribution remain unclear (du Toit et al., 2001; Lochner et al., 2010).

Although TTM severity will typically increase over the years before plateauing between the ages of 19–30, there is no evidence that an earlier onset is a reliable predictor of severity at a later age (Cohen et al, 1995; Flessner, Woods, Franklin, Keuthen et al. 2008; Stein et al., 2010). In addition, no significant link has been established between age of onset and comorbidity, treatment response, overall disability, and hairpulling style. The only significant finding to emerge was that earlier onset translated to significantly more years of pulling, highlighting the chronic and unremitting course typical of TTM (Flessner, Lochner et al., 2010). To demonstrate the tremendous

impact this condition can have on those who suffer from it, the social, occupational, physical, and psychological consequences of TTM will be examined in the next section.

Conceptualizing the Impact of Trichotillomania

Social consequences. Individuals with TTM often go to great lengths to keep their condition secret, not only from the public, but also from close family and friends (Marcks, Woods, & Ridosko; 2005). Stigmatization of TTM does occur, with one research study showing that those who chose to disclose their TTM saw a significant drop in social acceptability by those around them compared to those who kept their TTM secret (Marcks et al., 2005). This stigmatization not only discriminates against those with TTM, but can also significantly impact the individual's own acceptance of the condition, exacerbating the potential for issues around self-esteem and body image (Soriano et al., 1996). Soriano et al. (1996) reported that 80% of individuals with TTM have concerns surrounding body image, while over 20% qualify for a diagnosis of a body dysmorphic disorder as a result. A portion of individuals with TTM (17%) also reported being teased about their hairpulling (Duke et al., 2009).

It is common for individuals with TTM to limit or avoid participation in social activities (Townsley-Stemberger, Thomas, Mansueto, & Carter, 2000; du Toit et al., 2001). Due to the fear of having their hairpulling discovered, many individuals avoid visiting a stylist (75%; Townsley-Stemberger et al., 2000), swimming (62%; Townsley-Stemberger et al., 2000), participating in social events (57%; Wetterneck et al., 2006), group activities (56%; Wetterneck et al., 2006), and limit being outside on windy days (42%; Townsley-Stemberger et al., 2000). Individuals with TTM may also frequently avoid sexual intimacy (56%) or entering close relationships (44%) because of the shame,

secretiveness, and unattractiveness they may feel, along with the risk of having hairpulling exposed to their partner (Wetterneck et al., 2006). Innocuous contexts for most people: being in well-lit areas (37%) or going to movies, classrooms, and restaurants (21%), are completely avoided or carefully navigated because of the potential that someone could notice the alopecia (Wetterneck et al., 2006).

Occupational and academic consequences. The impact of TTM often extends to work or academic contexts as well. Woods, Flessner, Franklin, Keuthen et al. (2006) reported that over a third of individuals with TTM experience interference with their job responsibilities, while a smaller percentage have avoided either career advancement (15%) or job interviews (18%) because of the visibility of their hair loss.

Students with TTM are another subset who experiences a high degree of interference. Over 76% of students with TTM report that hairpulling causes significant difficulties in the ability to study, while a smaller subset have avoided educational advancement (9%) or have dropped out of school (5%) because of their hairpulling (Woods, Flessner, Franklin, Keuthen et al., 2006).

Physical consequences. In addition to potentially life-threatening trichobezoars occurring if an individual with TTM continually ingests hair, individuals with TTM may suffer permanent follicle damage at the site of pulling, resulting in permanent alopecia, loss of pigmentation or the regrowth of “wavy”, “kinky”, or “coarse” hairs, which can serve to encourage further pulling and create a vicious cycle if these types of hairs have the characteristics that individuals target for extraction (Casati et al., 2000; Christenson, & Mansueto, 1999; Woods, Flessner, Franklin, Wetterneck et al., 2006). In addition, carpal tunnel and dental concerns (e.g., gingivitis, stripping of tooth enamel associating

with biting and ingesting hair) have been reported to result in patients with prolonged TTM behaviour (O'Sullivan, Keuthen, Jenike, & Gumley, 1996; Woods, Friman, & Teng, 2001).

Psychological interference. Individuals with TTM report high levels of shame, embarrassment, and isolation around their condition (Casati et al., 2000; Townsley-Stemberger et al., 2000). Individuals with TTM commonly report believing that they were the only ones living with this condition and are often reluctant to seek treatment and social support because of the humiliation and stigma they expect from others (Casati et al., 2000). It is also not uncommon for close family members or friends who are aware of the hairpulling to blame the cause of the behaviour as a moral failing and weakness on the part of the individual (Franklin & Tolin, 2007; Penzel, 2003). Issues around body image and feeling unattractive are frequently reported, considering the prevalence amongst females, the adolescent onset of TTM, and the value and importance placed on beauty, hair, and hair health in society (Christenson, Mackenzie, & Mitchell, 1991; Soriano et al., 1996; Townsley-Stemberger et al., 2000).

Comorbidity. A range of comorbid psychiatric disorders is routinely found in clinical TTM samples. Christenson, Mackenzie, and Mitchell (1991) reported that as many as 82% of TTM individuals have met criteria for an Axis I disorder at some point in their past. The most common comorbid conditions were mood disorders (65%, with notable depression in 39–55% of cases), anxiety disorders (57%, with notably generalized anxiety disorder in 27–32% of individuals), substance abuse (19-22%), eating disorders (20%), body dysmorphic disorders (20%), and obsessive-compulsive disorder (16%) (Christenson, 1995; Christenson, Mackenzie, & Mitchell, 1991; Soriano

et al., 1996; Swedo & Leonard, 1992). It has been suggested that a link between TTM and schizophrenia exists, but this has not been supported by current reviews and research (Flessner, Lochner et al., 2010).

Individuals with TTM also show elevated levels of other body-focused repetitive behaviours (BFRBs) that include a range of conditions like compulsive skin-picking and nail-biting (Stein et al., 2010). While BFRBs are found to exist in approximately 14% of the population, rates among individuals with TTM have been found as high as 70% (Stein et al., 2008; Teng, Woods, Twohig, & Marcks, 2002).

Higher depressive and anxiety symptoms have been found to be a mitigating factor in TTM severity (Flessner, Woods, Franklin, Cashin et al., 2008; Flessner, Woods, Franklin, Keuthen et al., 2008). Higher levels of depression and anxiety are associated with higher levels of TTM-related distress and actual hairpulling severity, regardless whether the hairpulling is primarily focused or automatic (Flessner, Woods, Franklin, Cashin et al., 2008).

A history of how researchers and clinicians have conceptualized trichotillomania will be reviewed in the next section. I will progress to highlight the most recent understandings of how TTM should be conceptualized, before moving to discuss automatic and focused hairpulling, which will provide the framework I will use in operationalizing the condition through this thesis research.

Classifying Trichotillomania

TTM is a frequently misunderstood disorder that has undergone numerous reclassifications throughout the last two decades of study (Duke et al., 2009). From looking at its earliest conceptualization as an obsessive-compulsive behaviour, its current

place as an impulse-control disorder, and its potential future in a unique category of body-focused repetitive-behaviour disorders, as our knowledge of TTM increases, researchers are challenged with adjusting and changing their views on this evolving condition.

Trichotillomania as an obsessive-compulsive behaviour. TTM has been viewed in early research to function as an obsessive-compulsive spectrum disorder (Stein, Simeon, Cohen, & Hollander, 1995; Swedo & Leonard, 1992). There is certainly some evidence to support this: TTM has been reported to serve as an anxiety-relieving mechanism in some individuals (Diefenbach et al., 2002), known to be highly repetitive, and is occasionally done to establish symmetry (Mansueto et al., 1997): all of which potentially suggest a root in obsessive-compulsive behaviour. Arguing against TTM as an obsessive-compulsive spectrum disorder was evidence that TTM has no preceding obsessions (Stein et al., 2010), often reported to be a very pleasurable activity (Woods, Flessner, Franklin, Keuthen et al., 2006), and presents with a significantly greater gender disparity and earlier age of onset than obsessive-compulsive disorder (Tükel, Keser, Karalı, Olgen, & Çalıkuşu, 2001). Additionally, the modalities that drive TTM versus those that drive obsessive-compulsive disorder (OCD) are different; TTM is seen as an impulsive, reward-seeking behaviour, while OCD is often viewed as a compulsive, harm-avoidant behaviour (Stein et al., 2010). Research has also found TTM occurring with equal frequency in both OCD patients and people with other Axis I anxiety disorders, so while there is some comorbidity, it is not as high as would be expected if the conditions were related (Richter, Summerfeldt, Antony, & Swinson, 2003).

Conceptualizing TTM as an obsessive-compulsive spectrum disorder has guided the development of the major TTM assessment tools available today (Stanley, Breckenridge, Snyder, & Novy, 1999). The Psychiatric Institute Trichotillomania Scale (PITS; Winchel et al., 1992) and the National Institute of Mental Health Trichotillomania Severity and Impairment Scales (NIMH-TSS, NIMH-TIS; Swedo et al., 1989) have all been directly developed from the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989). While the Y-BOCS has been demonstrated to be a solid instrument for assessing the severity of obsessions and compulsions associated with OCD (Goodman et al., 1989), the TTM measures developed from it have generally shown dissatisfying psychometric properties for assessing TTM (Diefenbach, Tolin, Crocetto, Maltby, & Hannan, 2005; Stanley, Prather, Wagner, Davis, & Swann, 1993; Stanley et al., 1999). A large reason for why these TTM measures often perform poorly is because while OCD compulsions and obsessions are engaged in the full awareness of the individual, 70–80% of individuals with TTM are routinely unaware that their pulling behaviour is even occurring (Christenson, Mackenzie, & Mitchell, 1991; Woods, Flessner, Franklin, Keuthen et al., 2006). This makes the majority of items that assesses for interference, resistance, and the intensity of urges non-applicable for the vast majority of individuals at least a portion of the time. The result is that these scales are homogenizing different subtypes of TTM, and researchers are potentially underestimating and under representing the severity and characteristics of TTM in individuals.

Revising the DSM criteria for TTM. Currently, researchers responsible for updating the definition of TTM for the upcoming DSM-5 have re-examined the inclusion of criteria B/C as requirements for a diagnosis of TTM. Criteria B (i.e., increasing

tension before pulling or in attempting to resist pulling) and Criteria C (i.e., pleasure, gratification, or relief when pulling) are not reported to occur all the time in individuals with clinically significant hairpulling (Stein et al., 2010). In a recent study, Lochner et al. (2010) reported that over 27% of individuals with chronic and distressing hairpulling did not meet criteria B/C for TTM. Additionally, in the Trichotillomania Impact Project, Woods, Flessner, Franklin, Keuthen et al. (2006) found that only 38% of individuals reported that criteria B was present "all of the time", and only 40% endorsed criteria C as being present "all of the time" when describing their hairpulling behaviours. Since their research demonstrated that clinically significant hairpulling does occur in the absence of tension and/or gratification, changes have been proposed to update the upcoming DSM-5 to remove these criteria to attain a diagnosis of TTM (Stein et al., 2010). This suggests that conceptualizing TTM as an impulse control disorder, which includes such disorders as kleptomania, pathological gambling, and pyromania and requires the presence of tension or gratification to satisfy a diagnosis of the disorder, may also require revision in future versions of the DSM (Stein et al., 2010).

As an alternative to the current DSM diagnosis, some TTM researchers have suggested TTM belongs within a proposed new class of disorders called Body Focused Repetitive Behaviors (BFRBs) (Stein et al., 2010). This category encapsulates conditions like trichotillomania, including onychophagia (i.e., compulsive nail biting), dermatotillomania (i.e., compulsive skin picking), compulsive nose-picking, cheek-biting, and lip-biting; all of which, except for TTM, are currently classified in the Impulse Control Disorder Not Otherwise Specified (NOS) category of the DSM-IV-TR.

As researchers continue to learn more about TTM, they have moved to conceptualizing the condition as heterogeneous—referring to the continuum of behaviours TTM presents with (Duke, Keeley, Ricketts et al., 2010). In the next section, I will move to look at the two poles of this continuum—automatic and focused pulling—that will provide the framework for conceptualizing TTM in this thesis.

Automatic and Focused Hairpulling

Early in TTM research, Christenson, Pyle, and Mitchell (1991) found that not all individuals presenting with chronic hairpulling endorsed the DSM criteria of pre-pulling tension and post-pulling gratification (Criteria B/C) despite reporting their behaviour was distressing, impairing, and produced significant alopecia. In addition to failing to meet the full DSM criteria for trichotillomania, a significant portion of the TTM population (80%) reported that their awareness of the behaviour drifting between being fully conscious, termed "focused", and occurring outside their conscious awareness, termed "automatic". It was not until the works of Flessner, Conelea et al. (2008), Flessner, Woods, Franklin, Cashin et al. (2008), and Woods, Flessner, Franklin, Keuthen et al. (2006) that a better understanding of how automatic and focused pulling operate in the population began to emerge. These studies helped illustrate that these different pulling styles are not mutually exclusive and that while many individuals have a more dominant form of pulling, both are present in every individual with TTM. The framework I will use in this thesis for categorizing TTM into four distinct hairpulling profiles, which are developed in the next sections.

Refining the definitions of automatic and focused hairpulling. Several authors (Duke, Keeley, Ricketts et al., 2010; Lochner et al., 2010) have differentiated focused

from automatic pulling based on the individual reporting whether they experience pre-pulling tension or the release of tension following pulling. Under this categorization, individuals meeting one of these criteria are considered to be focused pullers, while individuals not endorsing either criterion are labelled as engaging in an automatic style of hair pulling (Duke, Keeley, Ricketts et al., 2010). It has also been suggested that focused hairpulling is engaged exclusively in the presence of emotional states (e.g., anxiety, tension, boredom, relaxed) and that automatic pulling is done in the absence of any emotional states (Begotka et al., 2004).

Studies do not appear to support that the separation between focused and automatic hairpulling occurs on the basis of tension or gratification being present in the behaviour. While up to 27% of TTM participants do not experience either increasing tension or gratification while engaging in their hairpulling, 70–80% of individuals who do report tension or gratification routinely pull while out of awareness of the behaviour (i.e., they pull automatically) (Lochner et al., 2010; O'Sullivan et al., 1997; Woods, Flessner, Franklin, Keuthen et al., 2006). This suggests that pulling in response to tension or gratification cannot be the lone qualifier for deciding between these two styles of hairpulling; individuals can intentionally and consciously pull in the absence of tension or gratification, but can also experience both tension and gratification but have the behaviour occur outside their awareness.

The second qualifier argued to distinguish automatic from focused hairpulling is that automatic pulling occurs in the absence of emotional states, whereas focused hairpulling occurs as a response to avoid, alter, and regulate negative affective states—labelled emotion or affective regulation (Begotka et al., 2004; Hayes, Wilson,

Gifford, Follette, & Strosahl, 1996; Shusterman et al., 2009). Research has repeatedly shown the importance of affective states for initiating, maintaining, and reinforcing hairpulling behaviour, but has not supported the idea that emotions occur exclusively to focused hair pullers or that they occur only in response to negative affect (Diefenbach et al., 2002; Duke, Keeley, Ricketts et al., 2010; Mansueto et al., 1997; Stanley et al., 1995). Flessner, Conelea et al. (2008), in their study using the MIST-A (the same self-report scale that will be used in this study), reported that individuals scoring higher on an automatic subscale of pulling experienced more stress and anxiety than individuals with low-automatic hairpulling behaviours, even though both styles of hairpulling predominantly occurred outside of individual awareness. While support for emotional regulation occurring in a subset of the TTM population has been found in order to control emotions like anxiety, tension, and boredom, this regulation does not appear to be isolated only to focused hair pullers (Duke, Keeley, Ricketts et al., 2010; Flessner, Conelea et al., 2008).

Automatic and focused hairpulling are now beginning to be understood as representing distinct styles of hairpulling, with different behavioural patterns and unique characteristics associated with each specific type (Flessner, Conelea et al., 2008). However, rather than being two mutually exclusive categories of the behaviour, individuals with TTM have components of both of these two styles, but vary in the degree that they engage in each pattern of pulling (Flessner, Woods, Franklin, Cashin et al., 2008). That is, some are more focused and less automatic, while others can be both high focused and automatic hair pullers. Individuals may also vary in the severity and

impairment they experience from each pattern (i.e., an individual might only endorse a couple automatic behaviours, but report a high degree of impairment from them).

Trichotillomania subtypes represent distinct phenomenon. In the Trichotillomania Impact Study (TIS; Woods, Flessner, Franklin, Keuthen et al., 2006), 848 participants meeting the diagnostic criteria for TTM, with relaxed criteria for any associated tension or gratification, were used in an exploratory analysis to determine the behaviours and characteristics that typify these two pulling styles. The behaviours were distilled and compiled to form the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner, Woods, Franklin, Cashin et al., 2008), an inventory that has never been used before to explore or understand the affective cycles that maintain and reinforce hairpulling, which will be discussed shortly. In creating the MIST-A, Flessner, Woods, Franklin, Cashin et al. (2008) identified 10 behaviours that most strongly distinguish focused pulling and five behaviours that frequently represent automatic pulling. Some focused-hairpulling behaviours included: "I use tweezers or some other device other than my fingers to pull my hair", "I intentionally start to pull my hair", and "I pull my hair to control how I feel", all of which highlight the role of intention and awareness associated with the behaviour (Flessner, Woods, Franklin, Cashin et al., 2008). Automatic items included: "I am usually not aware of pulling my hair during a pulling episode", "I pull my hair when I am concentrating on another activity", and "I am in an almost 'trance-like' state when I pull my hair", all of which highlight that hairpulling is occurring outside of an individual's awareness. The full 15-item MIST-A questionnaire used in this study is included in Appendix B: Form 6 as a part of the Subtypes of Trichotillomania Affect Questionnaire

(STAQ), while the psychometric properties of this measure are outlined in the Chapter 3 of this thesis.

Subtypes occur on a continuum within individuals. The development of the MIST-A confirmed that individuals do not present with either one of these subtypes to the proclivity of the other; rather, these types occur on a continuum with individuals displaying varying degrees of severity on each subtype (Flessner, Conelea et al., 2008; Woods, Flessner, Franklin, Keuthen et al., 2006). Originally it was reported that automatic hairpulling occurred in 5-32% of the TTM population, with 15-25% displaying focused-only hairpulling and as many as 80% of individuals displaying a mix of both patterns (Christenson, Mackenzie & Mitchell, 1994; Christenson, Mackenzie, & Mitchell, 1991; du Toit et al., 2001). However, with the development of the MIST-A, pure-automatic and pure-focused hairpulling have been isolated as occurring in less than 0.01% of the TTM population (Flessner, Conelea et al., 2008; Flessner, Woods, Franklin, Cashin et al., 2008). With such a substantial portion of the population expressing both styles, it becomes meaningful to group and understand how these styles are expressed in the individual, rather than grouping individuals into the one style they endorse best. As Flessner, Conelea et al. (2008) identified, an individual can endorse a low frequency of behaviours from a particular pulling style, yet still be highly impaired by them. The MIST-A measure accounts for both the quantity and quality of each pulling style and allows for the creation of individualized profiles that take into account how both pulling styles operate in the individual.

Severity across a continuum of hairpulling styles. With an assessment tool like the MIST-A able to establish the hairpulling style of an individual, research has begun

testing the relationship between severity and the styles or hairpulling (Flessner, Conelea et al., 2008). Four different groups were created by Flessner, Conelea et al. (2008) using the median-split procedure. This same median-split procedure will be used to create the groupings used in this thesis, to be further described in the Methods chapter. The four groups are (a) HFHA: high-focused, high-automatic hairpulling; (b) HFLA: high-focused, low-automatic hairpulling; (c) LFHA: low-focused, high-automatic hairpulling; and (d) LFLA: both low-focused and low-automatic hairpulling. Each will be described next following a brief introduction to the measure that will be measuring severity: the Massachusetts General Hospital Hairpulling Scale (MGH-HPS).

Assessing severity: The Massachusetts General Hospital Hairpulling Scale. Because it has the strongest psychometric properties of all the TTM assessments (see chapter 3) and has recently been shown to discriminate between high and low severity on both focused and automatic dimensions of hairpulling, the MGH-HPS is currently the best and most thoroughly-tested instrument form measuring global TTM severity (Flessner, Conelea et al., 2008). It is the only self-report measure available for assessing TTM severity (Keuthen et al., 1995; O'Sullivan et al., 1995), and is ideally suited for online formatting (Keuthen et al., 2007). The MGH-HPS correlates with scores on the MIST-A, and provides a way of establishing severity across different hairpulling subtypes (Flessner, Conelea et al., 2008; Keuthen et al., 1995). The seven-item MGH-HPS self-report is included in Appendix B: Form 2 as a part of the STAQ created for this study, while the psychometric properties of this measure are outlined in Chapter 3.

Low-focused, high-automatic hairpulling (LFHA). Flessner, Conelea et al. (2008) found that high-automatic hair pullers reported greater TTM severity, assessed

using the MGH-HPS, than low-automatic hair pullers. High-automatic hair pullers also reported higher levels of stress and anxiety than low-automatic hair pullers and were more likely to report experiencing problems with school or work, but less likely to conceal the condition or to seek treatment (Woods, Flessner, Franklin, Keuthen et al., 2006). Flessner, Conelea et al. (2008) grouped this type of individual who engaged in low-focused, high-automatic hairpulling as LFHA, which represented 27% of the population.

High-focused, low-automatic hairpulling (HFLA). Focused hair pullers also report higher levels of stress, depression, anxiety, disability, and severity scores on the MGH-HPS than low focused hair pullers (Flessner, Conelea et al., 2008). Those with predominately focused pulling showed a trend to show higher MGH-HPS severity scores compared to those with high-automatic hairpulling (17.4 versus 16.9, out of 28), but this finding was non-significant. High focused hairpulling individuals reported a greater avoidance of social activities and occupational advancement; they also reported experiencing academic difficulties as a result of their hairpulling behaviours (Woods, Flessner, Franklin, Keuthen et al., 2006). In their research, Flessner, Conelea et al. (2008) found that high-focused, low-automatic hairpulling (HFLA) occurred in 23% of the population.

High-focused, high-automatic hairpulling (HFHA). The group with high focused and high automatic hairpulling behaviours (HFHA) demonstrated the highest levels of hair loss and the highest levels of anxiety and substance abuse done in order to cope with their hairpulling (Flessner, Conelea et al., 2008; Woods, Flessner, Franklin, Wetterneck et al., 2006). This group experienced the highest levels of social, academic,

and economic problems of the four groupings. The HFHA profile was the most commonly occurring profile—occurring in 29% of the population (Flessner, Conelea et al., 2008).

Low-focused, low-automatic hairpulling (LFLA). The final group, those with low-focused and low-automatic hairpulling behaviour (referred to as LFLA), experienced little to no emotional or comorbid concerns and the least amount of impairment surrounding school, work, life, and social activities (Flessner, Conelea et al., 2008). This was the least commonly occurring profile, with only 21% of respondents showing this combination of hairpulling (Flessner, Conelea et al., 2008). These results all suggest that higher scores on automatic or focused hairpulling, as measured on the MIST-A, translate to higher levels of severity, as measured using the MGH-HPS, and that higher scores on both MIST-A scales lead to the highest impairment in social, economic, emotional, occupational, and academic domains, along with the highest reported hair loss (Flessner, Conelea et al., 2008).

Having fully developed an understanding of automatic and focused hairpulling, the Comprehensive Model for Behavioral Treatment (ComB), an integrative part of the proposed thesis, will be presented in the next section. This model, developed by Mansueto et al. (1997), allows for an understanding of the cycles of behaviours and affects that reinforce and strengthen hairpulling behaviour. In this thesis, I specifically examine the emotions and affect cycles that operate within this model, and I propose research questions to understand how different emotions operate within the four typologies of hairpulling: HFHA, HFLA, LFHA, and LFLA.

The Comprehensive Model for Behavioral Treatment (ComB)

The ComB for TTM separates the act of hairpulling into three component stages that provides a framework for explaining how the behaviour begins, how it is maintained, and how it is reinforced afterwards (Mansueto et al., 1997). As the ComB model provides the basis for operationalizing and contextualizing how affect triggers and maintains pulling, I will discuss the stages that describe ComB, while specifically highlighting how affect: the focus of this research, operates in the model. The three stages of the ComB model are the antecedents that cue and trigger hairpulling, the cues that facilitate or inhibit hairpulling, and the consequences that reinforce or punish hairpulling (Mansueto et al., 1997). Each of these three stages will be elaborated on next.

Stage 1: Antecedent cues that trigger hairpulling. The first component of the ComB model is antecedent cues that trigger hairpulling. Cues can be divided into two broad categories: external or internal. External cues refer to areas (e.g., bathroom, workplace, bedroom, living room couch, etc.) where pulling is more likely to occur, along with any implements, which refers to objects like mirrors or tweezers that can trigger an impulse to pull for more focused hair pullers (Mansueto et al., 1997; Mansueto, Golomb, Thomas, & Stemberger, 1999). Another external cue may be temporal, referring to specific times of the day where hairpulling tends to be exacerbated (e.g., before bed).

Along with the external cues, there are three categories of internal cues: affective states, sensations, and cognitions. Affective states refer to emotions that trigger hairpulling (Mansueto et al., 1997). While much of the attention in the literature has focused on how tension or anxiety trigger pulling, emotions such as boredom, anger,

guilt, happiness, and excitement may also serve as cues to hairpulling in some individuals (Mansueto et al., 1997).

Sensations can include any visual, tactile, or physical modality that triggers the impulse to pull (Mansueto et al., 1997). Discussed earlier was how individuals often select specific hairs to pull—hairs that comprise a particular texture, length, color, or feel that prompts the urge to pull. The hair may be viewed as too coarse, too straight, curly, short, long, dark, light, grey, smooth, thick, split, fine, gritty, or too knotted, and any one or all of these cues may trigger an individual to remove it (Duke et al., 2009; du Toit et al., 2001; Lochner et al., 2010). If the hair is seen as out of place or lacking symmetry, this may also trigger the individual to remove it (Mansueto et al., 1997). Any tingling, burning, itching, or discomfort can serve to initiate hairpulling in some individuals.

Cognitions are the final internal cue of the ComB model that may trigger hairpulling. These cognitive can occur independent of other internal cues ("I deserve to pull"), or they can interact with the affective ("If I pull just a couple hairs, I will feel much better") and sensory cues ("This hair is out of place", "My brows are not even") (Christenson & Mansueto, 1999; Mansueto et al., 1997).

Stage 2: Factors that facilitate or inhibit pulling. The second component of ComB includes factors that facilitate (i.e., make easier to occur) or inhibit (i.e., make less likely to occur) pulling behaviour (Mansueto et al., 1997). Like the antecedent cues that trigger pulling, facilitators and inhibitors can again be grouped into external or internal categories. Because the majority of individuals will refrain from pulling in the presence of others, the absence of people often serves as an external facilitator for pulling (Casati et al., 2000; Stanley et al., 1999). Implements (e.g., seeing tweezers, mirrors) also

commonly serve as external facilitators, particularly for more focused pullers (Mansueto et al., 1997).

Internal facilitators are further broken down into impulses, postures, and cognitions. Postures can be particularly problematic for facilitating pulling. Talking on the phone, resting the head on the hands while watching TV, or studying, driving and other situations can often leave hand(s) free and near the scalp to encourage pulling. Conversely, things that occupy the individual's hands (i.e., knitting or fiddling with a toy to distract the hands) serve as commonly prescribed inhibitors to pulling (du Toit et al., 2001; Mansueto et al., 1997). Finally, thoughts can serve to either encourage (e.g., "I deserve to only pull a couple hairs") or terminate (e.g., "I do not want to create a bald patch before the party") the behaviour (Mansueto et al., 1997). All these cues and facilitators combine to initiate the actual pulling behaviour and any associated pulling and disposal rituals the individual may engage in.

Stage 3: Consequences of pulling. The final component of the ComB model are the consequences of hairpulling, divided into aversive and reinforcing consequences. Aversive consequences include factors that terminate the pulling episode and include emotional states (e.g., guilt), discomfort, achieving the intention of pulling (e.g., pulling out the specific patch of coarse hairs), or the removal of all possible hairs (especially if pulling is targeted at the eyelashes or eyebrows) (Christenson & Mansueto, 1999; Mansueto et al., 1997). Reinforcing consequences include emotions of pleasure, relaxation, and the relief from stress or boredom by engaging in pulling (Mansueto et al., 1997). For a table illustrating the components of the ComB model, see Appendix C.

The Role of Affect and Affective Cycles Inside the ComB Model

According to the behavioural model, hairpulling is initiated, facilitated, and terminated by a variety of internal and external cues. This thesis is interested in determining what emotions are present and how they are regulated across the three stages (pre-, during, and post-pulling), mapped onto the four profiles of hairpulling described earlier (HFHA, HFLA, LFHA, and LFLA; see Appendix A). Emotional regulation—the way an individual identifies and responds to emotional experiences—has been proposed as one mechanism for how hypo- or hyper-arousal might trigger behaviour like TTM (Diefenbach et al., 2008). Some research has supported that individuals with TTM may have difficulty tolerating or regulating distressing emotions (Shusterman et al., 2009). Hayes et al. (1996) conceptualized the process as experiential avoidance, when an individual who has difficulty handling any triggering private experience will take steps to alter them. In the case of TTM, difficulty tolerating and regulating distressing emotions seems to cue individuals to engage in pulling, which serves as a self-reinforcing regulatory behaviour (i.e., distress that causes hairpulling causes distress that causes additional hairpulling). This was supported by research showing that those who had a greater difficulty regulating emotions had a higher hairpulling severity (Shusterman et al., 2009).

Supporting the hypothesis that low arousal (e.g., boredom) and high arousal (e.g., anxiousness, tension) states can maintain pulling behaviour, several affective cycles have been found to occur that help to begin developing an understanding around the complex role emotions play in TTM. Performing a latent class analysis across a sample of 1,162 individuals who hair pulled, Shusterman et al. (2009) found evidence not only for distinct

affective cycles, but also for distinct clusters of individuals with unique affective pulling profiles. One profile reported to be triggered only by hypo-arousal states like boredom, while others saw peaks only at boredom, tension, or anxiety with of a relatively mild intensity (Shusterman et al. 2009, p. 642). Other clusters reported several affective cycles not seen across the other groups (e.g., guilt, sadness, shame, and anger), and each of these four identified groups had a different intensity rating associated with the emotions that maintained the behaviour (Shusterman et al., 2009). While Shusterman et al. speculated that these clusters might map onto different pulling profiles (for example, HFHA pulling), they were not able to provide support for this hypothesis.

It is relevant to note, based on the above reviewed research, that I will use the MIST-A measure as a way of producing pulling profiles that create a more tangible way of mapping and discriminate affective cycles between groups. Next is a review of some of the most commonly reported TTM affect reduction cycles are described: tension, boredom, and anxiety; as well as positive affect generated through hairpulling; additional affect generated through hairpulling; measuring affect: the Hair Pulling Survey (HPS); and the role of anxiety and depression: The DASS-21.

Tension reduction cycle. The most common affective-cycle reported in the literature is the "tension-reduction" cycle (Casati et al., 2000; Christenson, Mackenzie, & Mitchell, 1991; Diefenbach et al., 2002; Duke, Keeley, Ricketts et al., 2010; Stanley et al., 1995). This cycle begins when an internal or external tension arises for the individual. When the individual begins to pull their hair, this tension or urge is released and mitigated downwards by engaging in the behaviour (Diefenbach et al., 2002). This behaviour then becomes operantly reinforced to function as an effective short-term means

to lower tension (Mansueto et al., 1997). Since a portion of individuals do not report tension as a hairpulling cue, and an even greater percentage (62%) do not always experience it, more affective cues and cycles need to be explored (Woods, Flessner, Franklin, Keuthen et al., 2006). The regulation of tension by hairpulling has been characterized by research as a conscious, focused response (Begotka et al., 2004). This was further supported by the work by Duke, Keeley, and Ricketts et al. (2010), who reported the tension reduction cycle being a more prevalent behaviour in individuals with a more focused as opposed to automatic styles of pulling. However, implying that urges and tension must always be conscious is not fully supported. For instance, academics and studying is often cited to be a common cue for pulling among individuals with TTM, suggesting that individuals can be engaging in the emotional downward regulation of tension outside of their conscious awareness (Mansueto et al., 1997; Woods, Flessner, Franklin, Wetterneck et al., 2006). It could be that the intensity and frequency of tension is more common in focused hairpulling, but this still remains unknown.

Boredom reduction cycle. Another affective cycle found to operate in reinforcing hairpulling is the boredom reduction cycle. Individuals with TTM commonly report boredom as one of the major affective cues to begin pulling (Diefenbach et al., 2008; Grant & Christenson, 2007; Mansueto et al., 1997). Similar to the tension reduction cycle, if hairpulling is able to regulate the hypoarousal of boredom, it may serve as an effective response to reinforce future episodes (Diefenbach et al., 2002; Duke, Keeley, Ricketts et al., 2010; Stanley et al., 1995). Hairpulling initiated by hypoarousal states, like boredom or relaxation, for example, while watching TV, reading, or waiting

around is hypothesized to be more characteristic in individuals who engage in more automatic or unconscious hairpulling (Duke, Keeley, Ricketts et al., 2010).

Anxiety reduction cycle. Anxiety has also been isolated as one of the dominant negative cues that initiates and regulates hairpulling (Diefenbach et al., 2002; Duke, Keeley, Ricketts et al., 2010). Participants reported that engaging in hairpulling often brings down feeling anxious and reported feeling less anxious during (Diefenbach et al., 2002). However, shortly after the hairpulling behaviour stop, anxiety begins to show a return back to pre-pulling levels (Diefenbach et al., 2008; Stanley et al., 1995; Woods, Flessner, Franklin, Keuthen et al., 2006). If the internal or external cue is still present after the pulling subsides, anxiety is also likely to show a sharp rebound back up to pre-pulling levels.

Additionally, a portion of the anxiety increase seen in post-pulling can be attributed to emotions like guilt, anger, and sadness that can result from pulling (Shusterman et al., 2009; Woods, Flessner, Franklin, Keuthen et al., 2006). Seeing all the hair they have removed or experiencing the internal turmoil of feeling helpless to control, and sometimes even enjoy, pulling may quickly spark emotions of guilt and anger that side load as additional anxiety for the individual (Casati et al., 2000). Like tension, there was evidence suggesting that while this cycle is a more significant to maintaining pulling in more focused hairpulling individuals, automatic hair pullers may also be engaging in the downward emotional regulation of anxiety to some degree, even though they may not be consciously aware of performing the behaviour (e.g., while driving) (Duke, Keeley, Ricketts et al., 2010).

Positive affect generated through hairpulling. There was evidence suggesting that negative emotions do not capture the full spectrum of affect that maintains hairpulling; there can also be positive emotions generated by pulling, and any associated rituals, that may play a role in reinforcing the behaviours as well (Diefenbach et al., 2008). Across several studies, relief has been reported to elevate at the onset of hair pulling (Diefenbach et al., 2002; Diefenbach et al., 2008; Duke, Keeley, Ricketts et al., 2010). The short-lived elevation in relief and lowering of negative emotions may help explain how hairpulling behaviour is continually engaged in, despite the long-term consequences of the condition (Mansueto et al, 1997).

There is also evidence that an individual's sense of calm becomes elevated during hairpulling (Diefenbach et al., 2002; Duke, Keeley, Ricketts et al., 2010; Stanley et al., 1995). The calming effect of hairpulling, as reported by Duke, Keeley, and Ricketts et al. (2010), has been hypothesized to serve as a means of emotionally regulating down negative emotions and maintaining homeostasis.

Another subset of individuals (11%) reported that engaging in hairpulling generated a sense of happiness (Diefenbach et al., 2002; du Toit et al., 2001). The mechanisms of how calm and happiness facilitate hairpulling is not currently known, though the self-soothing nature of the behaviour leads to the production of relief, and calm could induce a level of happiness, as could the reward-seeking nature (i.e., finding and removing the perfect hair) of the behaviour hairpulling can take (Mansueto et al., 1997).

Additional affect generated through hairpulling. Several other emotions—notably anger, guilt, and sadness—have also been observed to occur during

the hair pulling cycle, and it is possible that their interaction plays a role in maintaining and strengthening TTM. More recently, emotions like embarrassment, frustration, and loneliness have also been found to play a role in TTM behaviour (Duke et al., 2009). These emotional states will be described below.

Guilt, anger, and sadness are three emotions found to elevate after pulling has stopped (i.e., post-pulling; Diefenbach et al., 2008; Stanley et al., 1995). Diefenbach et al. (2008) reported that participants report drops in anger and sadness during pulling, which is consistent with the idea that hairpulling can serve as an emotion regulation behaviour for people with the disorder. Additionally, the sharp increase in anger and sadness following pulling may arise because people with TTM are not oblivious to the damage and impairment their hairpulling is causing them (Casati et al., 2000; Diefenbach et al., 2008). Increases in anger, guilt, sadness, tension, and anxiety following pulling may cycle the individual back into the hairpulling behaviour, thereby serving to maintain and negatively reinforce the behaviour, although one study did report a nonsignificant decrease in experiences of anger and sadness post-pulling (Duke et al., 2009)

Newer research by Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010) has also looked at the role three additional emotions (i.e., embarrassment, frustration, and loneliness) play as emotional cycles that may maintain hairpulling. Even though there have been some concerns over how automatic and focused hairpulling was defined by Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010), their preliminary work suggests that embarrassment increases across the hairpulling cycle and is more significantly associated with focused hairpulling. Being aware but unable to stop

the behaviour may explain why the behaviour may be more embarrassing for those with more focused hairpulling styles.

The findings by Duke, Keeley, and Ricketts et al. (2010) suggested that frustration is regulated down across the span of the hairpulling cycle and does not show any rebound in severity post-pulling. Like embarrassment, frustration is more prevalent and salient in maintaining focused hairpulling, although both focused and automatic styles reported the same decreasing trend (Duke, Keeley, Ricketts et al., 2010). The stable downward pattern of frustration suggests that hairpulling may be initiated by some internal or external incident that frustrates the individual (e.g., being stuck in traffic, solving a difficult problem), rather than the hairpulling itself being the primary frustrating behaviour. Although one study did report an increase in frustration during the behaviour, this suggested that being engaged in the behaviour may also have a component of frustration (Duke et al., 2009)

The two studies that included loneliness in their affective scales reported a decreasing trend until post-pulling (Duke et al., 2009) or a plateauing of the emotion during and post-pulling (Duke, Keeley, Ricketts et al., 2010). While little is understood about what loneliness is assessing with respect to hairpulling, research has supported the idea that hairpulling may have a self-regulatory component that maintains the behaviour. This was further support by the finding that three positive emotions (i.e., relief, calm, and happiness) may become elevated during the actual hairpulling session in some individuals (Diefenbach et al., 2008). This interaction again suggests that a potential self-regulatory mechanism for how hairpulling becomes a very powerful behavioural response for individuals.

In the next section I will review the Hair Pulling Survey (HPS), the survey used in this thesis to measure affect states across the before-during-after hairpulling cycle.

Measuring affect: The Hair Pulling Survey (HPS). In order to obtain a picture of the emotional cycles that operate in TTM, through my thesis research, I will be using a modified version of the Hair Pulling Survey (HPS) first developed by Stanley et al. (1995); a rationale for selecting this measure will be presented in the Methods chapter.

The HPS was created to assess affective patterns at three points in the hairpulling cycle: (a) before the individual engages in hairpulling (pre-pulling); (b) during the hairpulling behaviour (during); and (c) after hairpulling has stopped (post-pulling). The original HPS uses a 9-point Likert scale (0–8) to rate 10 affective states: boredom, happiness, sadness, anger, calm, anxiety, guilt, tension, relief, and indifference, at each point in the hair pulling cycle (pre-, during, and post-pulling) (Diefenbach et al., 2002; Diefenbach et al., 2008; Stanley et al., 1995). Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010) have expanded the original HPS scale with the inclusion of three other emotional states: loneliness, frustration, and embarrassed. Because significant changes in the levels of frustration and embarrassment occurred across the hair-pulling cycle in the studies conducted by Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010), in my thesis research, I will modify the original HPS to explore these additional new emotional experiences to understand how they operate across different hairpulling profiles as well. Diefenbach et al. (2002) were the first researchers who integrated the HPS into the three-component behaviour model proposed by Mansueto et al. (1997), as they saw the overlap of the three components of the behaviour model (i.e., antecedents, facilitators, and consequences) mapping to the structure of pre-, during, and post-pulling

addressed by the HPS. The HPS is congruent with the behaviour model and well suited to assess the emotions of interest to this study.

The role of anxiety and depression: The DASS-21. Because of the high degree of comorbidity between TTM and symptoms of depression and anxiety, and in order to understand how anxiety and depression interact with TTM severity across the four hairpulling profiles and different emotional cycles, the Depression Anxiety Stress Scale 21 (DASS-21; Lovibond & Lovibond, 1995a) has been included into the study questionnaire. The DASS-21 is a 21-item questionnaire that was derived as a shortened version of the original DASS-42; which has shown several advantages over both the DASS-42 and other commonly used depression and anxiety scales. The DASS-21 continues to be used in numerous TTM studies to understand the interplay that anxiety, stress, and depression have with the disorder (Hajcak, Franklin, Simons, & Keuthen, 2006; Lee, Franklin, Turkel, Goetz, & Woods, 2012; Woods, Flessner, Franklin, Keuthen et al., 2006).

Measuring depression, anxiety, and stress scales is of interest for this thesis because individuals with TTM often present with elevated depression, anxiety, and stress concerns when compared to a the general population (Christenson, Mackenzie, & Mitchell, 1991; Duke et al., 2009). Using the DASS-21 to understand whether this elevation is seen across all hairpulling profiles, in addition to what emotions correlate with each of the DASS-21 subscales across the four hairpulling profiles, is of interest to this thesis (Lovibond & Lovibond, 1995a; Woods, Flessner, Franklin, Keuthen et al., 2006). The DASS-21 scale has already been used by several previous authors in TTM research to specifically analyze the severity of symptoms across TTM samples—the same

purpose I have for this thesis by utilizing the DASS-21 for (Flessner, Conelea et al., 2008; Flessner, Woods, Franklin, Cashin et al., 2008; Woods, Flessner, Franklin, Keuthen et al., 2006). A full rationale for using the DASS-21 in this thesis, along with a full psychometric overview of the instrument, is provided in the Methods chapter.

In the previous section, I introduced the reader to the Comprehensive Model for Behavioral Treatment (ComB) and explored the role that affect plays to initiate, maintain, and reinforce the behaviour of TTM. I highlighted what emotions are suggested to maintain pulling and listed several instruments (e.g., the HPS and DASS-21) that aid in understanding the affective cycles and comorbid concerns that may be occurring across the four hairpulling group profiles.

In the next two major sections of this chapter, I discuss the current treatment models of TTM and then move to discuss how to study TTM. I will link how knowing more about the affective cycles of TTM can assist clinicians and therapists develop a greater understanding of this condition and work towards developing more effective treatment programs for clients. Once some of the current treatment models are outlined and how the results of this study could benefit treatment programming is examined, I will argue that studying TTM online provides this study with the best opportunity to address the research questions.

Treatment of TTM

The results of this study have implications for better understanding and conceptualizing the gamut of TTM profiles alongside relevant emotional cycles that may cue and maintain the behaviour. Perhaps more importantly, the results of this study can help further our current understanding of TTM treatment, thus allowing for the

development of more targeted and customized treatment regiments. TTM is viewed as a chronic and lifelong condition prone to periods of remission and relapse. There is no firm consensus on what underlying neurobiological and behavioural mechanisms trigger and maintain the disorder, and there remain scarce instances of treatment offering consistent and long-lasting attenuation of TTM symptoms. To date, there remains no pharmacological, neurological, biological, or psychotherapeutic intervention found that are widely and longitudinally effective in arresting TTM (Franklin, Tolin, & Diefenbach, 2006). TTM is a chronic and lifelong condition, and while remissions do occur, no cure exists to permanently treat the condition. A brief discussion of the current state of pharmacology and behaviour therapy is presented to outline the current state of TTM treatment.

Pharmacology. Antidepressant medication, specifically selective serotonin reuptake inhibitors (SSRIs), is the most common intervention for TTM. Forty-two percent of individuals with TTM have been prescribed antidepressant medication for their condition (Woods, Flessner, Franklin, Keuthen et al., 2006), while 31-44% have attended to therapy at some point for the disorder, including psychotherapy, support groups, or hypnosis (Bloch et al., 2007; Woods, Flessner, Franklin, Keuthen et al., 2006). What is perhaps most troubling for individuals with TTM who are given SSRI's is that these medications have been shown to be no more effective, and indeed sometimes less effective, than a placebo in a randomized double-blind control study (Bloch et al., 2007). The only medication with significant clinical testing shown to have some effectiveness at treating TTM, although still less effective than cognitive behaviour therapy with habit reversal, is the tricyclic clomipramine (Bloch et al., 2007; Flessner, Penzel, & Keuthen,

2010; Penzel, 2003; Swedo et al., 1989). However, clomipramine was only prescribed to 10% of all TTM individuals seeking medical interventions for TTM as reported by Woods, Flessner, Franklin, Keuthen et al. (2006).

Further, White and Koran (2011) explored the use of the atypical antipsychotic (AAP) medication aripiprazole. Their study demonstrated that two thirds of individuals improved by over 50% over the course of the eight-week trial. Several published case-study reports by Ak and Gulsun (2010) and Jefferys and Burrows (2008) have demonstrated that aripiprazole may show promise for the treatment of TTM. All the evidence has suggested that gains made by psychopharmaceuticals are usually not sustained long-term (Franklin et al., 2006). Therapy is currently viewed as the single most effective modality for treating TTM. In this thesis, I will inquire about any current medical treatment for TTM.

Recent research has suggested that the glutamate modulator and amino acid N-acetylcysteine (NAC) may be effective in treating some individuals with TTM (Grant, Odlaug, & Kim, 2009). Of the 50 individuals with TTM who followed the 12-week, placebo-controlled, double-blind study protocol, 44% saw a 50% and greater reduction in their TTM severity. While future research is needed to understand if NAC responds more effectively to address focused versus automatic pulling symptoms, NAC is emerging as a promising alternative to pharmaceuticals. Because NAC is available as an over-the-counter supplement found to produce no adverse side effects, it may be a promising substitute to medication or adjunct to psychotherapy to a portion of the TTM population (Grant et al., 2009).

Behavioural focus. Cognitive Behavior Therapy (CBT) has been heralded as the intervention of choice for showing the most efficacy in improving the symptom severity and impact of TTM (Franklin et al., 2006; Mansueto et al., 1999). CBT has shown to be more effective at reducing severity and producing more long-term improvements for patients with TTM when compared against both placebo and pharmacotherapy (Bloch et al., 2007; Flessner et al., 2010). The most common form of CBT therapy is a package of interventions that have fallen under the umbrella term of habit reversal training (HRT; Azrin & Nunn, 1973). HRT includes interventions that focus on (a) increasing awareness and developing self-monitoring strategies; (b) developing competing responses that involve performing actions similar to pulling, but antagonistic to hairpulling (e.g., pulling one's ear); (c) stimulus control strategies that include wearing gloves, discarding any tweezers and other implements, or placing gel or cream on the hairpulling site; and (d) finally developing social support (Azrin & Nunn, 1973). While HRT has shown some efficacy, recent developments in understanding automatic and focused pulling styles has caused HRT to become criticized for only attending to the automatic behaviours associated with TTM while leaving the focused behaviours unaddressed (Franklin & Tolin, 2007; Lerner, Franklin, Meadows, Hembree, & Foa, 1998).

The recent incorporation of Acceptance and Commitment Therapy (ACT; as cited in Twohig & Woods, 2004) into traditional CBT with HRT treatment has been called Acceptance-Enhanced Behaviour Therapy (AEBT; Flessner, Busch, Heideman, & Woods, 2008). What distinguishes AEBT from traditional CBT with HRT is that it has been hypothesized to addresses both the focused (with ACT) and automatic (HRT) components of hairpulling (Twohig & Woods, 2004). The acceptance component of

AEBT treatment is valuable because it is premised on the idea that hair-pulling serves as a way for the individual to avoid, escape, and regulate negative internal experiences (i.e., emotional regulation and experiential avoidance). It is, then, more responsive at addressing hair pulling that may be triggered by emotional cues. Based on their findings, Flessner, Busch et al. (2008) suggested that many individuals selectively respond more favorably to HRT or ACT treatment, reporting the highest recovery with a dual-modality treatment. These finding support the hypothesis that distinct pulling styles exist, respond to differential treatments, and that both styles of pulling (i.e., focused and automatic) exist to some degree in all individuals with TTM (Flessner, Conelea et al., 2008).

Dialectical Behaviour Therapy (DBT; Keuthen et al., 2010) has also shown promising results as an adjunct to traditional CBT with HRT. Like ACT, DBT is focused on generating acceptance and assisting individuals with emotional regulation, which has been argued as more favourable to ACT because the interventions are often explicit, brief, and structured: an approach that may favour clients, but also clinicians who may lack expertise in working with individuals with the disorder (Keuthen et al., 2010). More research needs to be done, but preliminary work has shown the importance of understanding and matching treatment to distinct pulling styles and the incorporation of booster sessions to strengthen treatment (Keuthen et al., 2011).

Understanding the different hairpulling profiles and emotional characteristics involved in maintaining hairpulling among these groups has important implications for creating psychotherapy that is more effective. One study has suggested that higher levels of negative affectivity (e.g., tension, anxiety, anger) may serve as predictors to relapse (Keijsers et al., 2006). These individuals may require more extensive therapy or more

targeted interventions to help manage these emotions outside of treatment, and knowing the affective profiles can help therapists and clients anticipate the chances and causes of relapse. HRT may be very effective at targeting hypoarousal affective states (e.g., calm, boredom), but it falls short at managing those with more focused pulling patterns or those who pull to emotionally regulate any number of other emotional states. Studies have suggested that those with more intense emotional profiles (e.g., HFHA hairpulling) may require more attention towards relapse training and emotional control on top of the gamut of usually prescribed CBT interventions (Lerner et al., 1998).

In this last section, before summarizing the chapter and proposing the research questions for this study, I look at how to study and structure TTM research. Based on the questions this thesis is seeking to answer, I will be using an online survey format in this study. I will present why this format provides the best means of collecting data that will not only address the research questions, but also help with future treatment planning.

How to Study Trichotillomania

Due to the lower prevalence rate associated with TTM and the intense fear, humiliation, and embarrassment those with this condition experience, studying TTM in a traditional in-person setting has posed significant challenges (Casati et al., 2000; Christenson, Mackenzie, & Mitchell, 1991; Townsley-Stemberger et al., 2000). TTM studies in a traditional lab setting have suffered from three major concerns: small sample sizes, gender disparity, and skewed population samples, each of which will be explored next.

Traditional trichotillomania research. Small samples sizes for quantitative studies have constrained TTM research across the last two decades. Stanley et al. (1999)

were only able to recruit 22 participants to conduct psychometric evaluations of numerous TTM assessment measures, while other major studies participant rates hovered between 26 (Woods, Flessner, Franklin, Keuthen et al., 2006), 34 (Diefenbach, et al., 2008), 36 (Wetterneck et al., 2006), 44 (Diefenbach et al., 2002), and 47 research participants (du Toit et al., 2001).

Gender disparity is another concern tied to limited sample sizes. The studies listed in this discussion range from including only one male in their study (Wetterneck et al., 2006) and peak at six males in the total sample (Diefenbach et al., 2002; du Toit et al., 2001). Therefore, clinical sample sizes have been disproportionate, with females comprising as high as 97% (Wetterneck et al., 2006) of the response pool. Some of the limitations of traditional TTM quantitative studies include (a) not being able to investigate how TTM generalizes across the male population, (b) whether sex differences truly exist, and (c) what differences may exist between male and female experiences with TTM (Christenson et al., 1994).

The last concern in traditional TTM research is generalizability from skewed or select samples. TTM research has previously recruited psychiatric patients (Christenson et al., 1994; Diefenbach et al., 2008; du Toit et al., 2001; Lochner et al., 2010) or pharmacological studies (Diefenbach et al., 2002; Grant & Christenson, 2007; Stanley et al., 1999). While these are valuable studies, how they generalize onto the general TTM population is a concern. Studies have achieved larger samples by interviewing college populations (Christenson, Pyle, & Mitchell, 1991; Duke, Keeley, Ricketts et al., 2010), but how these findings also generalize across other social and age groups is not well understood.

Studying trichotillomania online. Three major advancements benefiting TTM research have been (a) the adoption of computers, (b) the proliferation of the Internet, and (c) online studies becoming viewed as a legitimate and viable means for conducting research. I am choosing to use an online survey because this method addresses the three limitations discussed: (a) it generates vastly larger sample sizes, (b) it is more capable of exploring sex differences, and (c) it creates a more representative TTM sample (Gosling et al., 2004).

The ability to research TTM online provides a favourable method for reaching a larger, more diverse TTM sample (Begotka et al., 2004). This ability to obtain large samplings of data has allowed for the development of new assessment measures like the Hairpulling Distress and Impairment Scale (HDIS; Larson, 2008) and the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A; Flessner, Woods, Franklin et al., 2008), that relied on large data sets to quantify a diverse range of TTM behaviours and symptoms that would were unavailable for study in smaller samples. Large sample sizes have been able to demystify many areas around TTM, such as the medications commonly prescribed, what treatment options are sought, the perception of treatment (Woods, Flessner, Franklin, Keuthen et al., 2006), and the full spectrum of social, economic, psychological, and occupational impacts this condition can create (Wetterneck et al., 2006; Woods, Flessner, Franklin, Keuthen et al., 2006). With the advent of online sampling, participant pools as large as 425 (Wetterneck et al., 2006), 436 (Begotka et al., 2004), 1,189 (Larson, 2008), and 1,697 respondents (Woods, Flessner, Franklin, Keuthen et al., 2006) are now attainable.

Generally, Internet samples are more likely to generate a more accurate gender sampling than traditional in-person studies (Gosling et al., 2004). Regrettably, this has not carried over into TTM research, as females still respond 93% (Larson, 2008) to 97% (Wetterneck et al., 2006) of the time in online studies. While this produces a challenge to study males with TTM, these ratios still applied to online TTM studies still create participant pools ranging between 24 (Begotka et al., 2004), and 110 males (Woods, Flessner, Franklin, Keuthen et al., 2006), which is far larger than in-person TTM studies generate. While gender is neither the focus nor interest of this study, this study will not exclude the chance to include exploring differences between male and female hair pullers if a significantly high male participant pool can be obtained.

Online studies are also capable of producing a more representative and normally distributed sampling of the population (Gosling et al., 2004). Flessner, Conelea et al. (2008) reported that individuals with an automatic style of pulling are less likely to seek treatment, although their hairpulling may still be highly severe. Additionally, with only 50% of TTM sufferers seeking any form of treatment, it is suggested that traditional in-person research is drawing on a select sample of the TTM population. Internet samples are still not fully representative of the population, but they are often more generalizable than traditional studies (Gosling et al., 2004).

Addressing the limitations of studying TTM online. In researching human subjects, the researcher is required to obtain informed consent of the participants and ensure that all participants have an understanding of their rights and obligations for the study (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of

Canada [Tri-Council], 2010). With online research, when researchers are unable to directly obtain informed consent or ensure that the participant understands the purpose of the study, an alternative has been proposed. This method uses implied consent, where the opening homepage to the study clearly outlines the project and informs the participant that clicking to begin the survey *implies* that they have understood the rights and obligations as a participant and that by continuing on and submitting the survey, they have consented to include their responses. The safeguard to this method is to include a checkbox, where participants mark that they have understood the study before they begin (Kraut et al., 2004). It is also important before the study begins to debrief participants with what the purpose of the study is and where they can go to obtain more information about the study if they desire (Kraut et al., 2004).

Some issues have been raised around online responding and the concern of duplicate responses, or the data could become comprised by anonymity. To safeguard against duplicate responding, incoming surveys can be tracked by network IP addresses, with responses arriving from identical IP address checked and removed if they are found to be a repeating response. Additionally, some online survey hosting sites (e.g., Qualtrics, FluidSurveys) have methods that restrict how many times each can log in and complete the survey. The concern about data being compromised by anonymity refers to those who answer the survey with a malicious intent. Because this study will offer no financial incentives for participation, be relatively brief to complete, and be distributed only through a respected TTM research and support website, the concern for false or malicious responding is negligible. Suspicious patterns of responding, such as scoring 4/4 on each Likert measure, can be crosschecked against the incoming IP addresses to see

if malicious responding is occurring from any specific device. Online studies can also use Internet *cookies* that will only allow each respondent to access the survey once per device over a specific period of time. However, even without the safeguards described, Internet studies have consistently be found to be answered no more maliciously than traditional in-person studies (Kraut et al., 2004).

A final concern is that results from Internet samples do not map accurately onto results from in-person studies. A meta-analysis by Gosling et al. (2004) demonstrated that Internet methods provide data consistent with live in-person studies. Wetterneck et al. (2006) specifically looked at online versus in-person TTM research and supported that the two methods produce similar data. In this study, I expect that using online methods for studying TTM may prove valuable because it allows individuals with TTM to remain anonymous and not have to endure any potential embarrassment and shame from being asked to answer personal and private questions about their hairpulling in the presence of a researcher.

Summary on how to study trichotillomania. Support for studying TTM online has been provided in this section. Cautious of a few controllable limitations, I believe that online studies currently capture a far richer gamut of information than in-person studies and provide the best avenue for presently understanding TTM.

Summary

To this point, I have overviewed a breadth of information regarding the current understanding of TTM. Specifically, I started Chapter 2 by looking at the history of the disorder and the diagnostic criteria required to obtain a diagnosis of TTM. The understanding of TTM was further expanded during discussions about the prevalence of

the disorder; the general hairpulling characteristics commonly associated with TTM; and the social, psychological, and comorbid concerns individuals with TTM experience. This was done to provide the reader with the very latest understanding about TTM and was intended to outline the complexity and severity of this often-undiscussed condition.

I then shifted the review from providing breath about TTM to providing an in-depth exploration of the component aspects essential to this thesis. First was a discussion about the challenges of previous TTM research and I hope to address many of the limitations of traditional in-person studies by studying TTM in an online domain. There is a lot of benefit from conducting this thesis online, and by reaching a larger, more diverse, and more representative sampling, I hope to gather a sample size that will allow conclusions to be made that have a strong impact in helping the TTM community.

The second component explored in great depth was defining and developing an understanding of what focused and automatic hairpulling was. I worked from the early conceptualizations of TTM towards providing a rationale of why the four hairpulling profiles available today provides a far finer conceptualization of the condition than a homogenous (i.e., lumping all TTM behaviours together) or dichotomous (i.e., automatic or focused) conceptualizations have provided in the past.

The third major component was the use of the ComB model, expanding on how it breaks down TTM to understand the process of the behaviour: specifically, into what starts (i.e., antecedents), maintains (i.e., facilitates), and reinforces (i.e., consequences) the condition. Through this thesis research, I will be studying the changes and fluctuations in numerous affective states and how they map onto each of these three phases of the hairpulling cycle across the four-hairpulling profiles.

Finally, I began to suggest how understanding the affective cycles that maintain hairpulling integrate with treatment planning for TTM. There are numerous promising treatment discoveries that have emerged over the last five years and have begun to show a greater sensitivity towards incorporating different pulling styles to develop much more personalized treatment programs. I continued in that direction, hoping that a better understanding of affect further assists in developing more individualized and more targeted treatment planning.

All these components come together to form the purpose and hypothesis of this thesis. In the next section, the purpose of the thesis will be outlined and the four major hypotheses presented.

Purpose of the Study

Through this thesis, I am proposing to examine the affective cycles that operate across the four hairpulling profiles, as outlined in this chapter and summarized in Appendix A. I will also implement two changes to inclusion variables that have not been done in previous studies exploring affective cycles. In the past, the criteria for inclusion in the work by Duke, Keeley, and Ricketts et al. (2010) required participants only to report that they pulled out their hair more than others do in the course of normal grooming and separated individuals into automatic and focused dichotomies based only on whether they experienced tension before pulling. I will be more inclusive by asking participants questions that are more representative of the actual symptoms for assessing TTM (i.e., distress and alopecia). I will still maintain relaxed criteria for whether the individual has tension and gratification associated with their hairpulling behaviour, which

is a commonly agreed-upon practice in TTM research (Casati et al., 2000; Christenson, Mackenzie, & Mitchell, 1991; Woods, Flessner, Franklin, Keuthen et al., 2006).

The second improvement is that, for the first time outside the original work of Flessner, Conelea et al. (2008), I will use the MIST-A measure as a way of generating clusters of hairpulling behaviour. What distinguishes this thesis research from previous research is that I will not dichotomize pulling behaviours, rather I will recognize the heterogeneity and variability inherit in hairpulling to produce clusters that take into account the various automatic and focused behaviours those with hairpulling inevitably possess to some degree (Flessner, Woods, Franklin, Cashin et al., 2008).

Research Questions

I argue that different emotional profiles exist within each of the four hairpulling typologies derived from the MIST-A. Because of the known role affect plays in maintaining the behaviour, it is believed that the more emotional states an individual reports and the higher the emotional scores reported on the HPS, the more severe the TTM. I have four main research questions to be addressed. These research questions are:

1. How does hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), map onto each hairpulling profile created by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)? I expect to see the HFHA grouping report highest severity, but seek to understand how severity presents between high-focused (HFLA) and high-automatic (LFHA) groups.

2. What are the emotional cycles, assessed by the Hair Pulling Survey (HPS), that are active across different hairpulling profiles, assessed on the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?
3. What is the relationship between hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), and the emotional cycles that operate across each hairpulling profile, assessed by the Hair Pulling Survey (HPS)? I expect to find that the more emotional cycles that operate to maintain pulling, expected in the HFHA group, the higher the reported severity of hairpulling.
4. How are levels of depression, anxiety, and stress, assessed by the Depression Anxiety Stress Scale-21 (DASS-21), reflected in the emotional cycles of hairpulling, assessed by the Hair Pulling Survey (HPS)? I expect to find that higher DASS scores in more focused pulling profiles (i.e., HFHA, HFLA) than in the more automatic profiles of pulling i.e., (LFHA, LFLA), with the expectation that individuals with focused pulling will be engaging in the behaviour more to regulate these negative emotions.

Chapter 3: Methods

In this thesis, an online survey directed to adults with trichotillomania (TTM) was used to understand how different affective cycles contribute to maintaining hairpulling behaviour across different profiles of pulling. Results of this thesis will also be used to understand the role that depression, anxiety, and stress played across these profiles and their relationship with different affective cycles. How these objectives were executed is also described.

Overview

I have divided this chapter into six sections. Study location and participants sought for the study are discussed, describing the inclusion and exclusion criteria used for determining participation. In the next section, I describe each of the six forms included in the survey, how they have been previously used, any psychometric properties, and rationales for including them in the design of the study. In the Procedures section, I will describe the online survey software, as well as outline how participants were recruited. A breakdown of the survey is included that describes the informed consent, question format, and exit options for participants. A section on the collection and storage of Internet data is provided to describe how data was secured, along with detailing the access and ownership of data. Finally, I conclude this chapter by presenting the data analysis strategy that was used for each of the four research questions.

Study Location

The survey was hosted on Trichotillomania Learning Center website (TLC; www.trich.org) with permission (see Appendix D). This organization's website was chosen for two reasons. One, it provided access to a convenient sample since it is

assumed those with TTM will access this website. Second, it is easily accessible to a wide population of individuals. Previous studies hosted on the TLC website have seen participant pools of 425 (Wetterneck et al., 2006), 436 (Begotka et al., 2004), 1,189 (Larson, 2008), and 1,697 respondents (Woods, Flessner, Franklin, Keuthen et al., 2008). I believe that since I targeted the same population and adopted similar inclusion and exclusion criteria as those developed by Woods, Flessner, Franklin, Keuthen et al. (2008), a valid participant pool of at least 400 individuals was attainable.

Trichotillomania Learning Center. Once the survey was approved by HSR at the University of Lethbridge, it was submitted to the TLC. They reviewed the survey, submitted it through their approval process, and posted a link to the study on their website (http://www.trich.org). The TLC organization is the only one of its kind to serve as a meeting point for support, research, training, and information on TTM; it receives over 10,000 emails and phone messages per month inquiring about various aspects of TTM or other BFRBs. This level of exposure to a direct TTM audience could have been attained in any other fashion, which is why I chose to have the TLC review and link this thesis study on their website.

The TLC is a non-profit organization that provides information about treatment providers and support groups for individuals with TTM. The TLC also provides researchers with links to research; organizes annual conferences, training webinars, retreats, and workshops; distributes quarterly newsletters; provides research grants, and allows for networking with the goal of advancing TTM and BFRB research.

Participants

Participants were those who accessed the survey through the TLC website during the months of December, 2012 and January 2013. They were any English-literate adults who satisfied the full inclusion and exclusion criteria outlined by this thesis, as outlined in this section. The consent form and the survey scales were designed to have an approximate Grade 7 reading level.

Inclusion criteria. To be included in the study, participants needed to: (a) indicate that their current hair pulling has resulted in noticeable hair loss or the thinning of hair; (b) report this action causes them mild distress in at least one or more personal, interpersonal, occupational, or academic domains; and (c) indicate that they were at least 18 years of age. The screening criteria appear as Question 2 on the Basic Demographic Form, and Questions 2 and 6 to 11 on the TTM Demographic Form (see Appendix B: Forms 1 and Form 2). These criterion variables were adapted with permission from the author of the Trichotillomania Impact Survey (TIS), Dr. Douglas Woods, and used as modified DSM-IV-TR criteria that are able to assess hairpulling and distress in a relatable language (D. Woods, personal communication, May 16, 2012; see Appendix E). The frequency of pre-pulling tension and post-pulling gratification were asked (i.e., Questions 16 and 17 on the TTM Demographic Form found in Appendix B: Form 2), but were not required for inclusion in the study due to the proportion of individuals who report partially experiencing only one or neither of these criteria (Casati et al., 2001; Christenson, Mackenzie, & Mitchell, 1991; Lochner et al., 2011).

Exclusion criteria. Participants were not eligible to have their responses included in the study if they: (a) pulled their hair in response to voices others may not be

able to hear or in response to the belief that bugs or insects are crawling on their skin; and (b) pull as a result of another general medication condition (e.g., dry or itchy skin). These questions are labelled as items 13 and 14 on the TTM Demographics Form (see Appendix B: Form 2). The rationale for the exclusion variable regarding the belief of voices or bugs is to separate TTM from disorders like psychosis or drug abuse that may produce symptoms of hairpulling, but are not characteristic of the actual disorder itself. This question was adapted with permission from Dr. Douglas Woods from the TIS (Woods, Flessner, Franklin, Keuthen et al., 2006; see Permissions section). The rationale for the exclusion variable regarding another general medical condition is to separate TTM from conditions like dry skin, eczema, or pruritus that could include components of hairpulling, but are not characteristic of the actual disorder of TTM (Norberg, Wetterneck, Woods, & Conelea, 2007). There were no ethnic or gender exclusion criteria for this study; all participants meeting criteria who completed the study were included, although I expected to see responses skewed towards females and Caucasian participants based on the demographics commonly seen across previous online and large in-person TTM studies (as outlined in Chapter 2 or see Begotka et al., 2004; Duke et al., 2009; Duke, Keeley, Ricketts et al., 2010; Larson, 2008; Shusterman et al., 2009; Wetterneck et al., 2006; Woods, Flessner, Franklin, Keuthen et al., 2006).

Measures

For this thesis, two demographics forms and four inventories were compiled into one survey called the Subtypes of Trichotillomania Affect Questionnaire (STAQ; see Appendix B). The demographics forms were created by me, as the researcher, with questions adapted with permission from other TTM studies (see Permissions section),

while the four inventories had previously constructed by other authors and were either freely available or permissions were sought to include them in the study. The six items that comprise the STAQ were measured to only take 20-30 minutes to complete for most individuals completing the survey in a distraction-free environment, but participants were informed that it may take them up to an hour to complete. The survey was administrated online.

Permissions. Permissions were obtained from the main author of the TIS, Dr. Douglas Woods, to use the inclusion and exclusion criteria developed in their study for screening for TTM and to adapt questions from the TIS for use with this thesis (D. Woods, personal communication, May 16, 2012; see Appendix E). Permissions were also obtained on behalf of the main author of the Hair Pulling Survey (HPS), Dr. Melinda Stanley, to use the HPS in this thesis (B. Pennington, personal communication, March 19, 2012; see also Appendix F). Lastly, permission was obtained from the contact author of the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A), Dr. Douglas Woods, for use of the MIST-A in this thesis (D. Woods, personal communication, March 30, 2012; see Appendix G). Permissions were not required for the Massachusetts General Hospital Hairpulling Scale (MGH-HPS) or the Depression Anxiety and Stress Scale-21 (DASS-21), as both are in the public domain and available online for use. These survey questions are appended as Appendix B: Forms 3 and 4.

Question types in STAQ. The STAQ featured several question types. For questions like Question 1 on the basic demographic form (see Appendix B: Form 1): "Are you male or female", a forced-choice style was used to have the participant check only one of the available options. This type of forced-choice method is also used across

the multiple-choice questions in the TTM demographics form and the MGH-HPS measure. Other question types, for example Question 6 on the TTM demographic form: "List your hair pulling site(s) [Check all that apply]", allowed the participant to select as many options as are relevant to them. The majority of questions referred participants to a corresponding Likert scale, where they were asked to rate the response that best represents their behaviour to a given statement or question. For example, Question 2 on the MIST-A presented participants with the statement: "I pull my hair to control how I feel"; participants were asked to rate how true that statement is to them on a 10-point Likert scale that ranges from 0: not true for any of my hairpulling to 9: true for all of my hairpulling (see Appendix B: Form 6). Two of the Likert scale measures—the DASS-21 and MIST-A—have had their Likert scales, anchor points, and instructions reproduced without modification to ensure the responses are valid and comparable across studies. The HPS has had the Likert scale simplified to clarify scale points and improve flow for participants. Participants could change their answers at any point before submitting the survey; however, unless otherwise stated in the question, they could only select one final response per question. A paper copy of the STAQ is appended as Appendix B, while a sample online format of the STAQ participants completed is attached as Appendix H.

Basic demographic form. Participants were requested to answer six general demographic questions (see Appendix B: Form 1). The form was authored by me, as the researcher. This form collected data on the participants' sex, age, ethnicity, and marital status. These questions were asked to gain an understanding of the demographics of participants entering the survey.

TTM demographic form. Participants were requested to answer 20 questions pertaining to their experiences with TTM (see Appendix B: Form 2). The TTM demographic form was authored by me and was intended to gather descriptive information about TTM, act as a general screening tool to ensure participants completing the survey have current concerns and distress associated with hairpulling, and to gather data used for correlational analysis with data collected from other questionnaires.

The TTM demographic form (see Appendix B: Form 2) inquired if participants have ever been formally diagnosed with TTM (and if yes: who diagnosed them), what was the age of onset for their hairpulling, what are their hairpulling sites, what are their most frequent hairpulling site(s), in what areas of life do they experience distress from the condition, how often they experience pre-pulling tension, how often they experience gratification following pulling, how much time per day is spent thinking about and physically pulling hair, and how many episodes occur per day.

While the questions of the TTM demographics form served to increase the general knowledge of the demographics of TTM, the questions also tied directly into the literature review of Chapter 2, allowing for the comparisons to be made between the four hairpulling profiles on dimensions like hairpulling sites, age of onset, and areas of distress. These items were also important for assessing the correlation with dimensions like reported severity.

The TTM demographic form also contained two exclusion criteria questions for this study (i.e., hairpulling caused either by voices, belief of insects under the skin, or another general medical condition). Specifically, the questions are items 15 and 16 (see Appendix B: Form 2).

Massachusetts General Hospital Hairpulling Scale (MGH-HPS). The MGH-HPS is a seven-item, self-report measure designed to assess TTM severity (Keuthen et al., 1995; see also Appendix B: Form 3). It is the only formal self-report scale available for assessing global TTM severity (Keuthen et al., 2007). Strong psychometrics and ease of use make the MGH-HPS widely used and preferred in TTM research for understanding and scoring severity and impairment caused by TTM, making the scores easily cross-comparable across studies or time (Bloch et al., 2007).

History and previous use. Developed and tested by O'Sullivan et al. and Keuthen et al. in 1995, the MGH-HPS is a research and treatment inventory for measuring severity and tracking change across time (Bloch et al., 2007; Duke, Keeley, Ricketts et al., 2010; Keuthen et al., 2011). The MGH-HPS demonstrates a tremendous breadth of utility, with previous uses ranging from in-person adult research (e.g., Lochner et al., 2010) to adolescent and adult treatment trials (Keuthen et al., 2011), pharmacological trials (White & Koran, 2011), pediatric studies (Harrison & Franklin, 2012), and online TTM research (Larson, 2008; Norberg et al., 2007; Woods, Flessner, Franklin, Keuthen et al., 2006). A comprehensive presentation of the psychometric properties of the MGH-HPS is presented as my next topic of discussion.

Psychometrics. The MGH-HPS has been used in previous online TTM studies, showing a strong internal consistency (.846) comparable to in-person studies (.800-.890) (Diefenbach et al., 2005; Keuthen et al., 1995; Keuthen et al., 2007). This scale is easily formatted for Internet presentation (Keuthen et al., 2007), requires less than five minutes to complete, and uses language that is easily relatable and comprehendible to individuals with TTM who have at least a Grade 5 reading level.

In the MGH-HPS, participants are asked to consider their hairpulling across seven dimensions as they have experienced them over the past week. These items include: (a) how often they feel the urge to pull, (b) the intensity of urges, (c) ability to control hair pulling urges, (d) how often actual hair pulling occurs, (e) how often hair pulling is resisted, (f) ability to successfully stop from pulling, and (g) the level of discomfort associated with hair pulling (Keuthen et al., 1995). Each of these seven items provides anchor points for each rating. For example, anchor points for how often pulling occurs are: (a) this week I did not pull my hair (rated as 0); (b) this week I pulled my hair occasionally (rated as 1); (c) this week I pulled my hair often (rated as 2); (d) this week I pulled my hair very often (rated as 3); and (e) this week I pulled my hair so often it felt like I was always doing it (rated as 4). Possible summary scores range from 0–28, with higher scores representing greater overall severity (Keuthen et al., 1995).

The MGH-HPS demonstrates strong internal consistency. In three studies with samples sizes of 28, 119, and 990, the MGH-HPS reported alpha levels of .800, .890, and .846, respectively (Diefenbach et al., 2005; Keuthen et al., 1995; Keuthen et al., 2007). Test-retest reliability, with administrations separated by one hour, produced a Pearson product-moment correlation of $r = .97$, $p < .001$. The MGH-HPS also shows moderate convergent validity with the Psychiatric Institute Trichotillomania Scale (PITS; r range = .55-.63, $p < .003$), a clinician administered trichotillomania interview (Winchel et al., 1992), the Clinical Global Severity Scale (CGS; $r = .75$, $p < .001$), and inventories that measure TTM severity and global general impairment due to a disorder (O'Sullivan et al., 1995; Stanley et al., 1999). The MGH-HPS shows divergent validity with several depression and anxiety inventories, including the Beck Anxiety Inventory (BDA; $r = .10$,

$p > .10$), and the Beck Depression Inventory-II (BDI-II; r range = .26-.30, $p > .10$) (Diefenbach et al., 2005; O'Sullivan et al., 1995). This supports that TTM severity occurs independently of any comorbid depression or anxiety. The MGH-HPS has shown sensitivity to change with scores on PITS ($r = .83$, $p < .001$) and the Clinical Global Impression (CGI; $r = -.50$, $p < .02$), which measures global impairment (Diefenbach et al., 2005; O'Sullivan et al., 1995). Scores derived on the MGH-HPS have been found to be equally sensitive to distinguishing high and low severity among both focused and automatic groups derived on the MIST-A (Flessner, Conelea et al., 2008). O'Sullivan et al. (1995) concluded that the MGH-HPS is a valid measure for evaluating current TTM symptom severity.

Recently, the MGH-HPS has undergone additional factor analysis. Keuthen et al. (2007) found that the MGH-HPS has a two-factor structure that assesses Global Severity (when the total scale is considered), but could be broken down to Factor 1 "Severity" (measured by looking at questions 1, 2, 4, and 7) or Factor 2 "Resistance and Control" (measured by looking at questions 3, 5, and 6) (p. 708). Factors 1 and 2 have strong internal consistencies of .832 and .805 respectively, and account for 53.2% and 17.9% of total score variance (p. 708). These factors allow this study the opportunity to assess the relationship not only between hairpulling profiles and total MGH-HPS severity score, but to explore further how Factors 1 and 2 compose this severity score across different profiles of hairpulling.

Rationale. The MGH-HPS generates up to three scores (i.e., Global Severity, Severity, and Resistance and Control) for conceptualizing severity and was included in this thesis to compare scores across the four hairpulling profiles and to correlate severity

with the number of affective cycles reported by each group. Additionally, by breaking the MGH-HPS into three different scores, I was able to assess how Factors 1 and 2 compose this severity score across different profiles of hairpulling. The MGH-HPS was included as a part of the STAQ questionnaire and is appended as Appendix B: Form 3 at the end of this thesis.

Depression Anxiety and Stress Scale-21 (DASS-21). The DASS-21 is the short form of the 42-item general self-report measure of depression, anxiety, and stress developed by Lovibond and Lovibond (1995b). Participants are requested to reflect back on the last seven days and rate the accuracy of statements such as: "I found it difficult to relax" on a 4-point Likert scale, ranging from 0: Does not apply to me at all to 3: Applies to me very much, or most of the time (Lovibond & Lovibond, 1995a). The DASS-21 provides a global summary score (ranging from 0–63), with separate subscores for each of the depression, anxiety, and stress subscales (each rated out of 21), with higher subscores indicating more symptom severity in the specific domain (Lovibond & Lovibond, 1995a). The DASS-21 takes approximately five minutes to complete and is easily accessible to individuals with at least a Grade 5 reading level.

History and previous use. The DASS-21 is a general self-report measure of depression, anxiety, and stress used to measure symptoms across clinical and non-clinical populations (Henry & Crawford, 2005; Lovibond & Lovibond, 1995a). The DASS-21 continues to be extensively used in documenting patterns of behaviour in TTM research and other psychological phenomenon. Specifically, it has recently been used to find relationships between depression, anxiety, and stress across different hairpulling profiles (Flessner, Conelea et al., 2008); mapping the relationship between DASS-21 scores and

hairpulling severity (Flessner, Conelea et al., 2008); understanding the relationship between the frequency experiencing tension and gratification (i.e., Criteria B/C) and hairpulling severity (Lochner et al., 2011); and affective distress (Hajcak et al., 2006). A presentation of the psychometric properties of the DASS-21 is presented.

Psychometrics. The DASS-21 demonstrates high internal consistency. Cronbach's alpha scores for depression (.88–.94), anxiety (.82–.87), and stress (.90–.91) subscales are high (Antony, Bieling, Cox, Enns, & Swinson, 1998; Henry, & Crawford, 2005). The DASS-21 depression subscale shows strong convergent validity with the Beck Depression Inventory (.81), while the anxiety subscale shows moderate convergent validity with the Beck Anxiety Inventory (.74) (Lovibond & Lovibond, 1995a). The DASS-21 has demonstrated to be more reliable at parsing out depression and anxiety symptoms than inventories like the State-Trait Anxiety Inventory-Trait (STAI-T) (Antony et al., 1998). The DASS-21 also has an additional stress reactivity subscale shown to be important for tapping into the separate stress components (i.e., irritability, overreacting, and tension) not addressed by scales like the Beck Depression Inventory, Beck Anxiety Inventory, or STAI-T (Antony et al., 1998).

All three factors have items that demonstrate a strong internal consistency in their respective factor: depression (.94), anxiety (.87), and stress (.91), with none of the items in each factor reaching a loading higher than .25 on any of the other scales (Antony et al., 1998; Lovibond & Lovibond, 1995a). While DASS-21 has been derived from the original 42-item DASS-42, Antony et al. (1998) reported that the shortened scale "appears to have several advantages relative to the 42-item version, including fewer items, a cleaner factor structure, and smaller interfactor correlations" (p. 181). A recent

study by Henry and Crawford (2005) supported the use of the DASS-21 as an equally reliable measure compared to the DASS-42, with advantages of it being shorter and more accessible to participants.

Rationale. The DASS-21 was included in this study to understand how depression, anxiety, and stress scores map onto the four hairpulling profiles and what interaction exists between DASS-21 scores and the emotional cycles that maintain hairpulling. DASS-21 scores across all three subscales are significantly higher for individual with TTM than in the general population and even populations with OCD, so it is important that this thesis assessed how these components interact with severity, hairpulling profiles, and affective cycles associated with TTM (Antony et al., 1998). Because of its strong psychometric properties, its stronger divergent validity between depression and anxiety components, and the inclusion of a stress reactivity subscale that measures the elevated levels of psychological stress amongst those with TTM, the DASS-21 was a strong instrument for this thesis (Antony et al., 1998; Teng et al., 2002). The DASS-21 is included as a part of the STAQ questionnaire and is appended as Appendix B: Form 4 at the end of this thesis.

Hair Pulling Survey (HPS). The HPS was developed by Stanley et al. (1995) to assess the role affective states play in hair pulling among nonclinical TTM samples. This scale required participants to reflect on the degree to which they experience 10 different affective states before, during, and after engaging in hairpulling (Stanley et al., 1995).

History and previous use. While the HPS was developed in 1995, it continues to be used for studying affect in TTM. This scale has been used in reporting affective cycles across nonclinical, clinical, college, and community samples (Diefenbach et al.,

2002; Diefenbach et al., 2008; Duke et al., 2009; Duke, Keeley, Ricketts et al., 2010; Stanley et al., 1995).

Psychometrics. When completing the HPS, participants rate the extent to which they experience each emotion (i.e., anger, anxiousness, boredom, calm, guilt, happiness, indifference, relief, sadness, and tension) on a 9-point (0–8) Likert scale regarding how they experience each emotion before, during, and after they pull their hair (see Appendix B: Form 5). Five anchor points are included to assist participants in rating their experience, ranging from 0: I do not have this feeling; to 4: I have this feeling to a moderate degree; to 9: I have this feeling to a very strong degree. Currently, there is no published psychometric data regarding the use of the HPS (Diefenbach et al., 2008).

Rationale. Although no psychometric data exists on the use of the HPS, the research and continued use of the HPS supports the idea that affect plays an important role in the maintenance of hairpulling (Diefenbach et al., 2008; Shusterman et al., 2009). The HPS remains the only published survey used repeatedly in the literature that distills the data into specific phases and specific emotions for study. While the HPS has been used to collect data from in-person studies, this was the first time that the HPS had been used online to collect data from an extensive sample group and the first to explore affect across different hairpulling profiles. I viewed the HPS as mapping well onto the ComB model by Mansueto et al. (1997), key for mapping emotions as antecedents, facilitators, and consequences that contribute to the reinforcement of pulling.

The studies by Duke et al. (2009) and Duke, Keeley, Ricketts and et al. (2010) found merit in including three additional emotions phases into the HPS: embarrassment, frustration, and indifference. These additional states were included as a part of this thesis

into the HPS to understand the role these affective states may play in maintaining hairpulling via the ComB model (refer to Appendix C).

Modifications. For this thesis, modifications were made to the HPS scaling to condense and simply the scale for participants. The original 9-point Likert scale was reduced to a 5-point scale. The five new scale levels on the HPS in this thesis included: a) I do not have this feeling (rated as 0); b) I have this feeling to a mild degree (rated as 1); c) I have this feeling to a moderate degree (rated as 2); d) I have this feeling to a high degree (rated as 3); and d) I have this feeling to a severe degree (rated as 4).

Milwaukee Inventory for Subtypes of Trichotillomania. The Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A) was developed as an instrument to formalize the degree to which individuals engage in focused and/or automatic hairpulling (Flessner, Woods, Franklin, Cashin et al., 2008). As a relatively new instrument published in 2008, the MIST-A has been recommended for further use in research to improve the ability in discerning hairpulling subtypes and help expand on our current conceptualization and treatment approaches of the disorder (Duke, Keeley, Ricketts et al., 2010).

History and previous use. Included as part of the Trichotillomania Impact Study (TIS; Woods, Flessner, Franklin, Keuthen et al., 2006), the MIST-A originally consisted of 24-items designed by several prominent TTM researchers based on the variety of distinguishing characteristics and behaviours that differentiate focused and automatic types of hairpulling. An exploratory factor analysis of the MIST-A found it to contains a two-factor solution: (a) a focused factor, accounting for 17.1% of the total score variance; and (b) an automatic factor, accounting for 13.0% of the total variance. Using a structure

coefficient threshold of .40 to remove any focused or automatic items that did not correlate strongly with their respective factor, nine items were removed to form the finalized 15-item MIST-A scale (Flessner, Woods, Franklin, Cashin et al., 2008; see also Appendix B: Form 6). For a full review of the development of the MIST-A, see Flessner, Woods, Franklin, Cashin et al. (2008).

The finalized form of the MIST-A is a 15-item, self-report measure featuring 10-items found to be significantly correlated with characteristics of focused pulling (e.g., "I pull my hair to control how I feel"), and five items found that significantly correlated with automatic pulling (e.g., "I am usually not aware of pulling my hair during a pulling episode"). Participants rate each of the 15 items on a 10-point (0–9) Likert scale. Anchor points are provided for ratings of 0 (not true for any of my hair pulling), ratings of 5 (true for about half of my pulling), and ratings of 9 (true for all my hair pulling). Participants completing the MIST-A are not given a global summary score; instead, they receive two scores: (a) a focused score, ranging from 0–90; and (b) an automatic score, ranging from 0–45. An individual's score on these two scales help to group them into one of four hairpulling profiles of interest in this study: (a) High-focused, High-automatic (HFHA); (b) High-focused, Low-automatic (HFLA); (c) Low-focused, High-Automatic (LFHA); and (d) Low-focused, Low-automatic (LFLA). The median-split procedure used by Flessner, Conelea et al. (2008) was utilized in this research to divide the participant pool into the four hairpulling profiles; scores at or above the median-split on the focused scale qualified as "High" focused, and scores at or above the median-split on the automatic scale qualified as "High" automatic. Scores falling below these thresholds were assigned to the "Low" classification for each style.

The MIST-A continues to be used extensively in TTM research. It has been used (a) to understand how other BFRBs interact with TTM (Stein et al., 2008); (b) to test and measure the efficacy of Acceptance-Enhanced Behavior Therapy (AEBT) across different pulling subtypes (Flessner, Busch et al., 2008); (c) exploring cross-sectional changes from childhood to adulthood in women with TTM (Flessner, Woods, Franklin, Keuthen, et al., 2008); and (d) to study the use of Dronabinol in reducing the urges and severity of hairpulling (Grant, Odlaug, Chamberlain, & Kim, 2011). Additionally, a child-version of the MIST-A, the Milwaukee Inventory for Subtypes of Trichotillomania Child-Version (MIST-C; Flessner et al., 2007) has been developed to study hairpulling subtypes in children and adolescents. For a review of the pediatric MIST-C, please see the paper by Flessner et al. (2007).

Psychometrics. The MIST-A demonstrates adequate internal consistency. Coefficient alphas suggest that both focused (.77) and automatic (.73) scales include items that are adequately measuring their respective factor (Flessner, Conelea et al., 2008). A Pearson product moment correlation measuring discriminate validity suggests no statistical relationship between the two scales ($r = 0.01$, $p = 0.742$; Flessner, Conelea et al., 2008), supporting that these constructs are distinct from each other. The MIST-A has demonstrated sensitivity to change with respect to scores on the MGH-HPS, with higher scores either the automatic or focused scales translating into higher self-reported global TTM severity.

Rationale. The MIST-A is the only measure for conceptualizing and analyzing the two different subtypes of TTM (Duke, Keeley, Ricketts et al., 2010). Because of the growing understanding that differences exist across subtypes with respect to their

phenomenological expression (Flessner, Conelea et al., 2008) and their treatment response to both therapy (Flessner, Woods, Franklin, Keuthen, et al., 2008) and medication (Grant et al., 2009), the use of the MIST-A measure for this thesis came at an opportune time. The MIST-A allowed me to create and study the four hairpulling profiles, to understand how high and low expression on each of the two subtypes interacted with different emotions to create affective cycles that maintain the behaviour. An understanding of these profiles and affective cycles could support adjusting treatment to suit different profiles. The MIST-A takes approximately five minutes to complete and is easily accessible to individuals with at least a Grade 6 reading level.

Procedure

Upon approval from the University of Lethbridge Human Subject Research Committee (HSRC) and the TLC Scientific Advisory Board (SAB), I launched the survey created using a survey creation website Qualtrics (www.qualtrics.com). A description and rationale for choosing the Qualtrics online survey software is presented in this discussion.

Qualtrics. Qualtrics (www.qualtrics.com) was chosen to host the study based on its recognized commercial and academic reputation and after engaging in a live demonstration of the software on May 22, 2012. Based on these recommendations, Qualtrics stood out as the more attractive, intuitive, secure, and versatile option when compared to other popular survey generators like SurveyMonkey (www.surveymonkey.com). While SurveyMonkey has many of the features this survey design required (e.g., question skipping, question branching, multiple question types, etc.), because it is a lower-cost tier survey provider, it excluded some critical and

important features this thesis required (Lehmiller, 2008). For example, the ability to randomize the order of surveys and auto-generate SPSS files that correct for this randomization are important features available through Qualtrics that are missing in SurveyMonkey. The Qualtrics hosting service also provided exceptional data security and identity protection, a significant amount of question and aesthetic customization, easy export options to SPSS and Microsoft Excel, the ability to generate different screens for different scenarios (e.g., withdraw, thanking for participation, etc.), and ability to randomize the order of surveys to control for response bias (B. Winkelman, personal communication, May 22, 2012). Qualtrics also provided all the different question formats (e.g., multiple choice, Likert scales, checklists, etc.) necessary to construct the survey. Importantly, Qualtrics provided all this utility while remaining exceptionally user-friendly. This allowed me to construct, test, and debug the survey without having to be concerned about glitches and unexpected errors arising when the survey is launched.

Qualtrics surveys are also compatible with the most popular Internet browsers currently available: Internet Explorer 7/8/9/10, Firefox, Chrome, and Safari, and is even compatible with post-PC devices like Android, Apple, RT, and RIM tablets and mobile phones (Tate, 2011). While many studies do not specify their survey software in the abstract of their research, a search through the databases of ERIC, Google Scholar, and JSTOR revealed nearly 1,800 articles, with 1,000 specifically in the area of psychology that specifically mentioned using Qualtrics survey software in their research abstracts since 2002. Following the May 22, 2012 demonstration of Qualtrics, I received a complimentary single-user license valid for the period running May 23, 2012, to May 22, 2013.

Recruitment. Participants were recruited in three ways. One, through a hyperlink that remained active on the TLC website for a continuous period from December 2012 through January 2013 (see Appendix I). Second, a hyperlink informing people about this study was distributed via email to all eligible members of the TLC inviting them to participate (see Appendix J).

Online Survey

A breakdown of the STAQ is provided in this section. Included is an outline of the informed consent process for the STAQ, the survey format, and exit options including early termination and full completion.

Informed consent. When the survey was accessed, the opening webpage provided the participant with the informed consent protocol (see Appendix K). The informed consent outlined the nature of this study, the rights of the participant, and how they can exit the study should they choose to terminate early. The risks, benefits, compensation, and uses of the research were also outlined in the consent form. Participants were provided with contact numbers to my thesis supervisor, the HRSC at the University of Lethbridge, the SAB of the TLC, and me. The informed consent followed codes I.21, I.22, I.23, I.24, I.27, and I.30 under Principle I: Respect for the Dignity of Persons outlined by the Canadian Psychological Association (2000) *Code of Ethics* to ensure the protection of participants and the rights and limitations of informed consent. If the participant gave consent to complete the survey and indicated she or he was age 18 or older, the survey continued and presented the participant with the STAQ (see Appendices B and H).

Survey format. Following the informed consent, participants filled out the basic demographic form, followed by the TTM demographic form (see Appendix B: Forms 1 and 2). Following the demographic forms, the presentation of the measures (MGH-HPS, MIST-A, and HPS) were randomized by the Qualtrics survey software. This decision was made to address the potential for any response bias that could appear in a survey if the measures were sequentially placed in the same order for every respondent. The survey finished by presenting participants the DASS-21. Transitional statements were included between major sections of the survey to improve flow and guide participants throughout the various sections and instruments.

Exit options. Four exit options existed for this study, and they have been labelled as pre-consent, early-termination, late-termination, and completion. Each is outlined in this section.

Pre-consent. In pre-consent, the participant presented with the informed consent chose not to continue with the study and closed the window before beginning the survey. This could happen for any number of reasons: not meeting eligibility, length of study, bad time of day, and so forth. In pre-consent, no data were collected from the participant. If the participant exited the survey before giving consent, they could still return to the site later and begin the survey at any point after they consent.

Early-termination. Early-termination occurred when the participant continued past the consent page, but exited out of the survey prior to completing all the questions and measures. Participants were told of this option in the informed consent, which stated that should they choose for any reason to end the survey early, they only needed to close their browser window (see Appendix K). Any data that the participant provided was

included in the study and was discarded immediately. Also provided in the informed consent was that once a participant terminated a study for any reason, they did not have the option to re-enter again; the survey could only be accessed once per participant.

Late-termination. Late-termination occurred when the participant completed all the survey items, but chose not to submit their responses. Like the early-termination responses, participants were informed that closing their browser window exited them out of the survey and discarded all their responses. These responses were deleted without examination by the researcher. If the participant chose to terminate the study, they did not have the option to re-enter and complete the survey again.

Completion. Completion occurred when the participant completed all the survey items and submitted the survey into the response pool. Participants who completed all survey items were presented with a screen that allowed them to submit their responses (i.e., completion) or close their browser window and discard their responses (i.e., late-termination). Participants were informed during the informed consent that once they submit their responses, their data were anonymous and could not be extracted from the response pool if they chose to withdraw their responses in the future (see Appendix K). Participants who submitted the survey were also provided with a hyperlink that could be used to access survey results as they become available.

In addition, for participants who completed and submitted the survey, a $1 USD donation (up to a maximum of $250 USD) was made on their behalf to the Trichotillomania Learning Center. This donation was intended to support continued outreach and support for individuals and families with trichotillomania or other body-focused repetitive behaviours. This donation will be made by June 30, 2013 and a

verification of the receipt will be posted on the URL for participants who completed the survey to see. This information is provided to participants in the informed consent (see Appendix K).

Final survey page. This page became available after completing and submitting the survey and provided participants with several pieces of information (see Appendix L). The page first thanked the participants for their participation in the survey. This page also provided the participant with links to the main researcher, supervisor, HRSC, and the TLC, should there be any questions about the study or TTM that the individual would like to inquire more about. Additional resources were also provided for participants to access treatment providers in their area; this list has been compiled by the TLC for North American and is included as Appendix M. Finally, this page provided a reiteration of the purpose of this study and provided participants with a hyperlink to access the research findings as they became available.

Controlling and Collecting Internet Data

Completed survey responses were downloaded to my computer on a weekly basis. No private identifiable information was collected by either the principle researcher or the Qualtrics site. An internet cookie was put on each respondent's computer in order to allow the researcher to check against multiple responses from the same computer: for example, if a participant clicked "Submit" twice and two copies of their response were accidentally sent to the researcher. In the case of multiple copies being sent, the first completed survey was retained and subsequent copies deleted. The Qualtrics software provided the ability to restrict how many times each participant could access and complete the survey using cookies. For this thesis research, each participant was only

able to access and complete the survey once. This non-invasive IP-tracking is standard practice across websites and uses something called cookies to identify returning users. These cookies are not traceable back to any one individual, nor do they contain any confidential or private information; they simply tell the website that this device has entered the survey before and bars it from accessing the survey multiple times.

Storing survey data. Each completed survey was securely downloaded to the main researcher's computer in weekly batches. These surveys were formatted for import as a .cvs file into Microsoft Excel and as a .sav file for import into IBM's SPSS. I ensured all inclusion and exclusion criteria were met and scanned all completed surveys (inclusion and exclusion criteria presented earlier in Chapter 3). Surveys not meeting criteria were deleted off the Qualtrics server and the main researcher's computer. Surveys that met criteria were extracted and deleted from the Qualtrics site, stored in an encrypted folder on the main researcher's computer, and printed hard copies were made and stored in a locked filing cabinet accessible only to the researcher and supervisor and will be destroyed five years after the completion of this study.

Malicious responding. Along with safeguarding from duplicate responses, entries were also checked for any malicious responding, which may represent insufficient motivation or the intentional attempt to damage the research (Gosling et al., 2004). Flessner, Woods, Franklin, Cashin et al. (2008) suggested checking and removing surveys that have long-strings of identical responses and closely reviewing outlying data (e.g., individuals scoring 39–40/40 or 19–20/20 on MIST-A measures or those who report anomalously high affective responses on the HPS—for example, 4/4 across all 13 affective states). These procedures helped to protect the data set from contamination.

However, because the survey appeared on a respected TTM research and support website and was not providing a financial incentive for individuals to participate, these concerns were minimal. Gosling et al. (2004) have found that self-report surveys completed online are not likely to produce unreliable data any more so than well-designed traditional in-person studies and that web-based questionnaires may remove some of the social desirability of self-enhancing (or minimizing) that in-person exams may be susceptible to. This study placed little concern on malicious responding becoming a concern, but maintained several safeguards to guard against it.

Ownership of data. The ownership of the data will reside only with the main researcher and will remain accessible only to the main researcher and supervisor of the study. Qualtrics, while they securely stored and hosted the data for the duration of the data collection period, did not claim any ownership, access to the data, or any royalties from the study (B. Winkelman, personal communication, May 23, 2012; see Appendix N). The TLC, while they helped advertise the study on their website, also did not claim any ownership, access, or royalties to the data (J. Raikes, personal communication, April 11, 2012; see Appendix O). Finally, the Human Subjects Research Committee at the University of Lethbridge "acknowledges that IP created exclusively by a student in the course of completing the requirements for an academic degree or certificate is owned by the student Creator(s)" (as cited in University of Lethbridge, 2011, p. 54).

Statement of Ethical Conduct

I have ensured this thesis adhered to the Canadian Psychological Association's (2000) *Canadian Code of Ethics for Psychologists* and ensured an ethical approach towards research participants was maintained at all times. In addition, my research

abided by the Tri-Council (2010) policy statement regarding the ethical conduct for research involving humans endorsed by the HSRC at the University of Lethbridge.

Data Analysis Strategy

Participants were grouped into one of four profiles of hairpulling based on their scores on the MIST-A using the median-split procedure: HFHA, HFLA, LFHA, and LFLA. Descriptive statistics were run for the total sample, and each group was based on the responses on the basic demographic form and TTM demographic form asked at the onset of the survey (see Appendix B: Forms 1 and 2). The findings have been represented in text and tables, as deemed necessary.

Assumptions. Parametric analyses were used assuming several statistical assumptions were satisfied: (a) the assumption of normality (i.e., that the data is normally distributed), and (b) the heterogeneity of variances among participant cells (DePuy & Pappas, 2004; Harwell, 1988).

To determine the distribution of data for deciding which approach to take, SPSS had tests (e.g., PROC UNIVARIATE) that looked at the normality of the data (i.e., summary statistics, skewness, kurtosis, Levene's tests for equality of variances, and Shapiro-Wilk's tests) that helped support that the most appropriate and powerful test was utilized for the data (DePuy & Pappas, 2004). When the data fell outside assumptions that are required for parametric tests to be run, nonparametric analyses were utilized (Harwell, 1988). Each question was reviewed with this approach in mind.

Research questions. In this section, the data analysis method for each research question will be outlined. Explanations for how each of the four research questions was approached considering parametric and nonparametric methods are discussed.

***Research question 1 (RQ1)*:** How does hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), map onto each hairpulling profile created by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)? Because the appropriate assumptions were met to proceed with parametric testing, a multivariate analysis of variance (MANOVA) with follow-up sample *t*-tests across the four independent profiles to measure MGH-HPS severity was performed. These tests were performed on the overall MGH-HPS scale, along with the "Severity" and "Resistance and Control" factors of the MGH-HPS to understand their contribution to hairpulling severity across the different hairpulling profiles.

***Research question 2 (RQ2)*:** What are the emotional cycles, assessed by the Hair Pulling Survey (HPS), that are active across different hairpulling profiles, assessed on the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)? Because the data did not satisfy the assumptions for normal distribution, nonparametric analyses were performed on the data. Friedman Tests (Lund & Lund, 2010a) were be utilized to determine whether differences occurred between hairpulling groups and their scores on each emotion assessed by the HPS before, during, and after pulling. The Kruskal-Wallis test was run for each of the 13-emotional states assessed on the HPS, with follow-up Mann-Whitney U tests (Lund & Lund, 2010b) performed to determine the differences on the various emotion states between groups (Gall et al., 2007).

***Research question 3 (RQ3)*:** What is the relationship between hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), and the emotional cycles that operate across each hairpulling profile, assessed by the Hair

Pulling Survey (HPS)? The distribution of the data required nonparametric analyses. The Kendall's tau (τ) correlation was used to analyze the data.

***Research question 4 (RQ4)*:** How are levels of depression, anxiety, and stress, assessed by the Depression Anxiety Stress Scale-21 (DASS-21), reflected in the emotional cycles of hairpulling, assessed by the Hair Pulling Survey (HPS)? Nonparametric tests were performed on the data. The Kruskal-Wallis test assessed differences between groups on DASS-21 total, Depression, Anxiety, and Stress subscales, with follow-up Mann-Whitney U tests where appropriate (Gall et al., 2007; Hoskin, 2009, Lund & Lund, 2010b). Spearman's rank (r_s) correlations assessed the relationship between hairpulling severity and the DASS-21 total score. DASS-21 Depression and Anxiety subscales were correlated with scores on the respective dimension on the HPS using Spearman's rank correlation to understand how depression and anxiety are expressed to maintain hairpulling.

Summary

My intent in Chapter 3 was to integrate the information presented during the literature review and present a working process of how I addressed the four main research questions. An outline of how participants were selected, recruited, and routed through the survey was provided, along with a thorough rationale for why each measure was included and how it helped to address the research questions. I concluded with the data analysis strategy that will carry over into Chapter 5, the results section, where the raw findings of the study will be presented. The next section, Chapter 4, presents the data preparation process, which outlines how the data was thinned for analysis in Chapter 5.

Chapter 4: Data Preparation

Overview

Details about the data collection phase and how the data were thinned for analysis are provided in this chapter. Specifically, I outline the how the study was prepared for distribution, the data reduction process, and how the four hairpulling profiles were developed to create the final response pool used in the analysis.

Study Procedures

The study received approval from the Faculty of Education Human Subjects Research Committee at the University of Lethbridge on October 16, 2012 (see Appendix Q). The survey was developed using Qualtrics survey software and informally piloted to five friends during the month of November to ensure that the survey was accessible and compatible across a range of users and devices. The mock answers the respondents produced were reviewed to ensure responses were being recorded properly prior to submitting the survey for distribution. All mock data were deleted.

On November 26, 2012, the survey was submitted to the Trichotillomania Learning Center to be reviewed by their Scientific Advisory Board. The board was provided with a copy of the University of Lethbridge ethics approval (see Appendix P), a two-page abstract outlining the purpose of the study (see Appendix Q), and a succinct (250 words) description of the study to be posted on the TLC's research website (see Appendix R).

On December 10, 2012, Ms. Raikes, Executive Director of the TLC, indicated the Scientific Advisory Board granted approval to host the survey (see Appendix D). On December 11, 2012, the study was published online, available for the public to access.

On January 19, 2013, an email from the TLC describing and linking to the study was distributed to over 14,000 subscribers via the TLC's listserv to members (see Appendix J). Data collection for this study closed on January 25, 2013, with the first participant completing the survey on December 11, 2012, and the last participant to complete the survey was on January 25, 2013.

On March 15, 2013, a donation of $250 USD was made to the TLC on behalf of all the participants who completed the survey (see Appendix S). This donation was provided to support the TLC and all the awareness, support, and research programs they provide.

Data Reduction Process

Data reduction was a multi-stage process that included removing responses from duplicate IP-addresses, incomplete surveys, and from participants who failed to meet the inclusion criteria or endorsing the exclusion criteria identified in Chapter 3. In this section, I also outline how the four hairpulling profiles were created.

Duplicate IP-addresses. The first stage was to review the IP-addresses of all surveys received in order to exclude duplicate responses arriving from a single user. Of the total 609 received responses, 27 (4.4% of total responses) cases were identified as duplicate responses from identical IP-addresses. Of these 27 cases, 13 involved surveys where one of the two responses had been complete. In this instance, the completed survey was retained. Eight responses came from IP addresses where neither survey was complete, and in this instance, all four sets were removed from the response pool. Three cases (six responses) came from individuals who had completed the survey twice, and three cases (totally 10 responses) came from IP addresses reporting multiple complete

and incomplete responses. In these instances, the first completed survey submitted was retained for analysis, and all other copies were removed from the response pool. Following this process, 577 responses were retained.

Incomplete surveys. The second stage in the data reduction process involved the removal of incomplete surveys from the response pool. As defined in Chapter 3, surveys in the stages of early-termination (i.e., the respondent did not answer all the questions and did not submit the survey) or late-termination (i.e., the survey was fully completed but the respondent decided not to submit their responses) were classified as incomplete and were not included in the final response pool. Of the 577 responses, 105 (18%) were removed from the response pool for having been incomplete. Following this stage, 472 responses were retained.

Inclusion criteria. The third stage in the data reduction process involved reviewing whether participants met the inclusion criteria outlined in Chapter 3. Three inclusion criteria were established for participation: (a) the respondent indicated that their current hairpulling has resulted in noticeable hair loss or thinning of hair (see Appendix B: Form 2); (b) the respondent reported that their hairpulling produces mild distress across one or more personal, interpersonal, occupational, or academic domains (questions 6-11 on the STAQ; see Appendix B: Form 2); and (c) the respondent indicated that they were of at least 18 years of age (see Appendix B: Form 1, and Appendix K).

Of the 472 responses that have been retained following the removal of any duplicate IP-addresses and incomplete surveys, 407 (86.2%) were retained for reporting that hairpulling produces noticeable hair loss, and 34 (7.2%) were retained for reporting that hairpulling resulted in noticeable thinning of the hair if the area was not covered or

concealed. Of the 472 responses, 29 (6%) were removed for not meeting inclusion criteria (question 2, see Appendix B: Form 2); 27 of which were removed because they had reported that their hairpulling caused neither hair loss nor thinning of the hair, and two respondents were removed for not submitting responses to either question. Following this reduction, 441 surveys were retained.

The second inclusion criteria required that respondents report that hairpulling produces at least "mild distress" in at least one personal, interpersonal, social, or occupational and academic domain (questions 6 to 11, see Appendix B: Form 2). Two responses were removed for failing to meet this inclusions criterion. Following this reduction, 439 surveys were retained for analysis.

The final inclusion criteria required respondents to report that they were at least 18 years of age. This was a criteria first verified during the informed consent and again asked during the demographics form (see Appendix B: Form 1). All 439 survey respondents met the third inclusion criteria and were retained.

Exclusion criteria. Two exclusion criteria detailed in Chapter 3 were also included to determine participant eligibility in this study. The first came from the work of Douglas Woods (Woods, Flessner, Franklin, Keuthen et al., 2006; see Permissions section), which required a respondent to select that they have never pulled their hair in response to voices others may not be able to hear or in response to the belief that bugs or insects are crawling on their skin (question 13, see Appendix B: Form 2). The second exclusion question was adapted from the work of Norberg et al. (2007) and excluded respondents who reported hairpulling as a direct result of another general medication condition (e.g., dry or itchy skin; question 14, see Appendix B: Form 2). Three responses

were removed for reporting that hairpulling was a response to voices or bugs. Seven responses were removed for reporting various medical conditions, including dermatitis herpetiformis, digestive microbes, dermatillomania, self-harm, and psoriasis. One respondent was removed for reporting having no hairpulling sites. Following this reduction, 428 surveys were retained.

Developing hairpulling profiles. Each respondent was divided into one of four hairpulling profiles calculated by their score on the MIST-A. For a full rationale behind the creation of these four profiles, see Chapter 2. For the procedure of how these groups were created, please refer to Chapter 3 and 4.

One respondent was removed for not recording responses on the MIST-A questionnaire, preventing this individual from being classified into any of the four hairpulling profiles. Following this reduction, 427 respondents were retained for the final analysis.

Using the median-split procedure, respondents who scored 43 points or higher on the "Focused" sub-scale (questions 1 to 10, see Appendix B: Form 6) of the MIST-A were designated as having "High-Focused", or (HF) hairpulling behaviours. Participants whose score was 22 points or higher on the "Automatic" sub-scale (questions 11 to 15, see Appendix B: Form 6) were labelled as having "High-Automatic" (HA) hairpulling behaviours. Participants falling below these two cutoffs were designated as having "Low-Focused" (LF), and "Low-Automatic" (LA) hairpulling behaviours, respectively. All 427 respondents were categorized into one of these four hairpulling profiles, each profile a composite of one "Focused" and one "Automatic" label.

Summary

Over the 45-day period that the study was online, 609 individuals participated in the study. Of these 609 individuals, 477 completed the study, a response rate of 78%. For not meeting the inclusion or violating any exclusion criteria, 50 (10%) responses were removed from the response pool. A total of 427 surveys were retained for analysis.

Chapter 5: Results

Overview

This chapter is divided into two sections. The demographic and hairpulling information pertaining to the respondents are presented in Part I. Each of the four research questions are systematically addressed in Part II. Tables are included to enhance the interpretation of the results.

Part I: Demographics

Demographic statistics are presented to describe the participants who completed this study. Frequencies and percentages are used to describe the following variables: sex, ethnicity, marital status, first diagnosis, and most frequent hairpulling site. Standard deviation, mean, range, mode, and median statistics are provided in respect to current age, age of onset, number of hairpulling sites, reported distress, experiences of tension and gratification, and duration of hairpulling.

General demographics. A total of 427 individuals met the criteria to be included in the study and completed the STAQ survey. This sample consisted of 409 females (95.8%) and 18 males (4.2%). The age of the respondents ranged from 18 to 71, with a mean age of 33.44 years (*SD* = 12.42). The ethnic composition of this study included 86.9% individuals identifying as Caucasian, 1.6% as African-American, 2.8% Hispanic, 2.3% Asian, 0.2% Native or Aboriginal, 0.2% Pacific Islander, 3.7% Multi-racial, and 2.1% who identified as belonging to an "other" ethnicity.

This study also collected responses on the current relational status of respondents. Of the respondents who completed the study, 32.9% reported being single and never married, 15.9% reported to be dating, 32.9% as currently married, 1.9% separated, 6.3%

divorced, 7.7% common law (i.e., living with the partner for six consecutive months but not married), and 2.1% as "other". See Table 1 for a listing of demographic data collected.

Table 1.

Age, Gender, Ethnicity, and Marital Status of Participants

Age	Mean	(*SD*)	Range
Current age	33.44	12.42	18–71

Demographics	*n*	%
Gender		
Female	409	95.8
Male	18	4.2
Ethnicity		
White/Caucasian	371	86.9
African-American	7	1.6
Hispanic	12	2.8
Asian	10	2.3
Native/Aboriginal	1	0.2
Pacific Islander	1	0.2
Multi-racial	16	3.7
Other	9	2.1
Marital status		
Single/never married	141	33.0
Dating	68	15.9
Married	140	32.8
Separated	8	1.9
Divorced	27	6.3
Common law*	33	7.7
Widowed	1	0.2
Other	9	2.1

Note. $N = 427$. Common law = living with partner for six consecutive months, but not married.

Hairpulling demographics. The majority of respondents (66.5%) reported having been first diagnosed with TTM by a professional. A psychologist or psychiatrist provided the first diagnosis for 26.9% of respondents, followed by a therapist or counsellor (15.9%). Another 9.8% of respondents reported receiving their diagnosis from a family doctor, 6.6% reported being diagnosed from "other" sources, and 6.3% responded that they did not recall who provided their first diagnosis. Over a third (33.5%) of respondents reported said they had never been formally diagnosed by a health professional as having TTM. See Table 2 for a summary of these results.

Most respondents (92.7%) reported that their hairpulling resulted in noticeable hair loss (bald patches) if the areas were not covered or concealed. Thirty-one (7.3%) respondents reported that while their hairpulling did not result in significant hair loss, it still produced noticeable hair thinning.

Respondents were asked to reflect on the earliest age that they began to pull their hair—their self-reported age of onset. Reported onset ranged between age 1 and 51, with mean onset of 12.40 years (SD = 6.17). The most common time of onset was at 12 years of age. Despite females reporting an earlier mean age of onset (M = 12.35; SD = 6.22) to males (M = 13.67; SD = 4.73), a Mann-Whitney U test showed no statistically significant difference in age of onset across gender: U = 2,743.5, p = .067. See Table 2 for a complete presentation of the above data.

Table 2.

Age of Onset, Diagnosis, and Hairpulling Effects of Participants

Onset	*N*	Mean	(*SD*)	Range
Age	427	12.40	6.17	1–51

Presentation	*N*	%
Diagnosis		
Therapist/counsellor	68	15.9
Family doctor	42	9.8
Social worker	2	0.5
Psychiatrist/Psychologist	115	26.9
Do not remember	27	6.3
Other	28	6.6
Never diagnosed	143	33.5
Hairpulling effect		
Hair loss	396	92.7
Thinning hair	31	7.3

Note. *N* = 427.

When the scalp was considered to be five distinct hairpulling sites, the number of hairpulling areas reported by individuals ranged from one and 12, with a reported mean of 4.67 (*SD* = 2.51) sites. When the five scalp sites were collapsed into a single hairpulling site, the total number of sites ranged from one to 10, with an average mean of 2.87 (*SD* = 1.88) sites.

Of the 76.1% of respondents who reported pulling one of the five scalp sites, the mean reported scalp hairpulling sites was 2.56 (*SD* = 1.92). The most frequently reported scalp hairpulling sites, in descending order of frequency, were the crown (65.3%), forehead (51.1%), left-temporal (49.6%), right-temporal (46.4%), and occipital (43.6%) regions.

Overall, the most commonly reported hairpulling site was the scalp (76.1%), followed by the eyebrows (51.3%), eyelashes and genitals (each 47.5%). Legs and feet, armpits, arms, and "other", were reported by 19.1%, 15.0%, 8.9%, and 7.3% of respondents, respectively. The most frequently targeted single site for hairpulling was the crown (31.7%), followed by eyelashes (17.6%), left-temporal (13.6%), eyebrows (11.0%), and occipital region (8.1%). See Table 3 for a breakdown of hairpulling sites.

Distress associated with hairpulling was measured for personal, interpersonal, social, occupational and academic functioning, in addition to self-image and overall distress. The majority of respondents (32.6%) reported that hairpulling caused "mild distress" around their personal functioning. The majority of respondents reported experiencing "moderate" distress around their interpersonal (32.6%) and school or work functioning (29.3%). Participants (28.3%) most frequently reported "mild" distress around social functioning, and 39.1% experienced "high" distress regarding their personal self-image in relation to their hairpulling. Asked to rate their overall distress, 37.2% of individuals reported "moderate" levels of overall distress when reflecting on their hairpulling, 33.3% had "high" distress, 16.2% reported "mild" distress, and 12.6% experienced "severe" distress overall. See Table 4 for a complete breakdown of the distress experienced by respondents.

Table 3.

Number and Location of Hairpulling Sites

Number of sites	Mean	(*SD*)	Range
Scalp-1	2.87	1.881	1–12
Scalp-5	4.67	2.512	1–16

			Most frequent
Hairpulling sites	*n*	%	*N*(%)
Scalp			
Crown	279	65.3	133(31.1)
Right-temporal	198	46.4	23(5.4)
Left-temporal	212	49.6	57(13.3)
Frontal	218	51.1	27(6.3)
Occipital	186	43.6	34(8.0)
Total[a]	325	76.1	-
Eyelashes	203	47.5	74(17.3)
Eyebrows	219	51.3	46(10.8)
Pubic hair	203	47.5	11(2.6)
Moustache	13	3.0	-
Beard	17	4.0	6(1.4)
Trunk	17	4.0	-
Armpits	64	15.0	-
Arms	38	8.9	3(.7)
Legs/Feet	85	19.9	3(.7)
Other	31	7.3	3(.7)

Note. *N* = 427. Scalp-1 = scalp considered one hairpulling site; Scalp-5 = scalp considered as five separate hairpulling sites.
[a]Respondents with at least one scalp hairpulling site.

Respondents were asked to reflect on whether they experienced pre-pulling tension and gratification from hairpulling. Results showed that 95.6% of individuals reported experiencing tension around their hairpulling at least “a little of the time”. The majority (42.2%) of respondents endorsed tension around hairpulling “most of the time”

(71-89% of hairpulling episodes). Experiencing gratification, pleasure, or relief by hairpulling was endorsed by nearly every respondent (94.1%) at least "a little of the time" (11-29%), with most individuals (37.2%) reporting gratification occurring around most of their hairpulling episodes (71-89% of the time).

Table 4.

Levels of Distress Associated with Hairpulling

	None		Mild		Moderate		High		Severe	
Distress	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Personal	75	17.6	139	32.6	133	31.1	51	11.9	29	6.8
Interpersonal	38	8.9	103	24.1	139	32.6	89	2.8	58	13.6
Social	69	16.2	121	28.3	113	26.5	80	18.7	44	1.3
Work/Academic	56	13.1	123	28.8	125	29.3	78	18.3	45	1.5
Self-Image	6	1.4	50	11.7	93	21.8	167	39.1	111	26.0
Overall	3	0.7	69	16.2	159	37.2	142	33.3	54	12.6

Respondents were asked to rate their level of awareness of their hairpulling. While 34.7% of respondents reported that they were aware of their hairpulling "all of the time" (90–100% of the time), and 1.2% of respondents reported never being aware of their hairpulling, the majority (64.1%) stated that their awareness around hairpulling is characterized by fluctuations between states of awareness. Data on tension, gratification, and awareness of hairpulling are presented in Table 5.

Table 5.

Physical Tension, Gratification, and Awareness of Hairpulling

Experience	*n*	%
Physical tension		
Never/almost never (0-10%)	19	4.4
Little of the time (11-29%)	34	8.0
Some of the time (30-70%)	100	23.4
Most of the time (71-89%)	180	42.2
All of the time (90-100%)	94	22.0
Pleasure/gratification/relief		
Never/almost never (0-10%)	25	5.9
Little of the time (11-29%)	43	1.1
Some of the time (30-70%)	82	19.2
Most of the time (71-89%)	159	37.2
All of the time (90-100%)	118	27.6
Awareness of hairpulling		
Never/almost never (0-10%)	5	1.2
Little of the time (11-29%)	30	7.0
Some of the time (30-70%)	98	23.0
Most of the time (71-89%)	146	34.2
All of the time (90-100%)	148	34.7

Note. $N = 427$.

Data on the amount of time (duration) individuals spent thinking about, resisting, and pulling hair were collected. Duration spent thinking about pulling ranged from 0 minutes per day to over eight hours per day. Although the average amount of time thinking about pulling was over 2.5 hours per day, the most frequently reported time (26.5% of respondents) was less than 30 minutes per day. Time spent resisting pulling also ranged from 0 minutes to over eight hours per day, having a mean duration of nearly two hours per day and a median duration of under 30 minutes per day. Average time

spent pulling was approximately 1.5 hours per day, with a median time of 60 minutes. A full breakdown of times is provided in Table 6.

Table 6.

Duration Spent Thinking About, Resisting, and Pulling Hair

Duration	*n*	%
Thinking about hairpulling		
0-30 minutes	145	34.0
31-59 minutes	40	9.4
60-119 minutes	51	12.0
Over 120 minutes	190	44.6
Resisting hairpulling		
0-30 minutes	169	39.7
31-59 minutes	49	11.5
60-119 minutes	49	11.5
Over 120 minutes	159	37.3
Actual hairpulling		
0-30 minutes	112	26.3
31-59 minutes	81	19.0
60-119 minutes	97	22.8
Over 120 minutes	136	31.9

Note. $N = 426$.

Hairpulling profiles. When constructing hairpulling profiles, 219 (51.3%) were classified as HF pullers, 208 (48.7%) as LF pullers, 220 (51.5%) as HA pullers, and 207 (48.5%) as LA pullers. Applying the median-split procedure divided respondents into four hairpulling profiles: 107 (25.1%) of respondents were categorized with HFHA hairpulling behaviours, 112 (26.2%) HFLA, 113 (26.5%) LFHA, and 95 (22.2%) had LFLA hairpulling behaviours.

Part II: Research Questions

In the following section, I present an analysis for each of the four research questions developed for this thesis. Tables are included to enhance and summarize the interpretation of results. The alpha level of significance was set at $p \leq .05$, with Bonferroni corrections applied as necessary to reduce the risk of Type I error when post-hoc comparisons were performed.

Research Question 1 (RQ1). How does hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), map onto each hairpulling profile created by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?

Rational for parametric procedure. Significance tests for skewness and kurtosis for MGH-HPS Total, Severity, and Resistance and Control revealed the variables satisfied ratios to accept the assumption of normal distribution. Nonsignificant Shapiro-Wilks tests (HFHA: S-W(107) = .981, p = .141; HFLA: S-W(112) = .982, p = .148; LFHA: S-W(113) = .987, p = .377; LFLA: S-W(95) = .991, p = .774) for the MGH-HPS allowed the study to proceed by treating the samples as normally distributed. Nonsignificant Levene's tests (MGH-HPS Total: $F(3, 423) = .449$, $p = .718$; Severity: $F(3, 423) = .504$, $p = .680$; Resistance and Control: $F(3, 423) = .325$, $p = .807$) for homogeneity of variances also satisfied the assumptions to proceed with parametric analyses.

Descriptives of MGH-HPS. The mean MGH-HPS total score across all four profiles was 16.66 (SD = 4.81). The total Severity factor mean on the MGH-HPS was 9.11 (SD = 3.34), with a total Resistance and Control factor mean of 7.55 (SD = 2.23).

MGH-HPS Total scores across profiles ranged from 15.23 (*SD* = 4.68) for LFLA, up to 17.26 (*SD* = 5.01) for HFHA. Mean scores for the Severity factor ranged from 8.12 (*SD* = 3.32) for LFLA, to 9.95 (*SD* = 3.29) for HFHA. Mean scores for the Resistance and Control factor ranged from 7.13 (*SD* = 2.24) for LFLA, to 7.90 (*SD* = 2.09) for HFLA. See Table 7 for a complete breakdown.

Table 7.

Descriptives for MGH-HPS, including Severity and Resistance and Control Factor Subscales

MGH-HPS	HFHA	HFLA	LFHA	LFLA	Total[a]
Severity[b]	9.95(3.29)	9.06(3.13)	9.21(3.40)	8.12(3.32)	9.11(3.34)
Resistance & Control[c]	7.31(2.37)	7.90(2.09)	7.79(2.17)	7.13(2.24)	7.55(2.23)
Total	17.26(5.01)	16.96(4.48)	17.00(4.86)	15.23(4.68)	16.66(4.81)

Note. *N* = 427. Means are shown with standard deviations in parentheses. HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling; MGH-HPS = Massachusetts General Hospital Hairpulling Scale.
[a]Mean and standard deviations for the total sample.
[b]Questions 1-2, 4, and 7 on the MGH-HPS.
[c]Questions 3, 5-6 on the MGH-HPS.

Post-hoc analysis. A multivariate analysis of variance (MANOVA) was conducted comparing the hairpulling profiles across MGH-HPS total, Severity, and Resistance and Control factors. The MANOVA showed a significant main effect of hairpulling profile (Wilks' $\lambda = .934$, $p < .0001$). Follow-up pairwise comparisons showed significant group differences on MGH-HPS Total, $F(3, 423) = 3.763$ $p = .011$; MGH-HPS Severity, $F(3,423) = 5.356$, $p = .001$; and MGH-HPS Resistance and Control $F(3, 423) = 14.513$, $p = .032$. Because all comparisons produced a significant *F* statistic,

assumptions were satisfied to run post-hoc Protected Fisher Least Significant Difference comparison tests to maximize power and control for experiment-wise error rate.

Follow-up tests on MGH-HPS Total found HFLA (p = .003), HFLA (p = .009), and LFHA (p = .008) profiles reported significantly higher Total MGH-HPS scores than the LFLA group. Comparisons between HFHA, HFLA, and LFHA on MGH-HPS Total scores showed no significant differences (p range = .644–.955).

Follow-up tests were conducted comparing hairpulling profiles across both the Severity and Resistance and Control factors of the MGH-HPS. Post-hoc tests conducted on MGH-HPS Severity showed those with HFHA hairpulling had significantly higher hairpulling severity than either the HFLA (p = .046) and LFLA profiles (p < .001). Both HFLA (p = .037) and LFHA profiles (p = .016) also reported significantly higher MGH-HPS Severity scores than LFLA group. Post-hoc tests looking at the Resistance and Control factor of the MGH-HPS found those with a HFLA hairpulling profile experienced significantly more distress around controlling their hairpulling than either HFHA (p < .001) or LFLA (p = .013) hairpulling individuals. The LFHA hairpulling profile also reported significantly higher resistance and control scores than LFLA (p = .033). A summary of results is provided in Table 8.

Table 8.

Comparing MGH-HPS Total and Subscale Scores with Hairpulling Subtypes

	Hairpulling profile		
MGH-HPS	HFLA	LFHA	LFLA
Severity			
HFHA	.891*	.741	1.848*
HFLA	-	-.15	.957*
LFHA	-	-	1.107*
Resistance and Control			
HFHA	-.593*	-.479	.182
HFLA	-	.114	.776*
LFHA	-	-	.661*
Total			
HFHA	.297	.262	2.030*
HFLA	.262	-.036	1.733*
LFHA	-	-	1.768*

Note. N = 427. Mean difference scores. HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling; MGH-HPS = Massachusetts General Hospital Hairpulling Scale.
*$p \leq .05$

Research Question 2 (RQ2). What are the emotional cycles, assessed by the HPS, that are active across different hairpulling profiles, assessed on the MIST-A?

Analysis strategy. Friedman's 2-way ANOVAs were conducted examining differences between before-during (BD), during-after (DA), and before-after (BA) time periods of the HPS across each of the four hairpulling profiles. Bonferroni corrections were applied to protect against increasing Type I error as a product of multiple comparisons. The alpha level for significance was set at $p \leq .0167$. Analyses of the four profiles are presented in Tables 9 to 12. Follow-up Kruskal-Wallis tests were performed

to determine whether differences exist between hairpulling profiles across each of the different emotions of the HPS. The Bonferroni-corrected alpha of significance was set at $p \leq .0167$. See Table 13 for the results of the Kruskal-Wallis 1-way ANOVA. Follow-up Mann-Whitney *U* tests were conducted to determine the differences detected by the Kruskal-Wallis test. For the follow-up Mann-Whitney *U* tests, the corrected level of significance was set to $p \leq .0083$. Significance results for the Mann-Whitney *U* tests are presented in Table 14.

Analyses of emotional cycles within groups. The feeling of boredom (labelled "Bored" on the HPS) triggered a significant BD drop as a product of pulling across all hairpulling profiles. In all cases, this was significant to $p <.001$. Non-significant DA scores across the variable Bored were reported (*p* range: .209–.763). These tests indicated that a significant drop in Bored occurs once the individual engages in hairpulling, with no significant increase or decrease post-pulling, although all four profiles showed a trend towards decreasing Bored scores following the cessation of pulling.

Individuals reported a significant drop in scores of the emotion variable Happy after pulling. DA pulling across all four profiles (*p* range: .000–-.004) showed a significant drop in Happy scores after the individuals stopped hairpulling. While only HFLA showed a significant increase ($p = .007$) in BD scores of happy, a trend towards significance (*p* range: .020–.114) showed increasing scores of Happy once the individuals began to pull.

Friedman's ANOVAs showed a significant BA increase in scores on the variable Sad across all profiles ($p < .000$). There was also a trend towards significance ($p = .020$) for BD Sad scores to decrease in HFHA pullers.

The emotion variable Anger showed a significant DA ($p < .000$) and BA (p range: .000–.003) increase across all four hairpulling profiles (p range: .000-.004). The HFHA profile showed a significant BD decline in Anger ($p = .001$), while all other groups showed non-significant BD changes (p range: .150–.853).

The expression of the emotion variable Calm showed significant BD increases across all four hairpulling profiles ($p < .000$). Individuals reported higher Calm scores once they began hairpulling, irrespective of group. Calm DA scores showed a significant drop for HFHA ($p < .000$), and LFHA ($p < .000$) profiles, with a trend for significance for the HFLA group ($p = .057$). The HFHA group showed a trend for significance ($p = .039$), and HFLA showed a significant increase in BA Calm scores ($p = .001$), indicating that these two groups experienced increases in Calm once they stopped pulling that the LFHA and LFLA groups did not report.

Scores for the variable Anxious also showed significant change across all four profiles. These changes were seen in BD scores across all four profiles (p range: .000-.002), indicating significant declines in Anxious scores once individuals began to pull. No significant DA scores were reported (p range: .032–.647), showing that the decreases remained stable following the cessation of pulling, although there was a trend for Anxious scores to increase. Significant BA scores were reported for HFHA ($p < .000$), HFLA ($p < .000$), and LFLA ($p = .014$), showing a significant pre-post drop in Anxious scores as a result of pulling.

Scores of the variable Guilt showed significant increases across from BD ($p < .000$) and DA ($p < .000$) for all four hairpulling profiles. These results indicate that Guilt scores show a steady rise once the individual begins pulling, and continue to increase after individuals stop the behaviour.

Tense scores showed a significant drop from BD ($p = .000$) and BA ($p = .000$) across HFHA, HFLA, and LFHA profiles. These three profiles also showed a trend approaching significance for DA (p range: .027–.075), showing a trend for decreasing Tense scores after the individual stopped pulling. The LFLA profile reported no significant changes across time.

The scores for the variable Relieved showed a similar trend for all four hairpulling profiles. In all instances, low Relieved scores before pulling (M range: .18–.45) increased significantly ($p < .000$) during the pulling episode (M range: 1.09–1.83). All four profiles showed significant BA ($p < .000$) scores and insignificant DA scores (p range: .063–.763), indicating that increases in Relieved scores were maintained once the individual stopped pulling.

The feeling of indifference (labelled "Indifferent" on the HPS) showed significant BA decreases (p range: .000–.011) for HFHA, LFHA, and LFLA profiles. In addition, HFHA, HFLA, and LFHA showed significant DA decreases (p range: .000–.002). Throughout the cycle of pulling, all groups experience less indifference towards pulling than when they began.

For the HFHA group, pulling significantly lowered scores for the variable Frustrated from before ($M = 2.71$) to during ($M = 2.33$), $p = .008$. Also for the HFHA profile, DA scores for Frustrated showed a significant ($p < .000$) increase back to pre-

pulling levels. Significant BA increases in Frustrated scores (*p* range: .000-.013) resulted in higher Frustrated scores after pulling across all four profiles.

Scores on the variable Embarrassed showed a uniform pattern across all four profiles. Significant increases were seen from BA ($p < .000$), and from DA ($p < .000$). The results show that initial levels of Embarrassed (*M* range: .57–1.65) increase dramatically during the pulling cycle, resulting in significantly elevated scores after pulling stops (*M* range: 2.27–3.20).

The feeling of loneliness is also affected by hairpulling. DA scores across all four profiles showed significant increases in Loneliness ($p < .000$), although these results are not significantly higher than before the individuals began pulling for the LFLA profile ($p = .131$). However, for the HFHA, HFLA, and LFHA profiles, scores for Loneliness were significantly higher after stopping than pre-pulling levels (*p* range: .000–.013).

Table 9.

HPS Descriptive Statistics with Friedman Tests for High-Focused, High-Automatic Hairpulling (HFHA)

		HFHA					
		Before	During	After	*z*		
Emotion	*n*	*M(SD)*	*M(SD)*	*M(SD)*	BD	DA	BA
Bored	104	2.18(1.18)	1.20(1.23)	1.13(1.09)	48.02*	.20	6.24*
Happy	102	.77(1.23)	1.16(1.24)	.62(1.02)	5.45	17.89*	2.50
Sad	105	2.15(1.19)	1.85(1.28)	2.89(1.28)	5.26	43.61*	27.66*
Angry	106	1.75(1.30)	1.48(1.29)	2.38(1.44)	11.08*	21.06*	8.80*
Calm	101	.76(1.06)	1.77(1.41)	1.08(1.25)	23.29*	25.79*	4.25
Anxious	107	3.35(.88)	2.52(1.31)	2.74(1.26)	37.44*	2.20	22.23*
Guilty	103	1.45(1.26)	2.31(1.30)	3.36(1.09)	29.33*	5.97*	68.76*
Tense	106	3.17(.93)	2.42(1.18)	2.21(1.34)	25.81*	3.16	29.35*
Relieved	101	.45(.96)	1.83(1.34)	1.43(1.33)	47.69*	3.46	35.27*
Indifferent	101	.87(1.13)	1.10(1.15)	.69(1.07)	3.90	19.20*	6.55*
Frustrated	104	2.71(1.24)	2.33(1.21)	3.13(1.18)	7.14*	25.81*	5.59
Embarrassed	104	1.65(1.43)	2.15(1.51)	3.20(1.20)	14.88*	41.68*	56.53*
Loneliness	104	2.20(1.44)	1.93(1.38)	2.55(1.47)	1.79	23.27*	10.67*

Note. Means are shown with standard deviations in parentheses. BD = before-to-during; DA = during-to-after; BA = before-to-after; HFHA = high-focused, high-automatic hairpulling.

*$p \leq .0167$

Table 10.

HPS Descriptive Statistics with Friedman Tests for High-Focused, Low-Automatic Hairpulling (HFLA)

		HFLA					
		Before	During	After	*z*		
Emotion	*n*	*M(SD)*	*M(SD)*	*M(SD)*	BD	DA	BA
Bored	106	1.94(1.14)	1.08(1.19)	1.00(1.10)	33.99*	.95	55.90*
Happy	106	.48(.88)	.82(1.04)	.47(.81)	7.37*	8.40*	.02
Sad	108	1.99(1.23)	1.78(1.19)	2.56(1.22)	2.69	4.32*	25.78*
Angry	106	1.58(1.32)	1.46(1.32)	2.08(1.53)	.69	26.06*	11.95*
Calm	107	.53(.87)	1.27(1.19)	1.03(1.16)	25.78*	3.63	11.66*
Anxious	110	3.15(.99)	2.61(1.30)	2.34(1.34)	1.59*	4.59	24.36*
Guilty	105	1.02(1.20)	2.22(1.32)	2.99(1.24)	5.00*	32.27*	72.20*
Tense	110	2.74(.99)	2.23(1.26)	2.03(1.38)	18.46*	4.91	22.22*
Relieved	105	.35(.87)	1.54(1.38)	1.56(1.48)	41.29*	.12	41.29*
Indifferent	107	.64(.92)	.84(1.13)	.57(.94)	3.13	9.85*	3.33
Frustrated	110	2.23(1.29)	2.16(1.44)	2.64(1.33)	.80	10.88*	6.21*
Embarrassed	106	1.15(1.45)	1.87(1.39)	2.76(1.37)	32.27*	28.57*	57.32*
Loneliness	108	1.63(1.40)	1.43(1.40)	1.92(1.53)	2.17	22.26*	11.52*

Note. Means are shown with standard deviations in parentheses. BD = before-to-during; DA = during-to-after; BA = before-to-after; HFLA = high-focused, low-automatic hairpulling.

*$p \leq .0167$

Table 11.

HPS Descriptive Statistics with Friedman Tests for Low-Focused, High-Automatic Hairpulling (LFHA)

		LFHA					
		Before	During	After	*z*		
Emotion	*n*	*M(SD)*	*M(SD)*	*M(SD)*	BD	DA	BA
Bored	112	1.98(1.24)	1.36(1.24)	1.28(1.23)	35.53*	.09	43.66*
Happy	108	.66(1.00)	.81(1.04)	.41(.79)	2.50	21.43*	8.26*
Sad	110	1.36(1.07)	1.43(1.19)	2.36(1.21)	.02	51.57*	5.45*
Angry	106	1.00(1.13)	1.26(1.25)	1.81(1.43)	2.08	25.83*	22.44*
Calm	109	.90(1.15)	1.71(1.27)	.97(1.03)	26.68*	32.27*	.30
Anxious	112	2.65(1.21)	2.11(1.22)	2.35(1.22)	25.92*	4.41	3.81
Guilty	109	.90(1.21)	1.91(1.43)	2.85(1.35)	33.99*	54.07*	65.64*
Tense	110	2.39(1.24)	1.99(1.27)	1.84(1.31)	14.25*	3.77	14.63*
Relieved	109	.24(.62)	1.24(1.33)	1.19(1.24)	42.64*	.26	42.25*
Indifferent	108	1.18(1.30)	1.22(1.33)	.78(1.17)	.13	18.69*	17.82*
Frustrated	109	1.98(1.36)	1.77(1.29)	2.56(1.27)	.27	16.29*	13.47*
Embarrassed	110	.93(1.22)	1.67(1.40)	2.54(1.45)	32.44*	42.64*	59.28*
Loneliness	111	1.31(1.45)	1.23(1.41)	1.58(1.47)	.29	21.55*	7.41*

Note. Means are shown with standard deviations in parentheses. BD = before-to-during; DA = during-to-after; BA = before-to-after; LFHA = low-focused, high-automatic hairpulling.

*$p \leq .0167$

Table 12.

HPS Descriptive Statistics with Friedman Tests for Low-Focused, Low-Automatic Hairpulling (LFLA)

		LFLA					
		Before	During	After	*z*		
Emotion	*n*	*M(SD)*	*M(SD)*	*M(SD)*	BD	DA	BA
Bored	89	1.73(1.16)	1.10(1.06)	.92(.97)	33.33*	1.58	4.10*
Happy	86	.62(.87)	.87(1.13)	.51(.79)	2.94	9.14*	.44
Sad	92	1.17(1.10)	1.32(1.18)	1.99(1.33)	.82	32.36*	22.73*
Angry	92	.93(1.12)	.92(1.07)	1.51(1.39)	.03	26.95*	17.82*
Calm	91	.81(1.05)	1.31(1.29)	1.00(1.14)	13.56*	5.12	2.19
Anxious	95	2.41(1.18)	2.07(1.32)	2.18(1.26)	9.38*	.21	6.10*
Guilty	91	.82(1.13)	1.85(1.41)	2.53(1.42)	38.21*	33.33*	67.25*
Tense	94	2.18(1.21)	2.02(1.31)	1.98(1.35)	2.88	.00	3.00
Relieved	87	.18(.76)	1.09(1.17)	1.05(1.13)	41.09*	.09	37.10*
Indifferent	88	.86(1.01)	.66(.81)	.55(.80)	2.67	2.25	9.78*
Frustrated	91	1.67(1.27)	1.77(1.29)	2.35(1.35)	.03	22.22*	18.00*
Embarrassed	88	.57(.89)	1.42(1.35)	2.27(1.46)	31.84*	34.31*	61.06*
Loneliness	92	1.07(1.23)	.95(1.19)	1.21(1.53)	2.33	12.57*	2.29

Note. Means are shown with standard deviations in parentheses. BD = before-to-during; DA = during-to-after; BA = before-to-after; LFLA = low-focused, low-automatic hairpulling.
*$p \leq .0167$

Analyses of emotional cycles between groups. Kruskal-Wallis tests were conducted for each of the 13 emotions of the HPS. The results indicated significant differences between the four hairpulling profiles across 11 emotional states with the exception of Bored (Before, During, After) and Happy (Before, During, After). The output statistics and significance levels of the Kruskal-Wallis tests are provided in Table 13. Follow-up Mann-Whitney *U* 2-tailed tests were conducted, where significant

differences were detected in the other 11 emotional states. Significance scores of the Mann-Whitney tests are provided in Table 14.

Table 13.

Kruskal-Wallis Nonparametric Comparisons Across Hairpulling Profiles

	Before			During			After		
Emotion	*n*	*H*	α	*n*	*H*	α	*n*	*H*	α
Bored	426	5.543	.136	414	3.155	.368	415	4.490	.213
Happy	409	4.739	.192	415	5.244	.155	408	2.114	.549
Sad	420	47.521*	.000	419	15.485*	.001	425	28.539*	.000
Angry	417	31.776*	.000	413	11.712*	.008	417	17.260*	.001
Calm	411	6.498	.090	416	12.056*	.007	412	.304	.959
Anxious	426	48.762*	.000	425	15.790*	.001	425	11.310*	.010
Guilty	410	18.002*	.000	419	9.621	.022	423	25.678*	.000
Tense	425	41.090	.000	422	8.774	.032	424	3.808	.283
Relieved	404	2.964	.397	415	18.117*	.000	417	7.345	.062
Indifferent	410	9.188	.027	411	1.804*	.013	405	1.410	.703
Frustrated	418	33.027*	.000	419	8.740	.033	422	2.538*	.000
Embarrassed	409	31.550*	.000	419	12.409*	.006	424	23.750*	.000
Loneliness	420	35.611*	.000	419	27.775*	.000	417	4.784*	.000

Note. df= 3.
*$p \leq .0167$

Significant differences were detected in Sad scores across hairpulling groups. Tests showed the HFHA profile had significantly higher scores than LFHA ($U = 3{,}742.5$, $p < .001$), and LFLA ($U = 2{,}689.5$, $p < .001$) on Sad-Before. HFHA had significantly higher scores than LFLA ($U = 3{,}677.5$, $p = .002$) on Sad-During. Finally, HFHA profiles reported significantly higher scores on Sad-After than HFLA ($U = 4{,}916.5$, $p = .23$), LFHA ($U = 4{,}36.0$, $p < .001$), and LFLA ($U = 3{,}105.5$, $p < .001$). Tests showed HFLA had higher scores than LFHA on Sad-Before ($U = 4{,}347.0$, $p < .001$), and Sad-During

(U = 4,984.5, p = .015). HFLA also recorded higher scores than LFLA on Sad-Before (U = 3,149.0, p < .001), Sad-During (U = 3,868.0, p = .003), and Sad-After (U = 3,947.0, p = .001). No significant differences for Sad were found between LFHA and LFLA.

Both HFHA (U = 3,857.0, p < .001; U = 3,24.0, p < .001) and HFLA (U = 4,356.0, p = .001; U = 3,697.0, p < .001) reported higher Anger-Before scores than LFHA and LFLA, respectively. Significant Anger-During differences were reported between HFHA (U = 3,687.5, p = .002), HFLA (U = 4,045.0, p = .010), and LFLA. Significantly higher Anger-After scores were reported for HFHA than for LFLA (U = 3,452.5, p < .001). Tests indicated that HFHA and HFLA have higher Anger-Before and Anger-During scores than LFHA and LFLA, with HFHA also reporting higher scores in Anger-After than LFLA.

Regarding scores on Anxious, HFHA (U = 3,937.0, p < .001; U = 2,702.5, p < .001) and HFLA (U = 4,732.5, p = .001; U = 3,300.5, p < .001) reported higher Anxious-Before scores than LFHA and LFLA scores respectively. HFLA reported higher Anxious-During scores than LFHA (U = 4,725, p = .001), and LFLA (U = 4,043.5, p = .003). Significantly higher Anxious-After scores were reported between HFHA and the LFLA (U = 3,812.5, p = .002).

HFHA showed significantly higher Guilty scores than any of the other profiles in before and after time intervals. HFHA reported higher Guilty-Before scores than HFLA (U = 4,335.0, p = .007), LFHA (U = 4,279.5, p = .001), and LFLA (U = 3,812.5, p = .002). HFHA also reported higher Guilty-After scores than HFLA (U = 4,579.5, p = .002), LFHA U = 4,65.5, p = .001), and LFLA (U = 3,198.5, p < .001).

Only Tense-Before recorded significant differences across hairpulling profiles. HFHA showed higher before pulling scores for Tense than HFLA ($U = 4{,}457.5$, $p = .001$), LFHA ($U = 3{,}881.5$, $p < .001$), and LFLA ($U = 2{,}741.0$, $p < .001$). HFLA also showed significantly higher Tense scores before pulling than the LFLA profile ($U = 3{,}903.0$, $p < .001$).

HFHA profiles experienced significantly higher increases in scores for Relieved during pulling. These increases were seen between HFHA and LFHA ($U = 4{,}374.0$, $p = .002$), and LFLA ($U = 3{,}206.5$, $p < .001$). Tests indicated that HFHA experience greater increases in Relieved than either LFHA and LFLA.

Only one significant difference was reported across the hairpulling cycles around feeling Indifferent. The LFHA profile reported higher scores on Indifferent-Before than the HFLA profile ($U = 7{,}273.0$, $p = .003$).

Group differences were reported with respect to scores on the variable Frustrated. Tests indicate that the HFHA profile had higher Frustrated-Before scores than HFLA ($U = 4{,}545.0$, $p = .006$), LFHA ($U = 4{,}027.0$, $p < .001$), and LFLA ($U = 2{,}718.5$, $p < .001$) profiles. The HFLA profile also showed higher Frustrated-Before scores when compared to the LFLA profile ($U = 3{,}816.0$, $p = .002$). Tests indicated that HFHA reported significantly higher levels for Frustrated during pulling than the LFLA profile ($U = 3{,}67.0$, $p = .003$). Lastly, levels for Frustrated following pulling were significantly higher for HFHA than for HFLA ($U = 4{,}634.0$, $p = .004$), LFHA ($U = 4{,}351.0$, $p = .001$), and LFLA ($U = 3{,}336.5$, $p < .001$).

For scores on Embarrassed, only the HFHA profile experienced a difference across profiles. HFHA scores were significantly higher than HFLA on Embarrassed-

Before (U = 4,359.0, p = .006), and Embarrassed-After (U = 4,762.5, p = .005). The same trend was seen between HFHA and LFHA, with Embarrassed scores being significantly higher for HFHA before (U = 4,092.0, p < .001), and after pulling (U = 4,338.0, p < .001). Tests also indicated significantly higher Embarrassed scores for HFHA compared to LFLA before (U = 2,587.0, p < .001), during (U = 3,648.5, p = .001), and after pulling (U = 3,260.0, p < .001).

The final emotion assessed by the HPS was Loneliness. The HFHA reported significantly higher scores for before pulling than HFLA (U = 4,497.0, p = .004), LFHA (U = 3,957.0, p < .001), and LFLA (U = 2,788.0, p < .001). HFLA also showed higher Loneliness-Before scores than the LFLA group (U = 3,859.0, p = .003). HFHA showed higher Loneliness scores during pulling than either LFHA (U = 4,208.5, p < .001), or LFLA (U = 2,913.0, p < .001). For Loneliness-After scores, the HFHA profile showed significant scores compared to HFLA (U = 4,447.0, p = .004), LFHA (U = 3,785.5, p < .001), and LFLA (U = 2,478.0, p < .001). The LFHA profile also showed higher Loneliness-After scores than the LFLA profile (U = 3,666.5, p = .001)

Table 14.

Mann-Whitney U-Test Nonparametric Post-Hoc Test Significance Scores Across Hairpulling Profiles

	Hairpulling profile								
	HFLA			LFHA			LFLA		
Emotion	Before	During	After	Before	During	After	Before	During	After
Bored									
HFHA	-1.72	-.68	-1.04	-1.16	.97	.72	-2.26	-.27	-1.10
HFLA	-	-	-	.50	1.69	1.71	-.66	.43	-.06
LFHA	-	-	-	-	-	-	-1.07	-1.27	-1.77
Happy									
HFHA	-1.77	-1.85	-.70	-.31	-2.00	-1.29	.16	-1.65	-.15
HFLA	-	-	-	1.55	-.12	-.63	2.01	.10	.54
LFHA	-	-	-	-	-	-	.35	.21	1.17
Sad									
HFHA	-1.01	-.35	-2.28*	-4.84*	-2.58	-3.60*	-5.67*	-3.06*	-4.90*
HFLA	-	-	-	-3.80*	-2.43	-1.44	-4.77*	-2.97*	-3.19*
LFHA	-	-	-	-	-	-	-1.44	-.64	-1.95
Angry									
HFHA	-3.35	-.21	-1.37	-4.28*	-1.32	-2.59	-4.51*	-3.09*	-4.02*
HFLA	-	-	-	-3.34*	-1.11	-1.12	-3.56*	-2.91*	-2.56
LFHA	-	-	-	-	-	-	-.28	-1.80	-1.58
Calm									
HFHA	-1.59	-2.62	-.37	.81	-.23	-.44	.44	-2.34	-.48
HFLA	-	-	-	2.37	2.59	-.08	1.98	.04	-.15
LFHA	-	-	-	-	-	-	-.37	-2.22	-.09
Anxious									
HFHA	-1.58	.52	-2.29	-4.74*	-2.53	-2.46	-6.03*	-2.43	-3.15*
HFLA	-	-	-	-3.35*	-3.18*	-.01	-4.83*	-2.96*	-.89
LFHA	-	-	-	-	-	-	-1.72	-.16	-.96
Guilty									
HFHA	-2.68*	-.66	-3.05*	-3.34*	-2.35	-3.20*	-3.74*	-2.50	-4.94*
HFLA	-	-	-	-.94	-1.81	-.26	-1.37	-1.93	-2.38
LFHA	-	-	-	-	-	-	-.44	-.26	-2.01

	Hairpulling profile								
	HFLA			LFHA			LFLA		
Emotion	Before	During	After	Before	During	After	Before	During	After
Tense									
HFHA	-3.35*	-.60	-.89	-4.69*	-2.55	-1.95	-5.85*	-2.14	-1.13
HFLA	-	-	-	-1.81	-1.90	-1.00	-3.31*	-1.54	-.27
LFHA	-	-	-	-	-	-	-1.43	.22	.74
Relieved									
HFHA	-.79	-1.45	.47	-1.24	-3.15*	-1.55	-1.61	-3.90*	-1.91
HFLA	-	-	-	-.43	-1.76	-1.93	-.85	-2.45	-2.15
LFHA	-	-	-	-	-	-	-.45	-.64	-.35
Indifferent									
HFHA	-1.35	-1.97	-.82	1.57	.37	.24	.31	-2.48	-.54
HFLA	-	-	-	2.97*	2.14	1.04	1.72	-.47	.27
LFHA	-	-	-	-	-	-	-1.31	-2.62	-.77
Frustrated									
HFHA	-2.78*	-.67	-2.86*	-4.02*	-1.17	-3.48*	-5.41*	-2.98*	-4.22*
HFLA	-	-	-	-1.41	-.39	-.49	-3.08*	-2.00	-1.56
LFHA	-	-	-	-	-	-	-1.64	-1.85	-1.22
Embarrassed									
HFHA	-2.73*	-1.71	-2.83*	-3.86*	-2.53	-3.68*	-5.49*	-3.23*	-4.57*
HFLA	-	-	-	-.82	-.98	-.99	-2.54	-1.88	-2.13
LFHA	-	-	-	-	-	-	-1.93	-.95	-1.14
Loneliness									
HFHA	-2.87*	-2.57	-2.89*	-4.46*	-3.73*	-4.56*	-5.50*	-5.04*	-6.04*
HFLA	-	-	-	-1.89	-1.25	-1.71	-2.93*	-2.60	-3.38*
LFHA	-	-	-	-	-	-	-.96	-1.32	-1.74

Note. HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.
*$p \leq .0083$

Research Question 3 (RQ3). What is the relationship between hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS),

and the emotional cycles that operate across each hairpulling profile, assessed by the Hair Pulling Survey (HPS)?

Analysis strategy. Kendall tau (τ) correlations were conducted to examine the strength of the relationship between MGH-HPS Total and the emotional cycles that operate across each of the four hairpulling profiles. All correlations are 2-tailed, with a significance level set at $p \leq .05$. Table 15 presents the correlation and significance results comparing MGH-HPS Total with the HPS across each of the hairpulling profiles.

Results. Significant positive correlations were obtained for HFHA (M = 1.13, SD= 1.09; τ= .158, p = .038) and HFLA (M = 1.00, SD = 1.10; τ= .153, p = .045) on Bored-After scores. This indicates that higher Bored scores following pulling were significantly associated with higher reported MGH-HPS severity scores for these two profiles.

A positive correlation for Happy was reported by HFLA (M =.82, SD = 1.04) during pulling, τ = .164, p = .03. This indicates that higher scores for Happy during pulling are positively associated with more severe hairpulling scores on the MGH-HPS.

Positive correlations for Sad-Before for HFHA (M = 2.15, SD = 1.19; τ = .242, p = .001) and HFLA (M = 1.99, SD = 1.23; τ = .209, p = .004) indicated that for these profiles, higher Sad scores prior to pulling are significantly associated with higher hairpulling severity scores. Significant correlations were reported during pulling for HFHA (M = 1.85, SD = 1.28; τ = .181, p = .014) and LFLA (M = 1.32, SD = 1.18; τ = .181, p = .014). Lastly, significant correlations between Sad scores after pulling and MGH-HPS severity for HFHA (M = 2.89, SD = 1.28; τ = .180, p = .016), HFLA (M = 2.56, SD = 1.22; τ = .256, p < .001), and LFLA (M = 1.99, SD = 1.33; τ = .219, p =

.005) hairpulling profiles was reported. Test results indicate that those with higher Sad scores following pulling report higher hairpulling severity scores.

Higher Anger scores before (M = 1.58, SD = 1.32; τ = .150, p = .042) and after (M = 2.08, SD = 1.53; τ = .145, p = .049) pulling were significantly correlated with higher severity scores for HFLA individuals. Additionally, LFHA (M = 1.81, SD = 1.43) individuals show a positive correlation with Anger-After scores, τ = .190, p = .009, indicating that higher Anger after pulling for HFLA and LFHA individuals is associated with more severe hairpulling scores.

For LFLA individuals (M = .81, SD = 1.05), calm scores before pulling were negatively correlated with hairpulling severity, τ = -.240, p = .004. This test indicates that higher levels of Calm prior to pulling are associated with lower severity scores for LFLA individuals.

Kendall tau-b correlations show that Anxious-Before scores for HFLA (M = 3.15, SD = .99; τ = .183, p = .016), and LFLA (M = 2.41, SD = 1.18; τ = .205, p = .009) were significantly associated with higher scores on the MGH-HPS. LFLA scores for Anxious-During (M = 2.07, SD = 1.32; τ = .218, p = .005), and Anxious-After (M = 2.18, SD = 1.26; τ = .216, p = .006), were also significantly correlated with scores on the MGH-HPS. The HFHA profile also showed an association with scores on Anxious-After (M = 2.74, SD = 1.26; τ = .146, p = .05).

A significant positive correlation between hairpulling severity and Tense scores before pulling was reported for HFLA (M = 2.74, SD = .99; τ = .152, p = .04). Both LFHA (M = 1.99, SD = 1.27; τ = .144, p = .048), and LFLA (M = 2.02, SD = 1.31; τ = .188, p = .017) profiles reported significant positive correlations with Tense scores

during pulling and hairpulling severity. Lastly, both HFHA (M = 2.21, SD = 1.34; τ = .180, p = .015), and LFHA (M = 1.84, SD = 1.31; τ = .165, p = .022) profiles indicated a significant positive correlation for Tense scores after pulling and hairpulling severity.

Scores for Frustrated during pulling were positively correlated with hairpulling severity during pulling for HFLA (M = 2.16, SD = 1.44; τ = .147, p = .042), LFHA (M = 1.77, SD = 1.29; τ = .154, p = .033), and LFLA (M = 1.77, SD = 1.29; τ = .202, p = .011) profiles. In addition, HFLA (M = 2.16, SD = 1.44; τ = .197, p = .007) and LFLA (M = 2.35, SD = 1.46; τ = .266, p = .001) profiles reported significant positive correlations after pulling for Frustrated scores, indicating that higher Frustrated scores were associated with higher reported severity scores.

Individuals with a HFHA hairpulling profile had Embarrassed scores that were positively correlated with hairpulling severity before (M = 1.65, SD = 1.43; τ = .212, p = .004), during (M = 2.31, SD = 1.30; τ = .164, p = .026), and after pulling (M = 3.36, SD = 1.09; τ = .183, p = .017). Higher Embarrassed-During scores for HFLA (M = 1.87, SD = 1.39; τ = .169, p = .02), and LFHA (M = 1.67, SD = 1.40; τ = .157, p = .03) were also associated with higher MGH-HPS severity scores, as were scores after pulling for HFLA (M = 2.76, SD = 1.37; τ = .146, p = .046) and LFLA (M = 2.27, SD = 1.46; τ = .193, p = .014) following hairpulling.

The final emotion assessed by the HPS was Loneliness. Tests indicated that Loneliness-Before scores for both HFHA (M = 2.20, SD = 1.44; τ = .164, p = .025), and HFLA (M = 1.63, SD = 1.40; τ = .177, p = .016) were associated with higher hairpulling severity scores. In addition, both HFHA (M = 2.55, SD = 1.47; τ = .193, p = .01), and

LFHA (M = 1.58, SD = 1.47; τ = .189, p = .009) Loneliness scores after pulling were associated with a higher MGH-HPS score.

Table 15.

Kendall's tau-b Correlations for Hairpulling Severity and HPS

	Before			During			After		
Emotion	*n*	τ	α	*n*	τ	α	*n*	τ	α
Bored									
HFHA	107	.128	.083	104	.102	.179	105	.158*	.038
HFLA	111	.055	.451	107	.104	.168	107	.153*	.045
LFHA	113	.063	.382	113	.135	.062	112	.067	.354
LFLA	95	.029	.717	90	.057	.491	91	0	.997
Happy									
HFHA	104	-.123	.114	104	.005	.946	103	-.079	.317
HFLA	108	-.004	.96	109	.164*	.030	107	.080	.308
LFHA	109	-.021	.786	111	.042	.572	110	-.002	.976
LFLA	88	-.079	.358	91	-.125	.131	88	-.084	.334
Sad									
HFHA	106	.242*	.001	106	.181*	.014	107	.180*	.016
HFLA	109	.209*	.004	110	.185	.012	111	.256*	.000
LFHA	112	.032	.656	111	.069	.343	112	.118	.102
LFLA	93	.125	.123	92	.236*	.003	95	.219*	.005
Angry									
HFHA	106	.091	.219	106	.078	.293	107	.043	.562
HFLA	108	.150*	.042	108	.096	.195	107	.145*	.049
LFHA	108	.086	.253	107	.133	.075	108	.190*	.009
LFLA	95	.104	.199	92	.086	.294	95	.136	.083
Calm									
HFHA	101	-.13	.101	104	-.009	.901	105	-.062	.413
HFLA	107	.028	.725	109	.056	.448	107	-.032	.671
LFHA	111	.021	.781	111	.012	.87	109	-.055	.463
LFLA	92	-.240*	.004	92	-.12	.135	91	-.127	.122
Anxious									
HFHA	107	.111	.157	107	.105	.155	107	.146*	.05
HFLA	111	.183*	.016	111	.102	.164	111	.13	.073
LFHA	113	.128	.078	112	.125	.081	112	.06	.402
LFLA	95	.205*	.009	95	.218*	.005	95	.216*	.006
Guilty									
HFHA	104	.138	.067	105	.121	.103	107	.034	.664
HFLA	105	.032	.672	109	.045	.538	109	.132	.080

	Before			During			After		
Emotion	*n*	τ	α	*n*	τ	α	*n*	τ	α
LFHA	110	-.114	.128	110	.131	.07	112	.059	.425
LFLA	91	.121	.145	95	.125	.11	95	.120	.129
Tense									
HFHA	107	.070	.359	106	.089	.229	107	.180*	.015
HFLA	111	.152*	.040	112	.069	.336	111	.043	.557
LFHA	112	.112	.121	110	.144*	.048	112	.165*	.022
LFLA	95	.135	.085	94	.188*	.017	94	.171	.029
Relieved									
HFHA	102	-.109	.176	103	.01	.893	105	-.131	.079
HFLA	105	-.097	.226	109	.068	.35	108	-.067	.362
LFHA	110	.043	.591	112	.05	.494	111	-.127	.083
LFLA	87	-.121	.18	91	-.052	.525	93	.037	.646
Indifferent									
HFHA	101	-.066	.403	103	.001	.99	102	.054	.499
HFLA	107	-.017	.828	108	.072	.343	107	.048	.537
LFHA	112	-.002	.977	111	-.015	.841	108	.039	.609
LFLA	90	-.092	.272	89	-.034	.685	88	.003	.973
Frustrated									
HFHA	105	.086	.25	105	.023	.762	106	.122	.109
HFLA	110	.122	.092	111	.147*	.042	111	.197*	.007
LFHA	111	-.04	.579	111	.154*	.033	111	.133	.122
LFLA	92	.102	.198	92	.202*	.011	94	.266*	.001
Embarrassed									
HFHA	104	.212*	.004	106	.164*	.026	107	.183*	.017
HFLA	106	.147	.053	109	.169*	.02	112	.146*	.046
LFHA	111	.073	.327	111	.157*	.03	111	.099	.174
LFLA	88	.143	.098	93	.151	.057	94	.193*	.014
Loneliness									
HFHA	107	.164*	.025	106	.196	.008	105	.193*	.01
HFLA	108	.177*	.016	110	.089	.226	109	.132	.07
LFHA	112	.101	.165	111	.129	.079	111	.189*	.009
LFLA	93	.077	.342	92	.128	.117	92	.147	.068

Note. HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.

*$p \leq .05$, two-tailed.

Research Question 4 (RQ4). How are levels of depression, anxiety, and stress, assessed by the Depression Anxiety Stress Scale-21 (DASS-21), reflected in the emotional cycles of hairpulling, assessed by the Hair Pulling Survey (HPS)?

Analysis strategy. Kruskal-Wallis 1-way ANOVAs were conducted to determine whether differences between hairpulling profiles and scores on DASS-21 and DASS-21 subtests exist. Follow-up Mann-Whitney *U* tests were conducted to determine where differences exist on DASS-21 scores across hairpulling profiles. A Bonferroni correction to protect against Type I errors was set at $p \leq .0083$. Two-tailed Spearman's rank correlations (r_s's) were used to assess the relationships between scores for DASS-21 Anxiety and DASS-21 Depression sub scales with Anxious-Before and Sad-Before scores on the HPS.

Descriptives of the DASS-21. The mean DASS-21 total score (Total) across the four hairpulling profiles was 20.72 (*SD* = 11.70). Across the four profiles, the Total score ranged from a mean of 16.05 (*SD* = 10.48) for the LFLA profile, up to a Total mean score of 26.68 (*SD* = 12.55) for the HFHA respondents. In addition to the Total score, each of the three subscales—Depression, Anxiety, Stress—were measured across groups. A breakdown of descriptive statistics for the DASS-21 is provided in Table 16.

The Depression subscale had a mean score of 7.05 (*SD* = 5.36), with scores ranging from 5.37 (*SD* = 4.70) for the LFLA profile, up to 9.07 (*SD* = 6.01) for the HFHA profile. For the Anxiety subscale, the mean score across groups was 4.39 (*SD* = 3.86), with scores ranging from 3.05 (*SD* = 3.21) for the LFLA, up to 6.16 (*SD* = 4.17) for individual with a HFHA profile. Finally the Stress subscale was measured. The total

Stress average across groups was 9.30 (*SD* = 4.43), with a range going from 7.63 (*SD* = 4.18) for the LFLA profile, up to 11.59 (*SD* = 4.44) for individuals with a HFHA profile.

Table 16.

Descriptive Statistics for Hairpulling Profiles on DASS-21 Total and Anxiety, Depression, and Stress Subscales

	Hairpulling profile				
DASS-21	HFHA	HFLA	LFHA	LFLA	Profile total[a]
Depression	9.07(6.01)	7.27(4.81)	6.33(5.16)	5.37(4.70)	7.05(5.36)
Anxiety	6.16(4.17)	4.59(3.64)	3.63(3.62)	3.05(3.21)	4.39(3.86)
Stress	11.59(4.44)	9.39(4.02)	8.48(4.17)	7.63(4.18)	9.30(4.43)
Total[b]	26.68(12.55)	21.26(10.25)	18.50(10.86)	16.05(10.48)	20.72(11.70)

Note. Means are shown with standard deviations in parentheses. DASS-21= Depression Anxiety Stress Scale-21; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.
[a]Mean and standard deviations for the total sample.
[b]Sum of Anxiety, Depression, and Stress subscales.

DASS-21 across hairpulling profiles. Kruskal-Wallis 1-way ANOVAs were conducted to determine whether differences between hairpulling profiles and scores on DASS-21 total and Depression, Anxiety, and Stress sub scales existed. Results of the ANOVAs revealed significant differences in mean rank between the groups on Depression, $\chi^2(3, N = 424) = 24.880$, $p < .001$; Anxiety, $\chi^2(3, N = 423) = 4.649$, $p < .001$; Stress, $\chi^2(3, N = 424) = 43.045$, $p < .001$; and Total, $\chi^2(3, N = 421) = 44.748$, $p < .001$. Follow-up *U*-tests were conducted. Results of the Mann-Whitney Tests are provided in Table 17.

Table 17.

Mann-Whitney U Tests Between Hairpulling Profiles and DASS-21 Depression, Anxiety, Stress Sub Scales, and Total Score

	Hairpulling profile								
	HFLA			LFHA			LFLA		
DASS-21	*n*	*z*	α	*n*	*z*	α	*n*	*z*	α
Depression									
HFHA	218	-2.054	.04	219	-3.411	.001*	201	-4.488	.000*
HFLA	-	-	-	223	-1.723	.085	205	-3.178	.001*
LFHA	-	-	-	-	-	-	206	-1.232	.218
Anxiety									
HFHA	217	-2.862	.004*	218	-4.837	.000*	200	-5.689	.000*
HFLA	-	-	-	223	-2.313	.021	205	-3.497	.000*
LFHA	-	-	-	-	-	-	206	-.801	.423
Stress									
HFHA	217	-3.490	.000*	218	-4.882	.000*	199	-5.980	.000*
HFLA	-	-	-	225	-1.645	.10	206	-3.224	.001*
LFHA	-	-	-	-	-	-	207	-1.596	.110
Total									
HFHA	216	-3.051	.002*	216	-4.666	.000*	199	-6.098	.000*
HFLA	-	-	-	222	-2.091	.037	205	-3.980	.000*
LFHA	-	-	-	-	-	-	205	-1.583	.113

Note. DASS-21= Depression Anxiety Stress Scale-21; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.
*$p \leq .0083$

Results showed significant different group differences between HFHA and HFLA on subscales for Anxiety (U = 4,564.5, p = .004), Stress (U = 4,271.0, p < .001), and Total (U = 4,427.5, p = .002). Significant differences between HFHA and LFHA were also seen on subscales for Depression (U = 4,396.5, p = .001), Anxiety (U = 3,694.5, p < .001), Stress (U = 3,666.0, p < .004), and Total (U = 3,686.5, p < .001). Group

differences between HFHA and LFLA were found for Depression (U = 3,186.5, p < .001), Anxiety (U = 2,669.5, p < .001), Stress (U = 2,515.5, p < .001), and Total (U = 2,463.0, p < .001).

Follow-up tests also showed significant group difference between HFLA and LFLA on Depression (U = 3,876.0, p = .001), Anxiety (U = 3,748.0, p < .001), Stress (U = 3,895.0, p = .001), and Total (U = 3,533.5, p < .001). These post-hoc tests show that higher levels of focused behaviours are associated with higher DASS-21 scores.

DASS-21 and hairpulling severity. Spearman ranked correlations where applied across hairpulling styles to examine the relation between hairpulling severity (MGH-HPS) and DASS-21 scores within groups. All tests were 2-tailed. Results are presented in Table 18.

Table 18.

Spearman's rho Correlations Across Hairpulling Profiles on DASS-21

	HFHA			HFLA			LFHA			LFLA		
DASS-21	n	r_s	α	n	r_s	α	n	r_s	α	n	r_s	α
Depression	107	.389*	.000	111	.206*	.03	112	.195*	.039	94	.207*	.045
Anxiety	106	.349*	.000	111	.251*	.008	112	.088	.359	94	.221*	.032
Stress	105	.432*	.000	112	.260*	.006	113	.129	.174	94	.180	.083
Total	105	.458*	.000	111	.299*	.001	111	.158	.097	94	.239*	.02

Note. DASS-21 = Depression Anxiety Stress Scale-21; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.
*$p \leq .05$, two-tailed.

A significant positive correlation was obtained for DASS-21 Total and hairpulling severity for HFHA (r_s[105] = .458, p < .001), HFLA (r_s[111] = .299, p < .001), and

LFLA ($r_s[94] = .239$, $p < .001$). These tests indicate that higher scores on the DASS-21 are associated with higher hairpulling severity scores.

Spearman correlations were also applied across each of the three sub scale scores of the DASS-21. Tests indicated that scores for Depression ($r_s[107] = .389$, $p < .001$), Anxiety ($r_s[106] = .349$, $p < .001$), and Stress ($r_s[105] = .432$, $p < .001$) were positively correlated with hairpulling severity for the HFHA hairpulling profile. Significant correlations were also reported in the HFLA profile for Depression ($r_s[111] = .206$, $p = .03$), Anxiety ($r_s[111] = .251$, $p = .008$), and Stress ($r_s[112] = .260$, $p = .006$). LFHA reported a significant correlation on scores for Depression ($r_s[112] = .195$, $p = .039$), and LFLA reported significant correlations with the MGH-HPS on Depression ($r_s[94] = .207$, $p = .045$), and Anxiety ($r_s[94] = .221$, $p = .032$). These tests indicate that a significant association between sub scales on the DASS-21 and higher MGH-HPS hairpulling severity scores.

Depression and anxiety on the HPS. Spearman rank correlations were performed to assess the association between Depression and Anxiety on the DASS-21 with Sad and Anxious scores on the HPS. Tests show a significant association with Depression scores on the DASS-21 and Sad scores on the HPS for HFHA ($r_s[106] = .401$, $p < .001$), HFLA ($r_s[108] = .328$, $p = .001$), LFHA ($r_s[111] = .282$, $p = .003$), and LFLA ($r_s[92] = .314$, $p = .002$). These tests indicate that higher DASS-21 Depression scores were positively associated with scores for Sad on the HPS. Results are presented in Table 19.

Similarly, scores on the DASS-21 Anxiety sub scale showed significant correlations with Anxious scores on the HPS. Three profiles: HFHA ($r_s[106] = .295$, $p =$

.002), HFLA (r_s[110] = .218, p = .022), and LFHA (r_s[112] = .268, p = .004) reported a significant positive correlation, indicating that higher scores on the DASS-21 sub scale for Anxiety were associated with higher Anxious scores of the HPS.

Table 19.

Spearman's rho Correlations Across Hairpulling Profiles for DASS-21 Depression and Anxiety Sub Scales with Sadness and Anxious Measures on the HPS

	DASS-21 Depression		
Sad	*n*	r_s	α
HFHA	106	.401*	.000
HFLA	108	.328*	.001
LFHA	111	.282*	.003
LFLA	92	.314*	.002
	DASS-21 Anxiety		
Anxious	*n*	r_s	α
HFHA	106	.295*	.002
HFLA	110	.218*	.022
LFHA	112	.268*	.004
LFLA	94	.141	.176

Note. DASS-21 = Depression Anxiety Stress Scale-21; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; HPS= Hair Pulling Scale; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling.
*$p \leq .05$, two-tailed.

Summary

The purpose of this chapter has been to present the demographic statistics of the 427 individuals who participated in this study and to systematically analyze the findings for each of the four research questions for this thesis. The final synthesis and implications of this data will be presented in Chapter 6, the discussion chapter of this thesis.

Chapter 6: Discussion

Overview

This chapter begins by reviewing the purpose and research aims. A summary of relevant demographic data is presented, followed by a description and discussion of the results for each of the four research questions, and summarized with general conclusions. Identified strengths, limitations, and future directions for research will also be outlined, including a section regarding the consideration of trauma when treating TTM. A summary will follow to conclude the chapter. Table 20, in which I have outlined the main research findings, is included to summarize research results.

Purposes of the Study

The purpose of this thesis has been to study the affective qualities maintaining hairpulling across profiles. Four goals were developed for this study: (a) to understand differences between hairpulling severity across hairpulling profiles, (b) to understand the role that affect plays across hairpulling profiles, (c) to study the relationship between hairpulling severity and emotions across profiles, and (d) to study the role of depression and anxiety across different subtypes of hairpulling. These four research goals were translated into four research questions, designed to elucidate the intricacies of TTM and to suggest future directions and treatment recommendations to construct more sensitive and effective treatment strategies.

Relevant Demographic Data

Over the 45-day period that the online study was available to respondents, a total of 609 individuals participated in the study. From this respondent base, a total of 427

surveys were retained following multiple levels of data reduction (see Chapter 4), yielding a retention rate of 70.1%.

The final sample consisted of 409 females (95.8%) and 18 (4.2%) males. This skewed response rate towards females is consistent with findings in other online TTM studies, which have ranged from 82% (Larson, 2008) to 97% (Wetterneck et al., 2006) female participation.

The average self-reported age of onset for TTM for this sample was 12.4 years. This finding represents a younger onset than 13.1 years reported by Flessner, Lochner et al. (2010), 13.9 by du Toit et al. (2001), and a far younger mean onset than the 15.0 reported by Christenson et al. (1994). However, this onset still falls within the 10-14 year range commonly found to occur with TTM (Duke, Keeley, Ricketts et al., 2010; Stein et al., 2010).

The pattern of hairpulling sites reported by respondents showed consistency with previous TTM studies. The 76.1% of respondents who reported pulling from any one of the five scalp sites fell within the 72-84% range reported in previous research (Christenson, Mackenzie, & Mitchell, 1991; Lochner et al., 2010); finding the scalp to be the most commonly targeted site for pulling amongst individual with TTM. Eyebrows (51.3%), eyelashes (47.5%), and genitals (47.5%) were identified as the other three most frequently reported hairpulling sites. The order and range of these sites is also consistent with those reported in previous TTM research (Flessner, Lochner et al., 2010; Woods, Flessner, Franklin, Keuthen et al., 2006). The mean number of hairpulling sites (M = 2.87; SD = 1.88) also fell within the range reported by previous studies (Flessner, Woods, Franklin, Keuthen et al., 2008; Toit et al., 2001). The finding that individuals

maintain 2-3 specific hairpulling sites after the age of 18 has endured since the early work of Christenson et al. (1994), through to recent research by Flessner, Woods, Franklin, Keuthen et al. (2008).

Although the DSM-IV-TR requires individuals with TTM to endorse increasing tension before or while resisting pulling (Criteria B), and pleasure, gratification, and relief after pulling (Criteria C), researchers, including this study, have frequently not excluded respondents not endorsing Criteria B/C because no differences in the duration, onset, and severity of their hairpulling has been found between those meeting criteria and those who do not (Lochner et al., 2010; Lochner et al., 2011). In this study, 44 (10.3%) respondents reported never experiencing at least one of these criteria, and only 42 respondents (9.8%) endorsed experiencing these two criteria all the time. Had this study not included these respondents, it would have missed a significant subset of the population and miss understanding how emotional cycles contribute to their pulling.

Participants also reported that TTM creates distress across personal, interpersonal, and occupational domains. Participants reported experiencing moderate amounts of distress in interpersonal, social, and work/academic function. This distress has been shown in previous studies to cause individuals to avoid intimate relationships, group activities, and social or recreational events (Wetterneck et al., 2006); and affect job or academic performance, including missing or avoiding school or work, and advancement (Woods, Flessner, Franklin, Keuthen et al., 2006). What is also concerning is that this population reported experiencing a high degree of distress around their self-image, self-esteem, and how attractive they felt. Individuals who use pulling as a way to cope and

lower negative distress may also be unintentionally exacerbating their symptoms as hairpulling may be both the response to and cause for further distress.

The MIST-A results showed that individuals with TTM are rarely either purely focused or purely automatic in their pulling behaviours, but a blend of the two patterns. In this study, only one individual (.02%) reported being purely focused in their hairpulling symptoms, a finding similar to the .01% incidence rate of pure focused or automatic pulling reported by Flessner, Conelea et al. (2008).

In the next section, each of the four research questions will be discussed. Conclusions will be drawn that will inform directions for future research presented at the end of the chapter.

Research Questions: Results and Conclusions

This section covers the findings and conclusions made for each of the four research questions. Integrative recommendations for future research based on the four research findings are presented in this chapter in a section titled Future Directions and Treatment Implications. An overview the main results and conclusions of this study are provided in Table 20.

Table 20.

Research Summary Table with Conclusions

Question	Main Results	Main Conclusions
RQ1: How does hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), map onto each hairpulling profile created by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?	MGH-HPS Total: Significantly higher for HFHA, HFLA, and LFHA than for LFLA. MGH-HPS Severity: higher scores for HFHA than for HFLA; higher scores for HFHA, HFLA, and LFHA than for LFLA. MGH-HPS Resistance and Control: higher scores for HFLA than for HFHA; higher scores for HFLA, and LFHA than for LFLA.	Results fall within ranges of large online TTM studies, wider variation seen in smaller, in-person and clinical treatment studies. Suggests regression towards mean. No differences between HFLA and LFHA suggest these profiles are both equally severe and distressing. HFHA experience greater intensity and frequency of urges and pulling than HFLA and LFLA.
RQ2: What are the emotional cycles, assessed by the Hair Pulling Survey (HPS), that are active across different hairpulling profiles, assessed on the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?	Sad: Trend to be regulated down BD for HF profiles. Guilty, Embarrassed: linear increasing trend across all profiles. Frustration: linear increase in frustration for HFLA, LFHA, and LFLA. Bored: linear decrease across all profiles. Happy: significant BD increase during pulling across all profiles Anger: regulated down BD for HFHA Calm, Tense, and Anxious: contingent on pulling for LFHA, stable DA for HFHA,	Boredom is a stimulus cue for all profiles, reinforces future behaviour Higher sadness scores for HFHA, HFLA suggest emotional regulatory mechanism. Sadness and Anger post-pulling a product of self-reflection. HFHA use hairpulling to emotionally regulate frustration and anger Embarrassment serves a stimulus cue for HF individuals HF (specifically HFHA)

Question	Main Results	Main Conclusions
	HFLA, and LFLA Sad, Anger, Anxious, Tense, and Frustrated: significantly higher for HF than LFHA, LFLA. Guilty, Relieved, Embarrassed, Loneliness: Significantly higher for HFHA than HFLA, LFHA, and LFLA. LFHA and LFLA: no significant differences.	have more severe hairpulling cycles, emotional regulation plays a greater role in for HF profiles All profiles experience emotional cycles, HF pull to regulate larger pre-and-post increases in negative emotions
RQ3: What is the relationship between hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), and the emotional cycles that operate across each hairpulling profile, assessed by the Hair Pulling Survey (HPS)?	Bored: for HFHA, HFLA lowering by pulling is positively associated with severity Sad: positively associated with severity for HFHA, HFLA Loneliness, Embarrassment, Tense, Anxious, and Anger: before pulling, associated with higher severity for HF pulling Sad, Anxious, Tense, Frustrated, and Embarrassed: associated with severity for LFHA, LFLA during pulling Frustrated, Embarrassed, Loneliness: common across profiles HF have more before and after pulling HPS scores that are correlated with severity on the HPS	Boredom being an effective regulator, increases severity by reinforcing behaviour. Comorbidity with depressive symptoms exacerbating severity for HF profiles Difference in intent. Severity during pulling for LFHA and LFLA pullers a distressing byproduct and not intentionally induced emotion states Hairpulling, regardless of driving mechanism, leaves individuals feeling embarrassed, frustrated, and lonely, exacerbating its severity HF have more significant HPS scores on severity, suggesting emotions play a larger role in severity for HFHA and HFLA

Question	Main Results	Main Conclusions
RQ4: How are levels of depression, anxiety, and stress, assessed by the Depression Anxiety Stress Scale-21 (DASS-21), reflected in the emotional cycles of hairpulling, assessed by the Hair Pulling Survey (HPS)?	DASS-21 scores rank within the 83rd to 95th percentile of scores HFHA and HFLA: Depression and Anxiety reach moderate severity, Stress moderate for HFHA. LFHA and LFLA: scores range from normal to mild HFHA and HFLA: Depression, Anxiety, and Stress correlated with Severity. Sad and Anxious (HPS) correlated with Depression and Anxiety for all profiles	Individuals with TTM experience elevated depression, anxiety and stress score over normal population HF profiles show greater concern around depression, anxiety, and stress Hairpulling severity linked with level of stress, depression, and anxiety for HF profiles Important to assess and integrate depression and anxiety treatment in treating HF profiles

Note. BD = before-to-during; DA = during-to-after; DASS-21= Depression Anxiety and Stress Scale-21; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LFHA = low-focused, high-automatic hairpulling; LFLA = low-focused, low-automatic hairpulling; HF= high-focused hairpulling (includes HFHA and HFLA); HPS= Hair Pulling Survey; MGH-HPS= Massachusetts General Hospital Hairpulling Scale; MIST-A = Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version, TTM = trichotillomania.

Research Question 1 (RQ1). How does hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), map onto each hairpulling profile created by using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?

Findings. Participants were first divided into four hairpulling profiles based on their scores on the Focused and Automatic subscales on the MIST-A (see Chapter 4). Mapping MGH-HPS onto each hairpulling profile identified that for total scores on the MGH-HPS, three profiles: HFHA, HFLA, and LFHA had significantly higher hairpulling

scores than LFLA. Like the research of Flessner, Conelea et al. (2008), these results demonstrated a significant effect on hairpulling severity from having either high-focused (HF) or high-automatic (HA) hairpulling behaviours, but with no statistically significant effect of having both HF and HA (i.e., HFHA) behaviours. In addition, the lack of statistical significance between HFLA and LFHA (U = 6,358.0, p = .951) replicated earlier results that found both HF and HA hairpulling behaviours produced equivalent hairpulling severity that are both appropriately captured by the MGH-HPS (Flessner, Conelea et al., 2008).

Tests were also performed on the two factors on the MGH-HPS—Severity, and Resistance and Control—to determine how hairpulling intensity and resistance are expressed as severity across the four profiles. When broken into its component factors, the Severity factor of the MGH-HPS showed that HFHA individuals experienced higher severity hairpulling than HFLA or LFLA, characterized by more intense hairpulling urges, greater frequency to pull, frequency of urges, and overall distress. In addition, HFLA and LFHA both reported experiencing higher Severity than the LFLA group.

Resistance and Control, which includes control over hairpulling, resistance to hairpulling, and control over urges, also showed significant differences across hairpulling profiles. HFLA reported significantly higher Resistance and Control scores than HFHA in addition to LFLA, and LFHA also reported higher scores than LFLA.

Comparison to previous research. The mean MGH-HPS score for this study (M = 16.66, SD = 4.81) resembled scores published from other online TTM studies, which have ranged from 15.6 (Begotka et al., 2004) to 17.25 (SD = 5.07) (Keuthen et al., 2007). In-person clinical and treatment studies tended to collect samples with a wider

variation in mean MGH-HPS scores, ranging from 14.8 (*SD* = 4.37) (Lochner et al., 2011) to 19.0 (*SD* = 2.38) (Twohig & Woods, 2004).

Conclusions. The findings indicate that differences in hairpulling severity are found across hairpulling profiles, and that those who had more hairpulling behaviours—either focused or automatic—had more severe hairpulling than those reporting fewer focused or automatic behaviours. What the results also demonstrated is that individuals with HF or HA hairpulling behaviours both reported equal levels of severity, highlighting that despite presenting with distinct hairpulling behaviours, these two styles are equally severe and distressing. In other words, individuals who have more intentional or unconscious hairpulling behaviours tended to have higher hairpulling severity than individual who have less of either of these behaviours, and that more intentional hairpulling behaviours were represented by more frequent and intense hairpulling and urges.

Research Question 2 (RQ2). What are the emotional cycles, assessed by the Hair Pulling Survey (HPS), that are active across different hairpulling profiles, assessed on the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A)?

Preamble. The findings have been broken into two subsections: negative and positive affect. Negative affect covers the emotive states of boredom, sadness, angry, anxiety, guilt, tension, indifference, frustration, embarrassment, and loneliness. Positive affect addresses the cycles for happiness, calm, and relief. For each emotion, possible mechanisms that promote the cycles across profiles are offered.

Findings: Negative affect. What this study found is the boredom cycles were utilized by all four hairpulling profiles to produce a significant linear decrease from pre-

to post-pulling, with no significant differences in the magnitude of the drop across profiles, a finding consistent with previous research (Diefenbach et al., 2002; Duke et al., 2009; Duke, Keeley, Ricketts et al., 2010). What this suggests is that boredom serves as a stimulus cue for all profiles and that because pulling is an effective downward regulator of boredom, pulling becomes reinforced across time (Diefenbach et al., 2002). Under arousal has been speculated to serve as a stimulus cue that initiates hairpulling in individuals with more automatic pulling, but little is known if this same stimulus regulation cue also operates in more focused individuals (Penzel, 2003; Shusterman et al., 2009).

HF profiles (i.e., HFHA, HFLA) reported feeling more sad before beginning to pull than either the LFHA and LFLA profiles. Although not significant, there was a trend for HF profiles to show decreasing sadness scores during the pulling cycle, while the LFHA and LFLA profiles reported progressive increases in sadness across the pulling cycle. This suggests hairpulling may serve a regulatory function for HF profiles, but not for LF profiles. One hypothesis for this is that focused hairpulling is done as a response to lower negative arousal states, but automatic pulling is done to stimulate during low arousal (Shusterman et al., 2009). However, once pulling stops, all four profiles reported feeling significantly sadder than before they began pulling, with HFHA reporting the most severe scores, followed sequentially by HFLA, LFHA, and LFLA profiles. These findings contrast with the work of Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010), who found that individuals reported sadness less frequently after having engaged in hairpulling. Perhaps hairpulling is performed to regulate the higher levels of sadness that are pronounced in HFHA and HFLA profiles (Shusterman et al., 2009;

Stanley et al., 1995). Diefenbach et al. (2008) explained that the increased experience of sadness post pulling found across all four profiles might be a product of self-reflection on the negative consequences of having engaged in the behaviour.

All four hairpulling groups reported feeling angrier after pulling, but there were differences in the magnitude of this increase. Both HFHA and HFLA—the profiles with the most intentional hairpulling behaviours—had significantly higher anger scores prior to pulling than either the LFHA and LFLA profiles. These increases in anger post-pulling have been found to occur once the individual has had a chance to process and reflect on the implications of their behaviour (Diefenbach et al., 2002). What is also unique about the HFHA profile is that anger is significantly lowered during hairpulling, suggesting that for this profile, pulling serves to regulate down feelings of anger. What distinguishes these findings is that unlike the work of Duke et al. (2009) and Duke, Keeley, and Ricketts et al. (2010), this study found that after pulling, the feeling of anger increased for participants.

By engaging in hairpulling, all four profiles experienced significant decreases in anxiety and tension, with HFHA and HFLA reporting the highest pre-pulling levels of both emotions of the four profiles, a finding similar to the work of Duke, Keeley, and Ricketts et al. (2010) and Diefenbach et al. (2002). This means that hairpulling is used by all four groups to lower the increased negative arousal states of tension and anxiety and that this regulation is pronounced in individuals who pull intentionally to reduce these states of stress.

No differences between LFHA and LFLA were identified across the cycle of anxiety. For LFHA individuals, lower anxiety and tension remains contingent on

continuing to pull, with these emotional states rebounding back to pre-pulling levels once the behaviour stops. One explanation is that because individuals with focused hairpulling are more goal-focused toward alleviating tension and anxiety by pulling, their decreases can be more stable following the cessation of pulling. The other three profiles, HFHA, HFLA, and LFLA, did not follow this trend. Their levels of anxiety drop significantly once they stop pulling, suggesting that for these profiles, hairpulling is an effective downward regulator of anxiety. Tension showed a different trend with the HFHA, HFLA, and LFHA profiles, showing a stable post-pulling decrease once the behaviour had stopped.

All four profiles reported experiencing feelings of guilt associated with pulling that continued to increase across the entire hairpulling cycle, a finding consistent with the early work of Diefenbach et al. (2002). The HFHA profile reported experiencing higher pre- and post-pulling feelings of guilt than any of the other three profiles. Because HFHA individuals have the most intentional and unconscious hairpulling behaviours, higher levels of guilt can be attributed to the powerlessness of needing to pull, as well as the inability to stop, resist, or predict when hairpulling will occur next.

In the two previous studies that have looked at frustration across the hairpulling cycle, a decreasing linear trend in frustration scores pre- to post-pulling had been identified (Duke et al., 2009; Duke, Keeley, Ricketts et al., 2010). The opposite trend has been identified in this study, which showed that frustration increases from pre- to post-pulling, and it became significantly higher as the individual continues to pull. Although levels of frustration are higher post-pulling, HFHA individuals also used hairpulling as a way to emotionally regulate frustration down—a pattern not identified in previous

research. The levels of frustration experienced by HFLA and LFHA hairpulling did not differ in this study, a finding that contrasted the self-reports collected by Duke, Keeley, and Ricketts et al. (2010) favouring focused pulling as more frequently associated with feeling of frustration.

Duke et al. (2009) had previously reported is that feeling embarrassed decreased in frequency across the pulling cycle, while updated findings by Duke, Keeley, and Ricketts et al. (2010) reported that this was only true for automatic hairpulling and that focused hairpulling is characterized by increases in embarrassment. This study found that experiencing embarrassment was endorsed by both hairpulling styles. More specifically, HFHA experienced higher levels of embarrassment before and after pulling than any of the other three hairpulling styles, and both HF styles experienced more embarrassment surrounding their condition than the LF profiles. One explanation proposed by Christenson, Ristvedt, and Mackenzie (1993) is that when someone feels embarrassed, that may serve as a cue to begin hairpulling, and this cue is more prominent for HF hairpulling because of that subtype's tendency for pulling to serve a more prominent role in emotional regulation. Following pulling, embarrassment may shift from an external event (i.e., something happened that caused the individual to feel embarrassed) to an internal experience as one has to face the effects of their pulling (Neal-Barnett, Ward-Brown, Mitchell, & Krownapple, 2000).

Profiles with at least one HF or HA characteristic (i.e., HFHA, HFLA, LFHA) identified that they feel more lonely after pulling than they do both before and during the behaviour. HF hairpulling was also characterized by greater loneliness both before and

after pulling than LFLA individuals, and HFHA individuals reported the most severe experiences of loneliness of the three profiles.

The experiences of those with the most focused and automatic behaviours having the highest scores for both loneliness and embarrassment may relate to the social consequences that often accompany hairpulling (Wetterneck et al., 2006). The individuals with the most pulling behaviours experienced the most severe embarrassment, a factor that causes individuals to socially isolate themselves from social and intimate relationships (Townsley-Stemberger et al., 2000; Wetterneck et al., 2006).

Overall, there are a host of negative affective responses that are associated with hairpulling. These negative emotions may arise from either internal or external sources, though the end result of hairpulling to lower these negative emotions remains the same. TTM is also a behaviour that is intensified by the need to regulate these distressing emotions, because this maladaptive behaviour often exacerbates the initial symptoms it was trying to mitigate.

Findings: Positive affect. It is also relevant to understand how positive emotions are influenced by the experience of hairpulling. What has not been reported previously in any study is that engaging in hairpulling significantly elevates how happy a person feels. While individuals across all four profiles reported feeling happier during pulling than they feel either before or after pulling, this state is contingent on the individual continuing to pull. Once an individual stopped pulling, feelings of happiness actually dropped below pre-pulling levels, significantly lower for the LFHA profile.

All four hairpulling profiles report feeling more calm and relieved once they had engaged in the hairpulling behaviour, indicating that while hairpulling regulates down

emotions like boredom, anxiety, and tension, it also increases the experiences of very pleasurable emotions (Mansueto et al., 1997). While all four profiles report feeling more calm once they began to pull, LFHA and LFLA profiles return to pre-pulling calm levels as soon as they stop the behaviours, while the HFHA and HFLA profiles maintained an elevated feeling of calm even after pulling. The role in calming oneself by pulling has not been documented before, with this study finding an important role this emotion serves in the hairpulling cycle.

All four profiles report feeling relieved after they had stopped the behaviour. This shows that the relief obtained through pulling is a more stable and enduring state than the sense of calm, which presents as a more short-lived emotional state for LF pullers.

For the LFHA and LFLA profiles, maintaining an elevated sense of calm is strictly contingent on pulling, which may help to explain how individuals with these profiles often slip into a "trance-like" state by pulling (Flessner, Woods, Franklin, Cashin et al., 2008). For the HF profiles (i.e., HFHA, HFLA), hairpulling may be intentionally sought after not only for its regulation of negative affect, but because it also serves to boost—at least temporarily—the experiences of positive affect.

Conclusions. The results revealed that all four profiles show a complex pattern of emotional cycles by hairpulling. While important differences exist among the profiles, the general conclusion reached is that individuals who endorsed HF hairpulling behaviours showed higher amplitude cycles (i.e., larger changes across time) than LF profiles. Those with a HFHA profile experienced the highest amplitude emotional cycles, followed by HFLA, LFHA, and finally, LFLA.

Differences among profiles were reported. HF profiles regulate sadness significantly more than LF profiles. Differences in anger showed that for HF profiles, hairpulling emotionally regulates anger for these individuals, while for LF individuals, needing to pull enabled them to remain calm and control tension and anxiety. Guilt, frustration, and embarrassment were found across all four profiles, although with increased severity for HF profiles, highlighting an important need to attend to these emotions that characterize the way individuals perceive and react to themselves because of hairpulling.

While all hairpulling profiles experience some key emotional changes across the hairpulling cycle, HF hairpulling is characterized by experiencing emotions to a greater intensity and severity, and to emotionally regulate more negative experiences, than LF hairpulling. Emotions play a key part in hairpulling for all profiles, but they do not drive hairpulling to the same degree in LFHA and LFLA profiles as has been found to occur in HF profiles.

Research Question 3 (RQ3). What is the relationship between hairpulling severity, assessed by the Massachusetts General Hospital Hairpulling Scale (MGH-HPS), and the emotional cycles that operate across each hairpulling profile, assessed by the Hair Pulling Survey (HPS)?

Findings. Several emotions across all four hairpulling profiles are associated with higher hairpulling severity scores. For HF profiles, lower boredom scores are positively correlated with hairpulling severity, suggesting the possible role of reinforcement in the maintenance of hairpulling (Mansueto et al., 1999). For the HFLA profile, hairpulling severity was associated with increased levels of happiness during the

behaviour, which suggests that although hairpulling is distressing; it serves an important, yet maladaptive way of coping for HF individuals (Shusterman et al., 2009).

For HF profiles, experiencing sadness before, during (only for HFHA), and after was associated with higher MGH-HPS severity scores. Because HF profiles showed significantly higher scores for depression than LF profiles, and a higher tendency to regulate intense negative emotions, pulling to control these intense emotions may explain why severity was associated with higher sadness scores.

Before-pulling scores for loneliness, embarrassment, tension, anxiousness, and anger were also associated with higher MGH-HPS scores for one or both HF hairpulling profiles. For LFHA and LFLA, only anxiousness before pulling was significantly associated with hairpulling severity. This might be explained by the fact that intentional hairpulling was directed at relieving high-arousal negative states and because these individuals are fully aware of their hairpulling, higher isolation and embarrassment surrounding the behaviour translates into increased severity.

Where the LF profiles did show significantly more associations with the MGH-HPS over the HF profiles was during pulling. Scores for sadness, anxious, tension, frustration, and embarrassment during pulling were significantly associated with increased hairpulling severity for LF profiles. One explanation is that with the exception of feeling embarrassed, all of the other states are emotionally regulated down for HF individuals, and because of its purposeful nature, emotions during pulling are actively sought after by HF individuals, while for LFHA and LFLA profiles, these states are a distressing by-product of pulling rather than intentional.

Several emotions occurring after-pulling were also associated with increased hairpulling severity. While both increased boredom and sadness scores after pulling were shown to be associated with higher MGH-HPS severity scores for HF profiles, anger (HFLA), anxiety (HFHA), tension (HFHA), frustration (HFLA), embarrassment (HFHA, HFLA), and loneliness (HFHA) were also positively associated with more severe hairpulling. For LF profiles, sadness (LFLA), anger (LFHA), anxiousness (LFLA), tension (LFHA), frustration (LFLA), embarrassment (LFLA), and loneliness (LFHA) scores after pulling were associated with higher pulling severity. Because lowering anxiousness is dependent on LF individuals continuing to pull, increased scores following pulling explain why these emotions are associated with higher hairpulling severity. Other emotions—frustration, embarrassment, and loneliness—common across profiles suggest that the end result of the hairpulling is distressing regardless of the mechanism that initiates and maintains the behaviour.

Conclusions. The results showed HF profiles to have more scores on the HPS that are significantly associated with hairpulling severity, specifically before and after pulling. These results reinforced that hairpulling is performed to address distressing emotional states, even though these emotions return and elevate symptom distress following pulling. For LF profiles, scores significantly associated with hairpulling severity occurred most frequently during and after pulling, suggesting that for these profiles, symptom distress around hairpulling is attributed more to be a by-product of pulling, and less a response to emotionally regulate distressing affective states. One commonality across profiles was the degree to which embarrassment, frustration, and loneliness were associated higher hairpulling severity. What this suggests is that these

emotions are independent of hairpulling profile and may be more associated with the actual effects of hairpulling than with any specific hairpulling behaviours.

Research Question 4 (RQ4). How are levels of depression, anxiety, and stress, assessed by the Depression Anxiety Stress Scale-21 (DASS-21), reflected in the emotional cycles of hairpulling, assessed by the Hair Pulling Survey (HPS)?

Findings. This study found that HFHA individuals reported the highest DASS-21 Total, Depression, Anxiety, and Stress scores that were significantly higher than HFLA, LFHA, and LFLA profiles. In addition, HFLA scores across all four scales were significantly higher than scores for the LFLA profiles. No statistical differences existed between scores for HFLA and LFHA or between LFHA and LFLA, a finding also reported by Flessner, Conelea et al. (2008).

All three DASS-21 categories were higher amongst people with TTM than among a normative non-clinical sample (Henry & Crawford, 2005). The DASS-21 Total mean of 20.72 (*SD* = 11.70) across all four profiles was over twice as high than the 9.43 (*SD* = 9.66) mean collected in the normative study by Henry and Crawford (2005). Compared against nonclinical samples, scores on the DASS-21 Total found in this study range from the 83rd (LFLA) to 95th (HFHA) percentile relative to a normative sample (Henry & Crawford, 2005).

When examining each of the three subscales, differences among severity cut-offs were identified. For HFHA, all sub-scales scores crossed into the moderate severity threshold. Among HFLA individuals, both Depression and Anxiety reached moderate severity, while Stress reached mild severity. Finally, for both LF profiles, only

Depression and Stress reached mild severity, with Anxiety scores falling within normal thresholds (Lovibond & Lovibond, 1995b).

Looking at the associations between hairpulling severity and the DASS-21, both HF profiles were correlated across all three subscales of the DASS-21. For the LF profiles, only depression (LFHA, LFLA) and anxiety (LFLA) were weakly correlated. What these findings indicated is that special attention needs to be provided for those with a HF profile, as their elevated depression, anxiety, and stress scores are associated with higher levels of hairpulling severity. Levels of mood and anxiety disorders often co-occur with TTM, lifetime major depression occurring with as many as 52% of individuals (Christenson, 1995), and anxiety occurring in high as 50% (Christenson et al., 1994). While TTM is not a condition formed in response to depression or anxiety, it is a behaviour that for some profiles tries to regulate negative affect. In the case of anxiety or depression, what may be happening is a resonance effect, where higher levels of depression and anxiety attempt to be regulated by hairpulling, which, in response, increases hairpulling severity, which increases levels of anxiety and sadness. Particularly in the case of HF hairpulling being used to regulate negative emotions, the need to address the conjoint concerns of hairpulling and the elevated levels of sadness and anxiety is essential.

When Depression and Anxiety subscales of the DASS-21 were compared to Sad and Anxious on the HPS, the tests showed that levels of sadness and anxiety prior to pulling are positively associated with higher scores on the DASS-21 subscales, with the exception of anxiety for LFLA individuals.

Conclusion. The findings help to create some identifiable differences among hairpulling profiles that assist in understanding the high degree of Axis I comorbidity found in the TTM population (Christenson, Mackenzie, & Mitchell, 1991). LF profiles reported only mildly elevated scores on depression and stress subscales of the DASS-21 than the normal non-clinical population, and their anxiety fell within normal cut-offs. For the HF profiles, more specifically the HFHA profile, scores on the DASS-21 began to approach the severe cut-offs for distress in all three subscales and ranked in the 92nd percentile of scores when compared to a normal non-clinical sample (Henry & Crawford, 2005). What we also know is that HF profiles showed significantly higher scores on the HPS compared to LF profiles, have DASS-21 scores that were correlated with greater hairpulling severity, and have scores on the HPS that were more strongly correlated with depression and anxiety. Because depression and anxiety are factors that influence the severity of the condition, it is especially important to consider treatment planning around depression, anxiety, and stress for HF profiles in addition to treatment planning around hairpulling. One possible concern identified in this study is the potential resonance hairpulling may have with any comorbid or elevated depressive or anxious symptoms. If individuals intentionally pull to alleviate their sadness or anxiety, they may unintentionally be cyclically exacerbating their hairpulling severity.

General Conclusions

Four goals and research questions were outlined to gain an understanding of the role emotions play towards impacting hairpulling, severity, and comorbid anxiety and depression. Because focused and automatic hairpulling styles are not mutually exclusive behaviours, rather they both co-occur to varying degrees within each individual, this is

the first empirical study to look at the role of affect across hairpulling profiles that incorporated both focused and automatic qualities in each subtype: an approach that I argue treats TTM more like it would present naturalistically (Duke, Keeley, Ricketts et al., 2010; Flessner, Conelea et al., 2008). By viewing TTM in this fashion, the intent for examining affect, severity, and comorbidity through four distinct hairpulling profiles is to offer support towards considering hairpulling profiles in the design and implementation of treatment.

What this thesis research found is that severity is conditional on the degree of focused and automatic behaviours an individual engages in—the more automatic or focused behaviours, the more severe the hairpulling is rated by the individual. By showing that both HA and HF profiles are impaired by their condition, responding and addressing both subtypes is important for effective treatment. No incremental increases for the HFHA were found, suggesting that the degree of focused and automatic behaviours endorsed may account for a portion of an individual's hairpulling severity and that other factors not measured by the MIST-A also play a role in determining severity.

This is the first study to find that all profiles experience emotional cycles across their hairpulling episodes. What was found to differ is the intensity and amplitude that these cycles present within each profile, and in all cases, HF profiles displayed more intense pre- and post-pulling scores. The overall conclusion is that HF profiles use hairpulling to a greater degree to emotionally regulate themselves, and they also use hairpulling to regulate a wider range of emotions than LF profiles. In addition, the use of hairpulling to increase feelings of calm, indifference, relief, and happiness suggest

hairpulling to be far more than just a way to reduce negative affect, but to also be a pleasurable or dissociative experience for individuals.

When emotions were correlated with hairpulling severity, HF individuals reported that the negative emotions they experienced before- and after-pulling were associated with their hairpulling severity, while LF severity scores were associated with how these individuals felt during- and after-pulling. This may suggest unique differences in intent, with HF profiles pulling to regulate distressing emotions, while LF profiles experience negative emotions as a by-product of the behaviour.

Looking at the comorbidity across profiles, depression and anxiety should be considered when treating HF profiles. These profiles showed moderate-approaching-severe levels of depression and anxiety that are associated with increased levels of sadness and anxiousness scores; these profiles use pulling to sooth.

Through abandoning the notion that TTM can be best understood homogeneously, this thesis has uniquely found how the role of affect and emotional regulation play a role across different subtypes. The largest sample collected to date to look at affect has helped highlight the intricacies present across profiles, presenting the commonalities and differences important in the consideration of treatment.

Strengths

This thesis had key strengths that generated unique and valuable information that will inform future research and treatment. Strengths ranged using new DSM-5 criteria, obtaining the largest sample size to study emotions, treating TTM behaviours naturalistically, and providing important implications for the consideration of positive affect. Each of these key strengths is outlined below.

Inclusion criteria. This study developed inclusion criteria that were congruent with the revised diagnostic standards developed for the DSM-5. These new criteria for TTM allowed respondents to participate even if their hair loss was not noticeable, accounting for the fact that thinning hair or hair loss that occurs in non-visible parts of the body can now be classified TTM. Additionally, respondents were not excluded if they did not report experiencing pre-pulling tension or post-pulling gratification, which accounted for the fact that these criteria are not reliable markers of severity or distress; neither are they experienced by a significant portion of the TTM population.

Largest sample using the HPS. This was the largest TTM study conducted to date that used an HPS instrument to collect information about the emotions that occur during the entire hairpulling cycle. Of the five studies previously conducted using a measure like the HPS, sample sizes only ranged from 34 (Diefenbach et al., 2008) to 66 (Stanley et al., 1995) individuals. With a sample of 427 participants—six times larger than of even the largest previously conducted study, I was able to collect a large representation of responses, and I was able create large-group sizes capable of identifying the emotional patterns operating across different profiles.

Significance of positive affect. This was the first study to show that pulling significantly increased the experience of happiness during the behaviour. What this study showed is that across all profiles, pulling elicited several positive emotional states during the behaviour. The implications of this finding are far reaching, as this requires consideration for how to treat the positive and enjoyable components of hairpulling. Addressing negative emotions, teaching stress reduction, distraction, and habit-reversal

techniques may have limited efficacy unless we also acknowledge and address the positive symptoms of the behaviour.

Creating naturalistic profiles using the MIST-A. Using the MIST-A, this study was able to study compositions of pulling behaviours that are more characteristic of how TTM presents in the population: a mix of both automatic and focused behaviours (Christenson & Mackenzie, 1994; Christenson, Mackenzie, & Mitchell, 1991). This approach was able to detect inter-group differences that are less artificial than previous studies that had homogenized or dichotomized TTM samples, and it has provided conclusions and treatment recommendations that map onto the TTM population as it presents in the population.

Social media support. In addition to reaching a large audience online and through email, this study leveraged the support of two of the largest social networking communities—Facebook and Twitter—in order to advertise and distribute the survey. Using Twitter, the TLC (@TLCtrich) advertised the study to over 1,000 followers on two separate occasions (see Appendix T). These study links were redistributed by the Behavioral Health Nutrition Dietetic Practice Group (BHNDPG; @BHNDPG) to over 500 health professionals in the areas of eating disorders and mental health, including TTM. OCD Ireland (@OCDIreland) and several other individuals, including health professionals, also helped distribute the study through these networks. TLC also distributed this study on their Facebook page, which has over 4,500 followers. The dates of these posts corresponded with identifiable bumps in survey response rates, supporting that a tactical use of social media can help reach a wide range of participants eager to participate in TTM research.

Survey design. The selection of survey software played an important role in the success of this survey. Considering the average respondent spent 23 minutes completing 85 reflective questions, maintaining engagement was key. The robust software allowed me to ensure that the survey respondents saw was responsive, user-friendly, and engaging through the use of interactive toggles and constant feedback on progress. In addition, providing resources and a donation back to the TLC helped support that answering this survey not only benefited me, but progresses treatment and support for people with TTM and other BFRBs.

Limitations

Several limitations for this thesis need to be reported. These limitations ranged from the development of the survey itself, to the nature of self-reporting in online studies, to not discussing shame or differentiating TTM from cosmetic grooming. These limitations are discussed below.

Missing pilot. A pilot test to evaluate participant responses was not conducted for this study. While time was devoted to having several friends run through the online survey and report any outstanding technical or formatting issues related to the questions presented, piloting to study to the TTM in order to make any potential changes to the structure, format, or comprehension of the survey was not undertaken.

Survey length. With a trimmed mean duration of nearly 23 minutes to complete, the STAQ survey required a time commitment to complete the entire survey in a single continuous session. A consequence of this length was that over 18% of respondents beginning the survey did not complete it, while an unknown percentage of users may never have gone past the informed consent after reading the survey required an average

of 20 to 30 minutes to complete. In part, because of the design, feedback, and incentives the survey provided, a completion rate of nearly 80% was still obtained.

Self-reporting. Because the studies were conducted online, there was no clinical means of validating and confirming a TTM diagnosis for respondents. This self-selected sample may differ from in-person, referred, and clinical samples.

HPS reliability. One area of concern in trichotillomania research has been the testing and development of robust and valid measures. Fortunately, instruments like the MGH-HPS and MIST-A have been tested and exposed to numerous clinical and online samples that have studied these instruments against larger data sets and provided reliability and validity metrics unavailable when trichotillomania research began. While the HPS instrument has been used for decades to generate findings surrounding the emotional states of individuals with TTM, the exact psychometrics of this scale remain underdeveloped in the infant field of TTM research.

Constructs of the HPS. Numerous studies conducted with a measures like the HPS has shown the instrument to be useful in identifying the emotional cycles that operate across a wide range of clinical (Diefenbach et al., 2002; Diefenbach et al., 2008), nonclinical (Stanley et al., 1995; Neal-Barnett & Stadulis, 2006), college (Duke et al., 2009), and community samples (Duke, Keeley, Ricketts et al., 2010). What still remains to be established is how different individuals or profiles interpret the emotional states of the HPS. For example, one individual may have associated anger with an external event that led him/her to pull, while another may have associated their anger with the experience of trying to suppress or resist the urge to pull hair. Because the HPS has proven its value as a tool for identifying important emotional cycles essential to the

treatment of TTM, defining the constructs of the HPS could prove even more valuable in defining exactly how these emotions are expressed.

Retrospective scores on HPS. Answering the HPS required respondents to retrospectively report on the emotional cycles of their hairpulling over the past week. It may have been difficult for some respondents to reflect on all their hairpulling episodes over the previous past week and to know if there results reflect what they experienced on an average week. Two dynamics operated here: (a) recall bias from having to remember and condense a week's worth of experiences; and (b) memory bias, the tendency to remember certain emotional experiences based on their salience and our own current emotional state, known as mood congruence and emotional valence (Blaney, 1986). Fortunately, the abridged time gap of one week was designed to minimize any time-related decay in recall, and presenting the different emotional states on the HPS was designed to reduce any errors of omission (Coughlin, 1990).

Variance of the MIST-A. The MIST-A is able to account for 30% of an individual's hairpulling score for overall severity. Flessner, Woods, Franklin, Cashin et al. (2008) proposed the possibility that biological (e.g., genetic, emotional regulation, distress tolerance, addition comorbid conditions), environmental (e.g., family conflict, trauma), and yet undiscovered behaviours and subtypes of hairpulling may all influence the presentation of severity of TTM. What the MIST-A allowed was to create unique profiles and draw new conclusions on two of the most well documented behavioural patterns identified in TTM.

Affect regulation scales. This study inferred that significant changes in emotional experiences from before- to during-pulling represented an attempt—conscious

or not—to emotionally regulate distressing negative emotions. Future studies may want to include some formalized emotional regulation measure, such as the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), and Difficulty in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) to assess whether hairpulling represents a maladaptive way of emotionally regulating oneself, or a reduced capacity for distress tolerance.

Addressing shame. Feelings of shame are often associated with TTM, which are often generated through the individual's struggle to control, regulate, or stop hairpulling and by anticipating how they believe other people perceive them. While this thesis did address feelings of guilt, embarrassment, anger, and frustration via the HPS, it did not directly assess the role that shame may play in relation to interacting, cycling, and reinforcing TTM behaviours.

Differentiating TTM and cosmetic grooming. Despite the study soliciting information about an individual's TTM hairpulling habits, questions were not presented to differentiate whether some of the pulling sites reported were done for cosmetic reasons. For example, an individual listed pulling sites including their scalp, eyebrows, and from a birthmark on their arm. Whether or not all three sites represent pure hairpulling associated with TTM or whether sites were targeted for cosmetic grooming to remove unwanted hairs cannot be confirmed.

Continuing to pull. A minor formatting error prevented one of the 85 questions from appearing in the STAQ. The question was: If you could continue pulling, but the hair you plucked out would instantly and fully grow back, would you like to continue to pull? The purpose for asking this question was to assess whether individuals with TTM

saw the behaviour as rewarding and enjoyable if the negative physical consequences where removed. A limitation with minor implications because while the HPS did reveal the need to address positive emotions, this question would provide additional support that viewing TTM as an entirely negative behaviour limits the ability to comprehensively address it.

Future Directions and Treatment Implications

Trichotillomania and trauma. Despite over two decades of research surrounding TTM, studies have yet to identify any specific etiological cause for the development of TTM. Various models have been proposed, ranging from psychoanalytic explanations to various behavioural, hormonal, ethological, neuroanatomical, genetic, and neurobiological models (Duke, Keeley, Ricketts et al., 2010). While a specific cause still remains speculative, the current consensus is that TTM arises from the complex interaction of various biological, psychological, and social factors (Diefenbach, Reitman, & Williamson, 2000). For a review of various etiological models of TTM, see the reviews by Chamberlain, Odlaug, Boulougouris, Fineberg, and Grant (2009), and Duke, Keeley, and Ricketts et al. (2010).

One etiological model of TTM that has gained attention has been the trauma model. The belief behind this model is that traumatic childhood events, including forms of childhood abuse, underlie the development of hairpulling in adolescence (Boughn & Holdom, 2003). A brief review of the literature surrounding trauma will be presented to provide a rationale why this psychosocial variable may need to be considered when assessing and treating individuals with TTM.

Literature on trichotillomania and trauma. A study on post-traumatic stress disorder (PTSD) has found trauma may promote the development of obsessive-compulsive repetitive behaviours, such as excessive checking, which are interpreted as a way of coping with the excessive anxiety some individuals experience around traumatic events (Gershuny, Baer, Radomsky, Wilson, & Jenike, 2003). Viewed through the light of post-traumatic stress, hairpulling has been associated as a form of avoidance or self-soothing developed for traumatic memories (Gershuny et al., 2006). In support of this link, Gershuny et al. (2006) found that over 76% of clinical patients with TTM reported at least one traumatic event in their lifetime, a higher rate than the 39% reported to occur in the general population (Breslau, Davis, Andreski, & Peterson, 1991). Many of these traumas that elevated in the TTM population consisted of accidents, sudden injury, natural disasters, and questions around childhood and adult abuse. Of interest here is the possible link between childhood abuse and TTM development that I will focus on next.

Psychoanalytic theorists Singh and Maguire (1989) have written a case study that associated instances of childhood sexual abuse playing a role in the development of TTM. Their conclusion was that a child who has been a victim of sexual assault will develop displaced anger towards themselves and seek to deprive themselves of their femininity.

A review by Chamberlain et al. (2009) challenged this study, writing that the reported rate of childhood sexual abuse in individuals with TTM (18%; Christenson, Mackenzie, & Mitchell, 1991) did not exceed the levels among the general female population in the United States (27%; Rind, Tromovitch, & Bauserman; 1998). The numbers of self-reported experiences of some form of trauma appear to be higher in TTM

populations than amongst the general population, but this finding was not accounted by inflated levels of sexual abuse (Gershuny et al., 2006; Lochner et al., 2002). However, elevated self-reported emotional neglect and physical abuse disclosures appear to differentiate clinical inpatient TTM respondents from the general population (Lochner et al., 2002).

First reports of hairpulling. Authors who have differentiated between the events associated with first memories of hairpulling versus significant traumatic events have found stressful life events being identified far more frequently than significant traumas for having first ignited the behaviour (Boughn, & Holdom, 2003; Casati, 2010). These stressful life events range from the onset of menarche, pregnancy, puberty, changing schools, dating problem, fights with friends, study and exam stress, self-esteem, sexual identity concerns, family relocation, divorce, financial changes in the family, and death and loss (Casati, 2010; Christenson, & Mansueto, 1999; Boughn & Holdom, 2003). Many of these events are traumatic, or may be identified as traumatic, but also represent typical life stressors that many individuals will experience at some point. The review by Graber and Arndt (1993) found that from over 300 documented cases of hairpulling, less than 7% identified a significant precipitating traumatic event before or at the time of hairpulling, which included parental divorce and arguing, death of a relative, and academic stress. Shifting attention to study why some individuals seem predisposed to develop hairpulling when exposed to common stressors may provide a useful avenue for beginning to understand the complexity of factors that contribute to this behaviour.

Summary. The conclusion reached is that childhood trauma may play a role in the development of hairpulling in some individuals, though this not a necessary

requirement for developing the condition. Over a quarter of individuals could not recall a traumatic childhood event or stressful period that they attributed with starting to pull, while over 60% reported their hairpulling arose from commonplace life stressors. Because the rates of childhood sexual reside around North-American reported averages, I would caution approaching treatment with a predisposition that TTM has etiological roots based in childhood trauma, but would support a careful assessment of family dynamics if other markers suggested a disruptive environment were present for the individual. Future research should continue to seek out why TTM develops in individuals, whether it is a response to significant trauma, common stressor, or by some other yet unknown mechanism.

Stability of hairpulling profiles. Future research studies should explore the stability of hairpulling profiles across time. Understanding whether a natural oscillation exists with hairpulling profiles as a product of time or treatment could allow health professionals to dynamically adjust their approach to target the specific factors that characterize each of the four profiles. While an earlier age of onset has been found to correlate with more automatic pulling (Flessner, Lochner et al., 2010), there has been only one study to date to suggest that the severity of hairpulling behaviours, both focused and automatic, showed the highest levels of severity between the ages of 13 to 18, after which a steady decline in severity was reported (Woods et al., as cited in Stein et al., 2010). Understanding what role time has in an individual's hairpulling profile and how treatment could respond and adjust to profile changes is an important step to assessing what mechanisms are behind why different individuals present with different hairpulling styles and severities.

How different profiles interpret the MGH-HPS. An important avenue would be to view how the items on the MGH-HPS are interpreted by different hairpulling profiles. In the case of automatic pulling, the inability to "catch oneself in the act" and attempt to resist when pulling could be very distressing and lead to elevated severity scores. For focused pulling, the difficulty to resist hairpulling, experiencing more intense urges, and even the self-awareness of feeling helpless while actively aware of the behaviour could be highly distressing. In light of the distinct presentations of focused and automatic pulling, future studies should examine how the various items on the MGH-HPS are being interpreted. For example, focused hairpulling may be characterized by more attempts to resist the behaviour that ultimately prove unsuccessful, while Automatic hairpulling may be characterized by less attempts to resist (due to lack of awareness), but a greater desire to have opportunities to resist.

Addressing positive affect. Treatments like acceptance and commitment therapy, cognitive behavioural therapy, and habit reversal therapy have dominated the treatment of TTM. These treatments target negative thoughts, emotions, and values, along with a focus on self-monitoring and increasing awareness. What treatments should also address is the role of positive affect in the hairpulling cycle.

What some recent studies (Keuthen et al., 2010; Keuthen et al., 2011; Keuthen & Sprich, 2012) have done is begun to incorporate dialectical behaviour therapy (DBT) into the treatment of TTM. The DBT approach offers specific protocols to increase pleasurable self-soothing habits in individuals (Keuthen & Sprich, 2012). Soothing and distraction help lower autonomic arousal that individuals regulate by pulling and shift attention to an alternate activities the individual can do (Keuthen & Sprich, 2012;

McKay, Wood, & Brantley, 2007). Soothing includes ways people can calm themselves down like having a bath or preparing tea, while distractions are ways individuals shift attention from a distressing emotion or situation, like watching TV, going for a walk, or reading a book.

Pulling is a pleasurable, calming, and relaxing experience for many individuals. Future treatments should acknowledge the pleasurable nature TTM takes for individuals and develop alternative pleasurable responses the individual can retreat to when the desire for pulling is triggered.

Stimulus regulation. This thesis looked specifically at the emotional correlates surrounding hairpulling and the impact that focused and automatic behaviours had on the impact of hairpulling severity. One aspect not addressed by the MIST-A is the role of stimulus regulation (Penzel, 2003) and the role that tactile, visual, and oral stimulation by pulling may also play as a role in patterns of hairpulling and severity in attempting to return the body to a state of homeostatic arousal. Because up to 70% of individuals report some form of hairpulling ritual (Lochner et al., 2010) or oral habit (du Toit et al., 2001), differences in the expression of these behaviours could shed further light on the severity across hairpulling profiles.

Time constraints of the HPS. Future studies using the HPS may be interested in defining the time constraints around the hairpulling cycle. For example, After-pulling could be defined as immediately after stopping, after one hour, etc. This may help shed additional light on stability of emotions regulated though pulling.

Treating comorbid anxiety and depression. The last area of future research to be addressed before concluding the thesis is focused on the higher levels of depression,

anxiety, and stress that are found in specific profiles of TTM. Because of the higher depression, anxiety, and stress scores reported by HF profiles and the stronger correlations with hairpulling severity, treatments need to consider comorbidity when treating TTM. Although treating depression and anxiety are not robust, stand-alone treatments for treating hairpulling, addressing them either through pharmacological or psychotherapeutic interventions before or in conjunction with therapy for hairpulling would be important for individuals with HF pulling profiles (Franklin, Zagrabbe, & Benavides, 2011). Future studies should also examine whether hairpulling and comorbid anxiety and depression create a cyclical cycle with each condition exacerbating the other.

Conclusion

This was the largest study yet conducted designed to study the emotional correlates that operate to initiate, maintain, and reinforce trichotillomania in individuals and the first to break individuals into profiles that more accurately reflect their true hairpulling behaviours—that of having both focused and automatic components.

Through this study report, I have highlighted the important emerging role of both positive and negative affect for the maintenance of hairpulling and proposed how both need to begin being addressed, along with the need to consider targeting potential comorbid concerns for focused hairpulling. We continue to learn from those who have trichotillomania, seeing its full complexity and struggling to unravel why this condition arises and how we best to treat it. My hope is that this work adds one more piece toward answering why TTM remains such a complex and compelling condition.

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Appendix A:

Hairpulling Profiles Table

Table A1.

Hairpulling Profiles

High-focused, high-automatic (HFHA)	High-focused, low-automatic (HFLA)
MGH-HPS Severity: higher then LF, LA groups.	MGH-HPS Severity: higher than LF groups.
DASS-21 Anxiety: higher scores than LFHA, HFLA, LF, LA groups. Depression: higher scores than LF, LA groups. Stress: higher scores than LF, LA groups.	DASS-21 Anxiety: higher scores than LFLA group. Depression: higher scores than LF groups. Stress: higher scores than LF groups.
Functional Impact SDS: higher scores than LF group. Impact: more social, occupational, academic and economic problems than LFLA group. Hair loss: greater than LFHA, LFLA groups. Hairpulling: more likely to pull from eyebrows than LFLA. Comorbidity: more likely to develop another emotional disorder than LFLA. Drugs: more likely to use drugs/alcohol than LFLA.	Functional Impact SDS: higher scores than LF. Impact: more social, occupational, academic and economic problems than LFLA. Hair loss: greater than LFHA, and LFLA. Hairpulling: more likely than LFLA to pull from eyebrows, eyelashes, and pubic hair. Comorbidity: more likely to develop another emotional disorder than LFLA.
Low-focused, high-automatic (LFHA)	**Low-focused, low-automatic (LFLA)**
MGH-HPS Severity: higher then LA groups.	MGH-HPS -
DASS-21 Anxiety: higher scores than LA groups. Stress: higher scores than LA groups.	DASS-21 -
Functional Impact Impact: more academic problems than LFLA. Treatment: less likely to seek treatment than LFLA.	Functional Impact Damage: more money spent to conceal damage than LFHA.

Note. Results from "Styles of pulling in trichotillomania: Exploring differences in symptom severity, phenomenology, and functional impact" by C. A. Flessner, C.A. Conelea, D.W. Woods, M. E. Franklin, N. J. Keuthen, and S. E. Cashin, 2008, *Behaviour Research and Therapy, 46*(3), p. 345-357. DASS-21 = Depression Anxiety Stress Scale-21; HA = high-automatic; HF = high-focused; HFHA = high-focused, high-automatic hairpulling; HFLA = high-focused, low-automatic hairpulling; LA = low-automatic; LF = low-focused; MGH-HPS= Massachusetts General Hospital Hairpulling Scale; SDS = Sheehan Disability Scale.

Appendix B:

Subtypes of Trichotillomania Affect Questionnaire (STAQ)

FORM 1 of 6: BASIC DEMOGRAPHICS FORM

Are you (select only one):

- ☐ Male
- ☐ Female

Age as of today:

What category best describes you (select only one):

- ☐ White/Caucasian
- ☐ African-American
- ☐ Hispanic
- ☐ Asian
- ☐ Native/Aboriginal
- ☐ Pacific Islander
- ☐ Multi-racial
- ☐ Other

What is your marital status, as of today (select only one)?

- ☐ Single/never married
- ☐ Dating
- ☐ Currently married
- ☐ Separated
- ☐ Divorced
- ☐ Common law (Living with partner for 6 consecutive months but not married)
- ☐ Widowed
- ☐ Other

FORM 2 of 6: TTM DEMOGRAPHICS FORM

Message: The following 20 questions ask you to reflect on your hairpulling behaviour. It is important that you answer each question as honestly as possible. Before you begin I want to say that your responses are very important and that any information you provide is completely anonymous. Thank you.

1. **Have you ever been diagnosed by a doctor, psychiatrist, therapist/counsellor, or another health professional with trichotillomania?**
   ☐ Yes
   ☐ No

   If you answered 'Yes' to Question 1, who first diagnosed you (select only one)?
   ☐ Therapist/Counsellor
   ☐ Family doctor
   ☐ Social worker
   ☐ Psychiatrist/Psychologist
   ☐ Don't remember
   ☐ Other

2. **Do you currently pull out your hair which results in noticeable hair loss (bald patches) if the area isn't covered or concealed?**
   ☐ Yes
   ☐ No

   If you answered "No" to Question 2, do you currently pull out your hair resulting in noticeable thinning of the hair if the area isn't covered or concealed?
   ☐ Yes
   ☐ No

3. **If you answered "Yes" to Question 2, What was the earliest age that you can recall beginning to pull your hair?**

4. **If you answered "Yes" to Question 2, List your hair pulling site(s) (check all that apply):**
   ☐ Scalp
   If you pull from the scalp, what sites (check all that apply):
   ☐ Crown (top/middle part of the head)
   ☐ Right-Temporal (behind the right ear)
   ☐ Left-Temporal (behind the left ear)
   ☐ Frontal (front of the head above the forehead but before the ears)

☐ Occipital (middle back of the head)
☐ Eyelashes (either one or both)
☐ Eyebrows (either one or both)
☐ Pubic hair
☐ Moustache
☐ Beard
☐ Trunk (chest or belly)
☐ Armpits
☐ Arms
☐ Legs/Feet
☐ Other (please specify)

5. If you answered "Yes" to Question 2, From the hairpulling sites you listed in Question 4, what one site do you pull from most frequently?

For the next six questions (questions 6-11), I'd like you to reflect on what areas your hairpulling has affected you over the last month (30 days). Please use the following scale.

0 = No distress
1 = Mild distress
2 = Moderate distress
3 = High distress
4 = Severe distress

6. Using the rating scale above, on a scale from 0-3, what level of distress in <u>personal functioning</u> (e.g., being able to read, browse the Internet, or watch TV, etc.) does trichotillomania cause you?
☐ 0 = No distress
☐ 1 = Mild distress
☐ 2 = Moderate distress
☐ 3 = High distress
☐ 4 = Severe distress

7. Using the rating scale above, on a scale from 0-3, what level of distress in <u>your self-image</u> (e.g., impacts your self-esteem, body-image, how attractive you feel, etc.) does trichotillomania cause you?
☐ 0 = No distress
☐ 1 = Mild distress
☐ 2 = Moderate distress
☐ 3 = High distress
☐ 4 = Severe distress

8. Using the rating scale above, on a scale from 0-3, what level of distress in <u>interpersonal functioning</u> (e.g., such as meeting people, forming friendships, dating relationships, intimate relationships, etc.) does trichotillomania cause you?

□ 0 = No distress
□ 1 = Mild distress
□ 2 = Moderate distress
□ 3 = High distress
□ 4 = Severe distress

9. Using the rating scale above, on a scale from 0-3, what level of distress in <u>social functioning</u> (e.g., such as playing sports, engaging in activities, going out to events, participating in hobbies or interests, etc.) does trichotillomania cause you?

□ 0 = No distress
□ 1 = Mild distress
□ 2 = Moderate distress
□ 3 = High distress
□ 4 = Severe distress

10. Using the rating scale above, on a scale from 0-3, what level of distress in <u>school or work functioning</u> (e.g., studying, work-related tasks, participating in school or work, etc.) does trichotillomania cause you?

□ 0 = No distress
□ 1 = Mild distress
□ 2 = Moderate distress
□ 3 = High distress
□ 4 = Severe distress

11. Using the rating scale above, on a scale from 0-3, how would you rank your hairpulling distress overall?

□ 0 = No distress
□ 1 = Mild distress
□ 2 = Moderate distress
□ 3 = High distress
□ 4 = Severe distress

12. Would you like to stop pulling?

☐ Yes, I would like to stop. I am taking steps to stop right now
☐ Yes, I'm planning about how I would stop but have not put my plans in place
☐ No, no plans to stop right now but maybe in the future
☐ No, no plans to stop

If you answered "Yes" to Question 12, if you could continue pulling but the hair you plucked out would instantly and fully grow back, would you like to continue to pull?
☐ Yes
☐ No

13. Do you pull your hair because you believe small bugs/insects are crawling on you skin or in response to voices others may not be able to hear (e.g., deceased relatives, beings from another planet, etc.)?
☐ Yes
☐ No

14. Do you believe your hairpulling the result of another general medication condition not related to trichotillomania (e.g., dry skin, pruritus)?
☐ Yes
☐ No

If you answered "Yes" to Question 14, what condition?

For the next 6 questions (questions 15-20), I'd like you to reflect on some of your hairpulling characteristics and habits averaged over the last month (30 days).

15. On average, how often are you aware of when you are hairpulling?
☐ 10% of the time ("I am almost never aware of when I'm pulling.")
☐ 11-29% of the time ("I am aware of my pulling a little bit of the time.")
☐ 30-70% of the time ("I am aware of my pulling some of the time.")
☐ 71-89% of the time ("I am aware of my pulling most of the time.")
☐ 90-100% of the time ("I am almost always aware of my pulling.")

16. On average over the last month (30 days), do you experience an increased sense of physical tension to pull immediately before pulling your hair or when you try to resist pulling?
☐ None of the time/almost never (0-10%)
☐ A little of the time (11-29%)
☐ Some of the time (30-70%)
☐ Most of the time (71-89%)
☐ All of the time (90-100%)

17. On average over the last month (30 days), how often do you experience a sense of pleasure/gratification/relief after pulling your hair?
☐ None of the time/almost never (0-10%)
☐ A little of the time (11-29%)
☐ Some of the time (30-70%)
☐ Most of the time (71-89%)
☐ All of the time (90-100%)

18. If you have been having ups and downs, try to estimate an average day, how much time do you spend per day actually pulling your hair?

19. If you have been having ups and downs, try to estimate an average day, how much time do you spend per day trying to resist the urge to pull your hair?

20. If you have been having ups and downs, try to estimate an average day, how much time do you spend per day thinking about pulling your hair?

FORM 3 of 6: MASSACHUSETTS GENERAL HOSPITAL HAIRPULLING SCALE

Instructions: For each question, pick the one statement in that group which best describes your behaviours and/or feelings over the **past week**. If you have been having ups and downs, try to estimate an average for the past week. Be sure to read all the statements in each group before making your choice.

For questions 1-3, rate only the impulse or urges to pull your hair.

1. Frequency of urges. On an average day, how often did you feel the urge to pull your hair?
0 - This week I felt no urges to pull my hair.
1 - This week I felt an occasional urge to pull my hair.
2 - This week I felt an urge to pull my hair often.
3 - This week I felt an urge to pull my hair very often.
4 - This week I felt near constant urges to pull my hair.

2. Intensity of urges. On an average day, how intense or 'strong' were the urges to pull your hair?
0 - This week I did not feel any urges to pull my hair
1 - This week I felt mild urges to pull my hair
2 - This week I felt moderate urges to pull my hair
3 - This week I felt severe urges to pull my hair.
4 - This week I felt extreme urges to pull my hair.

3. Ability to control the urges. On an average day, how much control do you have over the urges to pull your hair?
0 - This week I could always control the urges, or I did not feel urges to pull my hair.
1 - This week I was able to distract myself from the urges to pull my hair most of the time.
2 - This week I was able to distract myself from the urges to pull my hair some of the time.
3 - This week I was able to distract myself from the urges to pull my hair rarely.
4 - This week I was never able to distract myself from the urges to pull my hair.

For Questions 4-6, rate only the actual hairpulling.

4. Frequency of hairpulling. On an average day, how often did you actually pull your hair?
0 - This week I did not pull my hair.
1 - This week I pulled my hair occasionally.
2 - This week I pulled my hair often.

3 - This week I pulled my hair very often.
4 - This week I pulled my hair so often it felt like I was always doing it.

5. **Attempts to resist hairpulling. On an average day, how often did you make an attempt to stop yourself from actually pulling your hair?**
   0 - This week I felt no urges to pull my hair.
   1 - This week I tried to resist the urge to pull my hair almost all of the time.
   2 - This week I tried to resist the urge to pull my hair some of the time.
   3 - This week I tried to resist the urge to pull my hair rarely.
   4 - This week I never tried to resist the urge to pull my hair.

6. **Control over hairpulling. On an average day, how often were you successful at actually stopping yourself from pulling your hair?**
   0 - This week I did no pull my hair.
   1 - This week I was able to resist pulling my hair almost all of the time.
   2 - This week I was able to resist pulling my hair most of the time.
   3 - This week I was able to resist pulling my hair some of the time.
   4 - This week I was rarely able to resist pulling my hair.

For the last question, rate the consequences of your hairpulling.

7. **Associated distress. Hairpulling can make some people feel moody, 'on edge', or sad. During the past week, how uncomfortable did your hairpulling make you feel?**
   0 - This week I did not feel uncomfortable about my hairpulling.
   1 - This week I felt vaguely uncomfortable about my hairpulling.
   2 - This week I felt noticeably uncomfortable about my hairpulling.
   3 - This week I felt significantly uncomfortable about my hairpulling.
   4 - This week I felt intensely uncomfortable about my hairpulling.

FORM 4 of 6: DEPRESSION ANXIETY AND STRESS SCALE-21

Instructions: Please read each statement and rate it as either 0, 1, 2, or 3 to indicate how much the statement applied to you over the **past week**. There are no right or wrong answers. Do not spend too much time on any statement.

0	1	2	3
Does not apply to me at all	Applies to me to some degree, or some of the time	Applies to me to a considerable degree, or a good part of time	Applies to me very much, or most of the time

1. I found it hard to wind down.
2. I was aware of dryness of my mouth.
3. I couldn't seem to experience any positive feeling at all.
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion).
5. I found it difficult to work up the initiative to do things.
6. I tended to over-react to situations.
7. I experienced trembling (e.g., in the hands).
8. I felt that I was using a lot of nervous energy.
9. I was worried about situations in which I might panic and make a fool of myself.
10. I felt that I had nothing to look forward to.
11. I found myself getting agitated.
12. I found it difficult to relax.
13. I felt down-hearted and blue.
14. I was intolerant of anything that kept me from getting on with what I was doing.
15. I felt I was close to panic.
16. I was unable to become enthusiastic about anything.
17. I felt I wasn't worth much as a person.
18. I felt that I was rather touchy.
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat).
20. I felt scared without any good reason.
21. I felt that life was meaningless.

FORM 5 of 6: HAIR PULLING SURVEY

Instructions: To what extent do you have each of the following feelings before, during, and after you pull your hair over the **past week**?

0	1	2	3	4
I do not have this feeling	I have this feeling to a mild degree	I have this feeling to a moderate degree	I have this feeling to a high high degree	I have this feeling to a severe degree

1. Bored
   Before:
   During:
   After:
2. Happy
   Before:
   During:
   After:
3. Sad
   Before:
   During:
   After:
4. Angry
   Before:
   During:
   After:
5. Calm
   Before:
   During:
   After:
6. Anxious
   Before:
   During:
   After:
7. Guilty
   Before:
   During:
   After:
8. Tense
   Before:
   During:
   After:
9. Relieved
   Before:
   During:
   After:
10. Indifferent
    Before:
    During:
    After:
11. Frustrated
    Before:
    During:
    After:
12. Embarrassed
    Before:
    During:
    After:
13. Loneliness
    Before:
    During:
    After:

FORM 6 of 6: THE MILWAUKEE INVENTORY FOR SUBTYPES OF TRICHOTILLOMANIA – ADULT VERSION

Instructions: Please choose a number which best represents how the question fits your hairpulling behaviour.

0 ------ 1 ------ 2 ------	3 ------ 4 ------ 5 ------	6 ------ 7 ------ 8 ------ 9
Not true for any of my hair pulling	True for about half of my pulling	True for all of my hair pulling

1. I pull my hair to get rid of an unpleasant urge, feeling, or thought.
2. I pull my hair to control how I feel.
3. I pull my hair because of something that has happened to me during the day.
4. I have thoughts about wanting to pull my hair before I actually pull.
5. I pull my hair when I am anxious or upset.
6. I have a “strange” sensation just before I pull my hair.
7. I pull my hair when I am experiencing a negative emotion, such as stress, anger, frustration, or sadness.
8. I use tweezers or some other device other than my fingers to pull my hair.
9. I intentionally start to pull my hair.
10. I pull my hair while I am looking in the mirror.
11. I don’t notice that I have pulled my hair until after it’s happened.
12. I am usually not aware of pulling my hair during a pulling episode.
13. I pull my hair when I am concentrating on another activity.
14. I pull my hair when I am thinking about something unrelated to hair pulling.
15. I am in an almost ‘trance-like’ state when I pull my hair.

Appendix C:

Mansueto's Comprehensive Behavioral Model (ComB)

Components and Modalities Grid				Modalities				
Functional Components				Cognitive	Affective	Motoric	Sensory	Environmental
ANTECEDENTS	Cue	External	Settings					
			Implements					
		Internal	Affective States					
			Sensation					
			Cognition					
	Disc. Stim.	External	Absence of Others					
			Presence of Implements					
		Internal	Urge/Impulse					
			Postural/Proprioceptive					
			Cognition					
BEHAVIOUR		Preparatory	Go to Place					
			Secure Implements					
			Choose Body Site					
			Visual Search					
			Tactile Search					
		Pull	Handedness					
			Select Hair					
			Manipulate Hair					
			Traction (gentle, quick)					
		Disposition	Quick Discard					
			Retain					
			Examine					
			Self-Stimulate (oral/tactile)					
CONSEQUENCES		Reinforce	Positive Emotional States					
			Increase/Decrease Sensation					
			Attain Goal					
			Attention					
		Punish	Negative Emotional State					
			Aversive Sensations					
			Criticism/Disapproval					

Components and modalities grid. Adapted from "A Comprehensive Model for Behavioral Treatment of Trichotillomania," by C. S. Mansueto, R. G. Golomb, A. M. Thomas, and R. M. Townsley Stemberger, 1999, *Cognitive and Behavioral Practice, 6*, p. 36. Adapted with permission.

Appendix D:

Email of Permission from the Trichotillomania Learning Center

December 11, 2012

Hi, Sebastian,
Thanks for checking in – you are all set! The SAB committee approved the study and we can post now if you are ready – or whenever you are ready.

-Jen

Jennifer Raikes
Executive Director
Trichotillomania Learning Center, Inc. (TLC)
(contact information)

Appendix E:

Permission from Dr. Douglas Woods to use Questions from the TIS

May 16, 2012

Hi Sebastian,

Plese feel free to use any of the questions you desire.

good luck.

doug
Douglas W. Woods, Ph.D.
Professor of Psychology
Associate Dean of Social Sciences, Education and Business
The Graduate School
University of Wisconsin-Milwaukee
Milwaukee, WI 53211
(phone)
(fax)

May 15, 2012

Hello Dr. Woods;

My name is Sebastian Siwiec located at the University of Lethbridge in Lethbridge, Alberta. I am currently working towards my masters thesis under the supervision of Dr. Dawn McBride, interested in looking at the emotional patterns in Trichotillomania.

The TLC foundation has helped me out considerably with providing me with information to assist my study, including the Trichotillomania Impact Survey (TIS) created by your team for the TIP project.

My question is whether I could use several of the inclusion questions that you and your team developed in my own study, specifically:

2. Do you experience an increased sense of physical tension or an "urge" immediately before pulling your hair or when you try to resist pulling?

3. Do you experience a sense of pleasure/gratification/relief after pulling your hair?

6. How often do you pull your hair because you believe small bugs/insects are crawling on your skin or in response to voices others may not be able to hear (e.g., deceased relatives, beings from another planet, etc.)?

10. How aware are you of your hair-pulling?

15. What percent of your pulling episodes leads to you feeling more anxious?

In addition to adapting a few questions around pulling frequency, medication use, and a listing of treatment who may have diagnosed the individuals with TTM.

I am more than happy to provide acknowledges in my paper and on the survey itself to your work and the questions you created.

Thank you very much Dr. Woods

sebastian siwiec.
(phone #)
(email address)

Appendix F:

Email on Behalf of Dr. Stanley for Permission to use the HPS

March 19, 2012

Attached is the Hair Pulling Scale.

Belinda Pennington
Administrative Coordinator II
Fellowship Coordinator
Mental Health Care Line
Michael E. DeBakey Veterans Affairs Medical Center
2002 Holcombe
Houston, TX 77030
Phone-VA 713 791-1414 x6665
Phone-McGovern Campus 713 794-8832
Fax (number)

March 06, 2012

Hello Dr. Melinda Stanley;

My name is Sebastian, a M.Ed (counselling) thesis candidate and I am under the supervision of Dr. Dawn McBride at the University of Lethbridge (Alberta, Canada). My research involves studying the different typologies and emotional cycles of trichotillomania.

My supervisor and I would like to inquire if we may gain permission to use the following survey in my thesis research (n= 100+): Hair Pulling Survey (HPS) questionnaire developed in the article published:

Stanley, M. A., Borden, J. W., Mouton, S. G., & Breckenridge, J. K. (1995). Nonclinical hair-pulling: Affective correlates and comparison with clinical samples. Behaviour Research and Therapy, 33(2), 179–186. doi:10.1016/0005-7967%2894%29E0018-E

Any reference to the use of your scale would be cited in APA format. Permission to use the form will be added to the form before distribution. The form would only be used for

research – it would not be intended for clinical use.

If there are any other specific requirements around format, crediting, referencing, or layout of the HPS, and around how we may use it in our research, please let me know.

Thank you Dr. Stanley.

Kind regards.

Sebastian Siwiec
siwiec@mac.com

Dawn Lorraine McBride, Ph.D., Associate Professor, Reg. Psychologist (Clinical Specialty) & Supervisor
University of Lethbridge, Faculty of Education, Counsellor Education
(email address)

sebastian.

Appendix G:

Email from Dr. Douglas Woods for Permission to Use the MIST-A

March 30, 2012

sorry for the delayed response. This is fine with me.

Douglas W. Woods, Ph.D.
Professor of Psychology
Associate Dean of Social Sciences, Education and Business
The Graduate School
University of Wisconsin-Milwaukee
Milwaukee, WI 53211
(phone)
(fax)

March 06,2012
Hello Dr. Douglas Woods;

My name is Sebastian, a M.Ed (counselling) thesis candidate and I am under the supervision of Dr. Dawn McBride at the University of Lethbridge (Alberta, Canada). My research involves studying the different typologies of trichotillomania.

My supervisor and I would like to inquire if we may gain permission to use the following survey in my thesis research (n= 100+): Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A) questionnaire developed in the article published:

Flessner, C. A., Woods, D. W., Franklin, M. E., Cashin, S. E., & Keuthen, N. J. (2008). The Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A): Development of an instrument for the assessment of "focused" and "automatic" hair pulling. Journal of Psychopathology and Behavioral Assessment, 30(1), 20–30. doi:10.1007/s10862-007-9073-x

Any reference to the use of your scale would be cited in APA format. Permission to use the form will be added to the form before distribution. The form would only be used for research – it would not be intended for clinical use.

If there are any other specific requirements around format, crediting, referencing, or layout of the MIST-A, and around how we may use it in our research, please let me know.

Thank you Dr. Woods.

Kind regards.

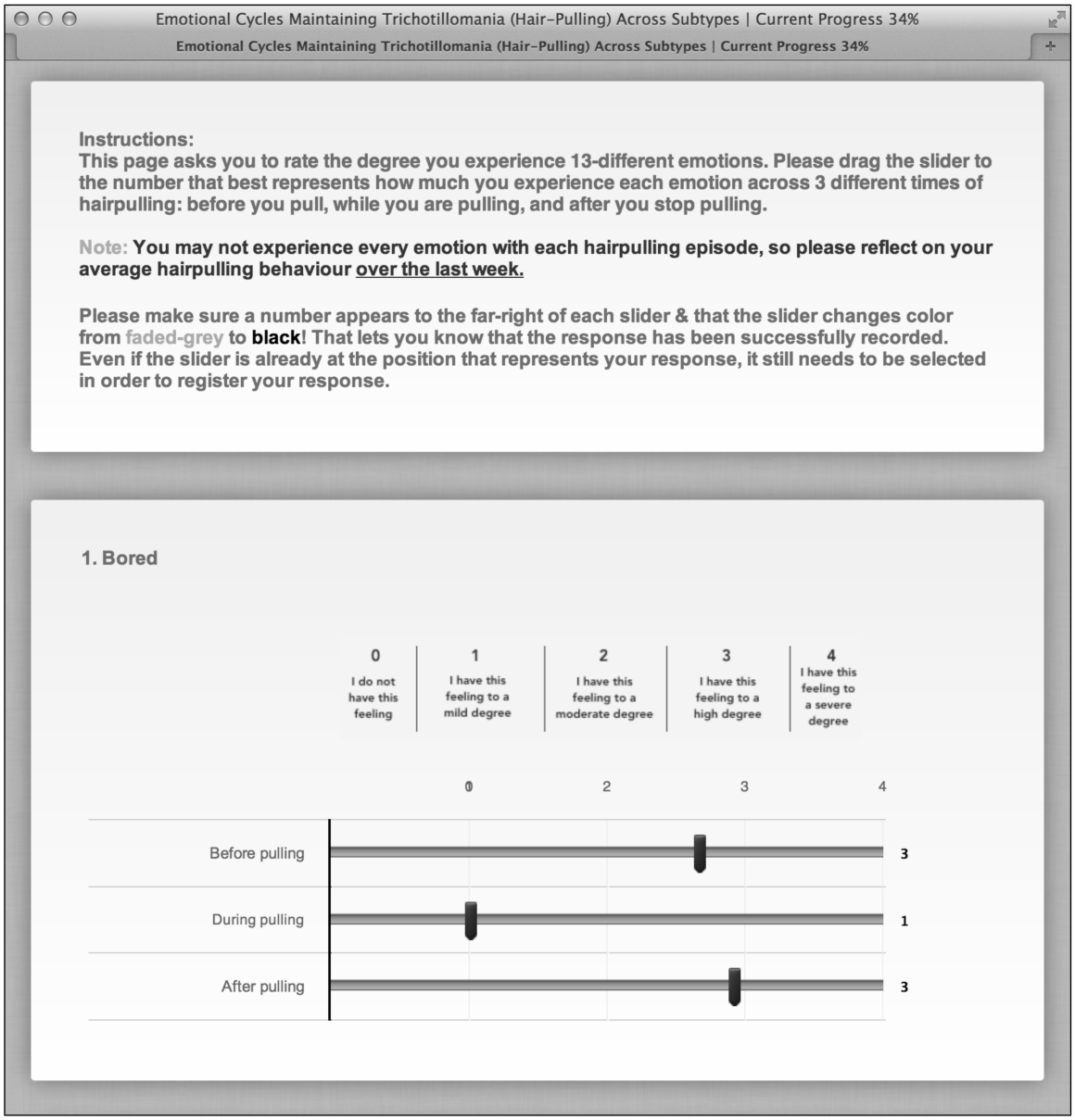
Sebastian Siwiec
(email address)

Dawn Lorraine McBride, Ph.D., Associate Professor, Reg. Psychologist (Clinical Specialty) & Supervisor
University of Lethbridge, Faculty of Education, Counsellor Education
(email address)

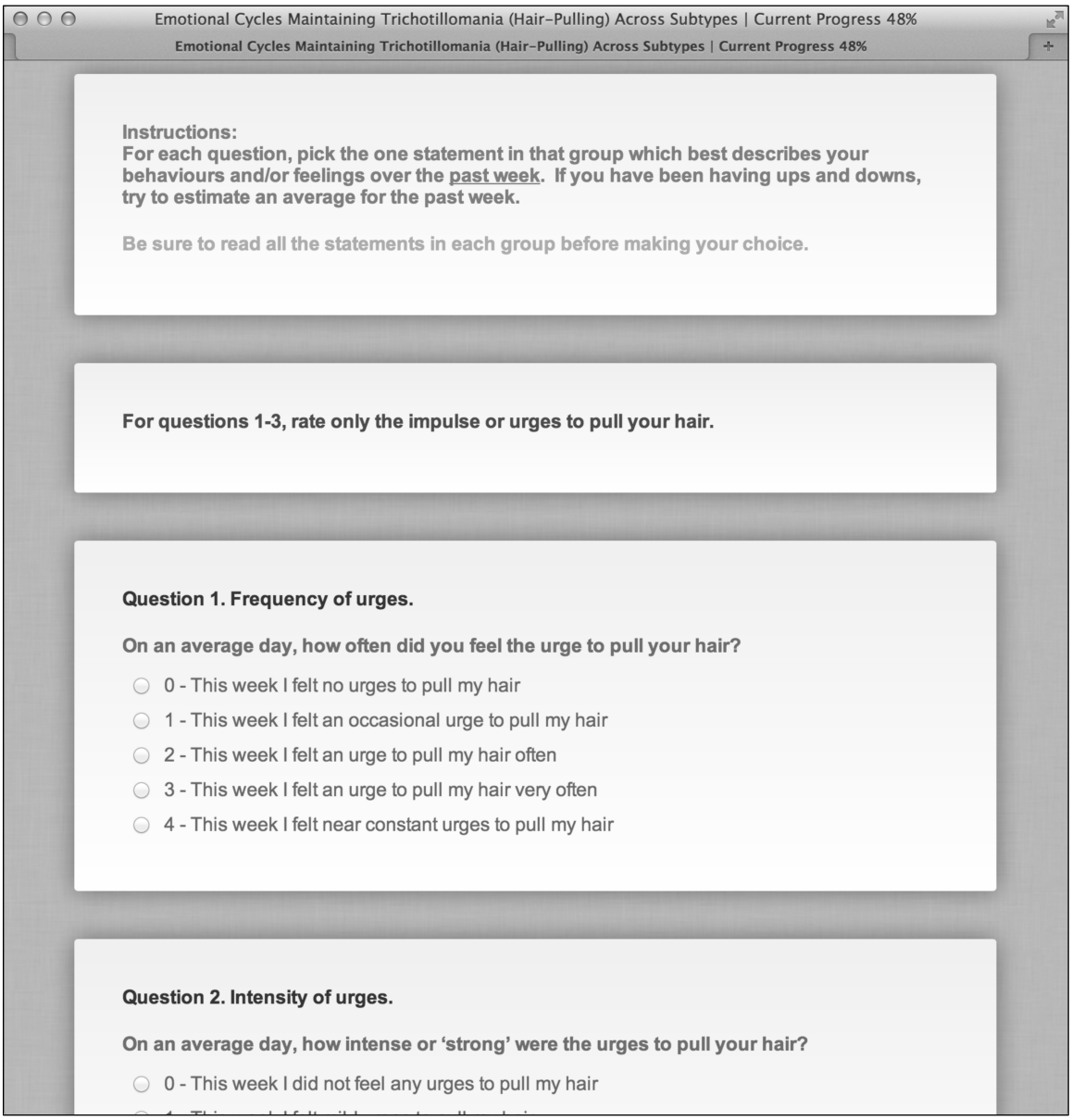
sebastian.

Appendix H:

STAQ Online Survey Sample Pages



Online version of the STAQ showing the Hair Pulling Survey (HPS) with mock answers.



Online version of the STAQ showing the Massachusetts General Hospital Hairpulling Scale (MGH-HPS).

Appendix I:

Link to Online Survey

Understanding the Emotional Cycles that Maintain Hairpulling among Subtypes of Trichotillomania

A graduate student, Sebastian Siwiec, from the University of Lethbridge in Alberta, Canada, is seeking your participation in an anonymous online survey to develop our understanding about the emotional patterns in adults with trichotillomania (hair-pulling disorder).

This study is inviting any adults who are 18 or older and who have trichotillomania or chronic hair-pulling to participate. You will be asked to complete an internet-based survey. The survey will take most individuals only 20-30 minutes to complete. For taking the time to complete the survey, I will be donating 1$ on your behalf to the Trichotillomania Learning Center.

Purpose behind the study: Individuals with trichotillomania often fluctuate between pulling their hair intentionally, or finding themselves suddenly aware that they have pulled without any idea of when they started. These two styles are commonly called focused and automatic pulling. What this study hopes to do with your help is develop an understanding of the emotions that occur around these two styles of pulling. My hope is that the information we collect together in this survey will help shed more light on trichotillomania and help continue developing effective treatment strategies.

To participate and learn more about this completely anonymous study, please click the link below. Thank you so much for your time and contribution!

<< URL >>

This study has been approved by the University of Lethbridge Human Subjects Research Committee.

Appendix J:

Email Distributed by the TLC to Participants

TLC

Participate in Research!

Raise $1 for TLC while advancing understanding of Trichotillomania

Dear (Contact First Name),

For those of you with trichotillomania who are 18 years of age or older, ***your participation is requested!*** The following research study hopes to gain insight into the differences between focused and automatic hair pulling, described below. As an added incentive, the researcher is donating $1 for every completed survey to TLC!

To participate and learn more about this completely anonymous study, please click here:
https://acsurvey.qualtrics.com/SE/?SID=SV_9KLyCKH9KDM65RH

More regional and online studies are posted online >>

About this Study:
Understanding the Emotional Cycles that Maintain Hairpulling Among Subtypes of Trichotillomania

Adults 18 and over with trichotillomania are invited to participate in an anonymous online survey to develop our understanding about the emotional patterns in adults with trichotillomania (hair pulling disorder).

Individuals with trichotillomania often fluctuate between pulling hair intentionally and finding themselves suddenly aware that they have pulled, without any idea of when they started. These two styles are commonly called focused and automatic pulling. This study hopes to develop an understanding of the emotions that occur around these two styles of pulling, thus shedding more light on trichotillomania and the development of effective treatment strategies.

You will be asked to complete an internet-based survey. It will take most individuals only 20-30 minutes to complete. For taking the time to complete the survey, the researcher will donate $1 on your behalf to The Trichotillomania Learning Center.

To participate and learn more about this completely anonymous study, please click here:
https://acsurvey.qualtrics.com/SE/?SID=SV_9KLyCKH9KDM65RH

This study has been approved by the University of Lethbridge Human Subjects Research Committee.

Thank you so much for your time and contribution!

With Love,
TLC

More Research Recruitments:

Internet Surveys:
various programs for adults with TTM, CSP, OCD and parents.

Florida :
Habit Reversal Training for Children and Adolescents with Trichotillomania: A Controlled Trial

Illinois:
Skin Picking Treatment Study

Massachusetts:
Genetics Research Study

Ohio:
Children with Hair Pulling Disorder (Trichotillomania) Needed for Family Assessment Study

Pennsylvania:
Children with Trichotillomania Needed for Behavior Therapy Study

Wisconsin:
Teens: Computerized Cognitive Training Programs for Trichotillomania

Adults: Acceptance-Enhanced Behavior Therapy (ACT) for Trichotillomania

Children ages 5-9: Non-drug Treatment Study

TLC

Trichotillomania Learning Center
207 McPherson St, Suite H, Santa Cruz, California
TLC is a 501(c)(3) nonprofit organization. Our EIN # is 77-0266587.

DONATE NOW

Stay In Touch

Forward this email

SafeUnsubscribe

Trusted Email from Constant Contact
Try it FREE today.

This email was sent to siwiec@mac.com by info@trich.org |
Update Profile/Email Address | Instant removal with SafeUnsubscribe™ | Privacy Policy.

Trichotillomania Learning Center, Inc. | 207 McPherson Street, Suite H | Santa Cruz | CA | 95060-2760

Appendix K:

Informed Consent

University of Lethbridge
Faculty of Education

CONSENT FORM

Emotional Cycles Maintaining Trichotillomania (Hair-Pulling Disorder) Across Subtypes

Thank you for indicating interest in this study. It is important you know your rights before you begin the study. You may decide that this survey is not a good fit for you. However, you may also decide that you want to help researchers, such as myself, understand trichotillomania.

What is the study's name? Emotional Cycles Maintaining Trichotillomania (Hair-Pulling Disorder) Across Subtypes. Basically, this fancy title states why people with trichotillomania may continue to hair pull.

Why are you being invited? You are being asked to participate in this study because as a member of the Trichotillomania Learning Center (TLC) and if you have trichotillomania, your personal experiences and insight answering this survey will be valuable to furthering the understanding of this condition. You must be 18 years or older to participate in this study.

What is the reason for this study? I want to study an area that not much is known about - what role do feelings play for those who have chronic hair pulling (trichotillomania).

What will I have to do? It is simple. If you agree to participate in this research, your participation will include completing an online survey that can take up to 60 minutes, but most people will be able to complete it in 20-30 minutes if you're working in a non-distracting environment. TIP: Please find time to complete the survey in one sitting because once you continue onto the next page, closing out of the survey will prevent you from returning and accessing the survey again.

The questionnaire you will be filling out consists of items asking for you to carefully read the question and honestly reflect on your experiences with trichotillomania. I, nor anyone else, will ever know your name so it is ok to be honest. An example of a survey question might be to rate how bored were you just before you pulled your hair?

There is a chance you might feel some discomfort when reflecting on your answers. However, if you want to stop answering the questions because it is causing you

distress, you can leave the survey by just closing your Internet browser. Once you do this, information about counselling services, with links, will be provided on screen.

And, did you know that to ensure this study is safe for participants, this study had to be approved by the Faculty of Education Human Subjects Research Committee at the University of Lethbridge and by the Trichotillomania Learning Center Scientific Advisory Board?

What will I gain and the TTM gain if I participate in this study? If you complete this survey, you will be helping researchers develop better and quicker strategies for assessing and treating trichotillomania. By reflecting on what types of emotions you may experience around hair pulling, you may gain further insight about the potential triggers that may make your hair pulling more likely. Also, once you complete the survey you will be provided with a link to access to the research findings and study results when they become available.

In addition, for every participant who submits a completed survey, I will be donating 1$ on your behalf (up to a maximum of 250$) to the Trichotillomania Learning Center to support its programs and outreach to the individuals and families of those with trichotillomania and other body-focused repetitive behaviours.

Do I have to participate? No. Your participation in this study is your choice, and it is your right as a participant to terminate the study at any point. Should you choose to exit the study, your answers will be discarded and not used in the research study.

Is privacy promised? Yes – very much so. This study takes many steps to protect your anonymity. You will *not* be required to provide your name, address or any other personally identifiable information. Additionally, everyone's responses will be combined into a database so there is no way to identify the answers you provide. This study will use web browser cookies to make sure participants can only answer the survey once.

Also, my supervisor, and myself will be the only ones to ever see the database throughout the data collection period. I promise to keep all data on a secure server, in a locked filing cabinet, and on my encrypted and password-protected computer and USB drive (stored in the locked filing cabinet). At the conclusion of the study, the online survey will be closed and all responses will be completely wiped from the online database. All survey responses will then be securely kept for a period of 5 years on an encrypted computer, USB drive, and locked filing cabinet, and then deleted or destroyed. Your name and identity will never be known as part of the study!

Who will find out about the results? Professionals and the community. The results of this study will be published in journals read by counsellors, psychologists and other health professionals. The findings, as well as treatment ideas, may also be shared with other researchers and students at conferences, meetings, and presentations. Your responses will also be used as part of my Master's thesis, and copy of my thesis study will be made available in the University of Lethbridge Library. There is no way anyone

will know your answers as the survey never asks for your name or any other identifying information.

Who is the researcher? Sebastian Siwiec. I am a Graduate student in the Faculty of Education at the University of Lethbridge and you may contact me if you have further questions by email at (email address) or by phone at (number).

Am I being supervised? Yes! As a Graduate student, I am required to conduct research as part of the requirements for a degree in Counselling Psychology. It is being conducted under the supervision of Dr. Dawn Lorraine McBride, Ph.D., R.Psych. You may contact my supervisor at (email address).

I will also be in contact with a statistical consultant who will help ensure my analysis produces the most accurate answers to furthering our understanding of trichotillomania. If you have any questions for my consultant, you may contact my supervisor at (email address).

If I would like more information or have comments on the study, who should I contact? In addition to being able to contact me or my supervisor (see above), you may verify the ethical approval of this study, or raise any concerns you might have about this study, by contacting the Chair of the Faculty of Education Human Subjects Research Committee at the University of Lethbridge (phone number) or by e-mail at (email address). Or, feel free to contact the Scientific Advisory Board of the Trichotillomania Learning Center at (phone number) or by email at (email address).

Your participation in the online survey indicates that you understand and agree to the above conditions. Submitting the completed survey implies that you have consented to allow your responses to be used in the research study. You may only complete the survey once.

Thank you for your participation in this survey!

□ I have read and understood the conditions of this study. I accept the conditions.

□ I am 18 years of age or older.

Appendix L:

Final Survey Page

Thank you for completing the survey! Your responses have been submitted successfully!

For taking the time to fill out the survey, I will be donating $1.00 on your behalf to the Trichotillomania Learning Center. This organization has played a pivotal role in helping connect and support individuals with trichotillomania and other body-focused repetitive behaviours, as well as serve as an advocate to society about trichotillomania. Your time in completing this survey directly benefits this organization and their efforts. Thank you.

What will happen to my survey responses? Your responses will be placed in a secure database alongside others who have also completed the survey. In my research prior to this study, I have found that because there are lot of individual differences in how people pull their hair, that there may also be different emotional triggers that make people more or less likely to pull (for example, while I might be triggered to pull while bored or tense, others may pull because they are feeling anxious or angry). What your responses help me to do is understand the link between different hairpulling styles and the emotions experienced when pulling. Ultimately, my hope is that our work together helps to create a better understanding of trichotillomania in order to develop more effective treatments.

If I have any questions, who may I contact? If you have any questions, feel free to contact me, Sebastian Siwiec, at (email address). I'd be happy to answer any questions that you may have.

You may also contact my supervisor, Dr. Dawn Lorraine McBride, Ph.D, R.Psych at (email address).

In addition to being able to contact me or my supervisor, you may verify the ethical approval of this study, or raise any concerns you might have about this study, by contacting the Chair of the Faculty of Education Human Subjects Research Committee at the University of Lethbridge at (phone number) or by e-mail at (email address). Or, feel free to contact the Scientific Advisory Board of the Trichotillomania Learning Center at (phone number) or by email at (email address).

***

Please bookmark this website. For completing this survey, I want you to have access to the findings of this study. I will be updating this page periodically with my findings under the 'Findings' tab at the top of this page.

***

If you require information on treatment providers who have identified themselves as professionals familiar with trichotillomania, please click a link below (clicking a link will open a new tab)

For Canada

For the United States

For your own records, a copy of the informed consent can be obtained << URL >>

Appendix M:

North American Treatment Providers Compiled by the TLC

Professional Resources - Canada

Note: TLC is not a certifying organization and does not endorse or recommend a particular treatment provider. However, our professional members have identified themselves as mental health providers familiar with trichotillomania.

For an updated list, please visit: http://www.trich.org/treatment/treatment-provider.html

Alberta:

Dr. A. Michael Maclean, Ph.D
Maven Health and Wellness
700, 1816 Crowchild Trail N.W.
Calgary, Alberta, Canada
T2M-3Y7
p. +1 403-313-8309
w. http://www.mavenhealth.com/

Janet Caryk, M.Ed., C. Psych
Centre for Cognitive Behavioral therapy
318 Capital Place, 9707 - 110 Street
Edmonton, Alberta, Canada
T5K-2L9
p. +1 780-455-8133

Dr. Karen Lefko-Singh
Glenrose Rehabilitation Hospital
10230 111 Ave.
Edmonton, Alberta, Canada
T5G-0B7
p. +1 780-471-7928

British Columbia:

Maven Health and Wellness
400 - 601 West Broadway
Vancouver, British Columbia, Canada
V5Z-4C2
p. +1 877-313-8309
w. http://www.mavenhealth.com/

Montréal:

Dr. Mordechai Glick
5800 Cavendish Blvd. Suite 401
Montréal, Quebec, Canada
H4W-2T5
p. +1 514-481-1918

New Brunswick:

V. Covert, M. D.
713 Millidge Ave.
St. John, New Brunswick, Canada
E2K-2N7
p. +1 506-634-7124

Ontario:

Dr. Peggy (Margaret) Richter
Sunnybrook Health Sciences Centre
2075 Bayview Ave., Rm. FG21a
Toronto, Ontario, Canada
M4N-3M5
p. +1 416-480-6832
e. peggy.richter@sunnybrook.ca

Saskatchewan:

Dr. R. C. Bowen
Anxiety and Mood Disorder Program
Royal University Hospital
103 Hospital Drive
Saskatoon, Saskatchewan, Canada
S7N-0W8
p. +1 306-966-8224

Professional Resources - United States of America

Note: TLC is not a certifying organization and does not endorse or recommend a particular treatment provider. However, our professional members have identified themselves as mental health providers familiar with trichotillomania.

For a full list, please visit: http://www.trich.org/treatment/treatment-provider.html

Appendix N:

Email from Bryce about Ownership of Data from Qualtrics

May 23, 2012

Sebastian,

Thank you for sending along your username, your account is upgraded.

I would be happy to answer your questions below:

1. There is no specified period of time. Due to the fact you own the data, you decide how long you would like us to host it.

2. I have attached our security documentation. Please let me know if anything else is needed.

3. I don't have any specific documentation about how to increase response rates, but I have an attached testimonial of a case study done about this topic.

Is anything else needed?

May 22, 2012:

Hello Bryce;

Thank you so much for the Qualtrics demo this afternoon. I was incredibly impressed by the demo you showed us today and I am excited to begin working towards building my survey in the software.

You had asked for my qualtrics username at the end of the conference, my username is:
siwiec@mac.com

Thank you for offering to support my study and providing me with a user license. This is a huge help and I really appreciate it.

Couple additional comments/questions the came up:

- You mentioned that Qualtrics keeps the data on their secure server, how long is the data kept on the server for?

- Also, is it possible to send me the whitepaper on the security of Qualtrics so that I may append it to my ethics application?

- And finally, do you offhand have any references or sources about how engagement in surveys improves responses?

Thanks again Bryce. The demo certainly had a lot of us jazzed to refer and speak to your software for upcoming institutional use.

sebastian.

Appendix O:

Email from Jennifer Raikes about Ownership of Data from TLC

April 11, 2012

Hi, Sebastian,
Thanks for your follow up.

TLC would not claim any ownership of results from your survey – normally we wouldn't consider ourselves to be distributing the survey, per se, but rather we are happy to advertise how people can participate. That is, we can post a link to an online survey or provide your contact information so you can distribute a survey to interested parties. We do appreciate a mention of TLC's assistance in any publication of the results.

If you want us to physically distribute a survey, for example by mail, then you would need to provide all the information to be sent, and would need to cover the cost of the mailing, and we would mail it out with a cover letter explaining that we are distributing it on your behalf as a service to the community.

As for particular information for an informed consent – normally our Scientific Advisory Board leaves it to your institutional review board to determine what is necessary – and some university's seem to require IRB approval of the advertising message itself as well as of the study design/informed consent form.

I hope this helps. Please do continue to follow up if I haven't answered all your questions.

Jennifer Raikes
Executive Director
Trichotillomania Learning Center, Inc. (TLC)
(contact information)

April 11, 2012

Thank you for the response Ms. Raikes.

Perhaps it will be best to list the questions my supervisor Dr. Dawn McBride and I had, and then if either yourself or Dr. Jon Grant could help me with them, that would be great appreciated.

1) I need to inquiry about ownership of survey data. I will cite TLC whenever I share my results and will send you copies of any of my results.

My #1 question: Who owns the data I collect if I collect the data through your website? I am willing to share any of the results you would like but I want to confirm who has ownership and control over the data.

2) I will have a very user-friendly consent form, approved by the university ethics board. I will, of course, list all of the required components to a consent form (e.g., right to withdraw, risks/benefits, etc) I will also list TLC is distributing the survey but that no one from TLC will have access to the data nor be able to identify any participants.

My #2 question: Would the TLC like any specific information to be included on the informed consent, aside from the standard items?

These are the most pertinent questions my supervisor and I had. Thank you again for your assistance and I really look forward to working with the TLC in helping to present my study.

sebastian.

Appendix P:

Human Subjects Research Approval Letter

The University of Lethbridge

MEMORANDUM

TO: Sebastian Siwiec
FROM: Kerry Bernes
Date: October 16, 2012

RE: Human Subject Research Application

Thank you for submitting the changes to your Ethical Review of Human Research Application "Emotional Cycles Maintaining Trichotillomania (Hair-Pulling) Across Subtypes." These changes are approved and adheres to the Tri-Council Policy Statement, published on the website
http://www.pre.ethics.gc.ca/eng/policy-politique/initiatives/tcps2-eptc2/Default/

Good luck with your research.

_____
Kerry Bernes, Ph.D.
Chair Human Subject Committee
Faculty of Education

Cc: Graduate Studies
Dawn McBride, Supervisor

Appendix Q:

Abstract Submitted to the Scientific Advisory Board

Purpose and Aims of the Study

It is well known that various cognitive, emotional, and situational variables may help initiate, maintain and reinforce hairpulling in individuals. What this online study is specifically looking to understand is what emotional experiences seem to trigger and hairpulling across different types of hairpulling patterns. To accomplish this goal I will be using the Milwaukee Inventory for Subtypes of Trichotillomania-Adult Version (MIST-A) by Flessner, Woods, Franklin, Cashin, and Keuthen (2008) to create four distinct hairpulling profiles.

What is unique about these four profiles is that rather than just grouping behaviours into either focused or automatic, each of the four subtypes includes both styles of pulling, but vary in the ratio and intensity that each of these two behavioural styles are emphasized. For example, one profile known as high-automatic, low-focused (HFLA) is characterized by a high degree of automatic behaviours but only a few focused hairpulling characteristics.

What I will be doing with these hairpulling subtypes is creating four profiles and identifying the emotions that are present to initiate hairpulling, maintain hairpulling, and terminate and reinforce hairpulling. For example, boredom might be a powerful emotion that initiates hairpulling in one profile, anxiousness could be initiating in another profile, while both boredom and anxiousness could trigger hairpulling in the third profile.

Ultimately, the value I believe this study has is that it will allow clinicians to carefully consider their treatment creation and administration. It promotes a greater differentiation of hairpulling styles that could lead to more targeted and effective treatment planning. For example, If I am triggered to pull when bored, distress tolerance training may not be effective, but awareness and mindfulness training might be; while someone who pulls when bored and anxious could benefit from both modalities of treatment.

Study Qualities

- Internet-based survey that takes most people only 20-30 minutes to complete
- Completely anonymous! No personal and identifiable data will be collected
- Short demographics questionnaire with language adopted from other large-scale trichotillomania studies (some questions borrowed with permission from the Trichotillomania Impact Project).
- Completing the Milwaukee Inventory for Subtypes of Trichotillomania (MIST-A), Hair Pulling Survey (HPS), Depression Anxiety and Stress Scale-21 (DASS-21), and Massachusetts General Hospital Hairpulling Scale (MGH-HPS)

Study URL

<< URL >>

Appendix R:

Study Description Submitted to the TLC

Understanding the Emotional Cycles that Maintain Hairpulling among Subtypes of Trichotillomania

A graduate student, Sebastian Siwiec, from the University of Lethbridge in Alberta, Canada, is seeking your participation in an anonymous online survey to develop our understanding about the emotional patterns in adults with trichotillomania (hair-pulling disorder).

This study is inviting any adults who are 18 or older and who have trichotillomania or chronic hair-pulling to participate. You will be asked to complete an internet-based survey. The survey will take most individuals only 20-30 minutes to complete. For taking the time to complete the survey, I will be donating 1$ on your behalf to the Trichotillomania Learning Center.

Purpose behind the study: Individuals with trichotillomania often fluctuate between pulling their hair intentionally, or finding themselves suddenly aware that they have pulled without any idea of when they started. These two styles are commonly called focused and automatic pulling. What this study hopes to do with your help is develop an understanding of the emotions that occur around these two styles of pulling. My hope is that the information we collect together in this survey will help shed more light on trichotillomania and help continue developing effective treatment strategies.

To participate and learn more about this completely anonymous study, please click the link below. Thank you so much for your time and contribution!

<< URL >>

This study has been approved by the University of Lethbridge Human Subjects Research Committee.

Appendix S

Donation to the TLC

The following is being sent on behalf of Executive Director Jennifer Raikes.

March 19, 2013

Mr. Sebastian Siwiec

Dear Sebastian,

On behalf of the Board of Directors, staff and the community we serve, I thank you for your donation of $250 (through Network for Good) to support TLC's Research Programs, in honor of all who participated in your research study. We also acknowledge that we have provided no goods or services for your charitable gift. Your message to them says, **"On behalf of those who participated in the Understanding the Emotional Cycles that Maintain Hairpulling among Subtypes of Trichotillomania survey. Thank you for the gift of your time and stories. I am moved by the gracious support you have shown me through this study. Your stories and responses will help move trichotillomania research forward, and support all of us in the journey to understand and end the suffering caused by this condition. –Sebastian"**

Your generosity will fund seminal research projects, bring scientists together to share ideas, and promote interest in trichotillomania and skin picking in the larger scientific community. TLC's research programs include an annual grant program that funds small-scale or pilot studies into the underlying biology, etymology, and improved treatment methods for hair pulling and skin picking disorders. In addition, TLC's Trichotillomania International Consortium for Research is now creating a well-phenotyped biobank of genetic data from individuals with trichotillomania or skin picking, putting our community in a position to benefit from current and future advances in genetic research and treatment. This is a project that our Scientific Advisory Board considers of the highest priority for improving our understanding of trichotillomania and skin picking, and creating better treatments. We, at TLC, thank you deeply.

Thank you for the active role you are playing to improve the lives of everyone suffering with trichotillomania and skin picking. We look forward to continuing working with you to bring hope and healing – and a cure! -- to our community in the years to come.

Warmest wishes,

Jennifer Raikes
Executive Director
Trichotillomania Learning Center
(contact information)

Appendix T

Twitter Link Distributed by the TLC