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The Milwaukee Inventory for Styles of Trichotillomania-Child Version (MIST-C)

Initial Development and Psychometric Properties

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This article describes the development and initial psychometric properties of the Milwaukee Inventory for Styles of Trichotillomania-Child Version (MIST-C), a self-report scale designed to assess styles of hair pulling in children and adolescents diagnosed with trichotillomania (TTM). Using Internet sampling procedures, the authors recruited 164 parent–child dyads, the children of whom met modified diagnostic criteria for TTM. The MIST-C was administered in the context of a larger survey examining functional impairment experienced by children with TTM. Results of an exploratory factor analysis on MIST-C items revealed a two-factor solution. Factors 1 ("focused" pulling scale) and 2 ("automatic" pulling scale) consisted of 21 and 4 items, respectively, with both scales demonstrating acceptable internal consistency and good construct and discriminant validity. The development of the MIST-C provides researchers with a reliable and valid assessment of "automatic" and "focused" pulling, and provides a means by which to examine the developmental trajectory and treatment implications of these pulling styles.

Keywords: *focused; automatic; pulling; trichotillomania*

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Trichotillomania (TTM) is characterized by the recurrent pulling out of one's hair resulting in noticeable hair loss. Individuals must experience an increasing sense of tension prior to or when attempting to resist pulling and gratification, relief, or pleasure when pulling. In addition, pulling must result in clinically significant distress or impairment and must not be better accounted for by another mental health or medical condition (American Psychiatric Association, 2000, p. 677). Despite these formal criteria, a diagnosis of TTM is often conferred in the absence of reported tension prior to and/or relief when pulling (Diefenbach, Tolin, Crocetto, Maltby, & Hannan, 2005; Watson & Allen, 1993; Watson, Dittmer, & Ray, 2000), although the validity of this practice has yet to be examined empirically.

In adults, prevalence estimates for TTM range from 0.6% to 3.4% depending on the extent to which tension and relief criteria are applied, and the disorder is more common among females (Christenson, Pyle, & Mitchell, 1991). In children and adolescents (hereafter referred to as children), prevalence is less certain but may be more prevalent (Mehregan, 1970) and the gender distribution more balanced (Cohen et al., 1995).

Treatment options for those with TTM are limited. In adults, various forms of pharmacotherapy have demonstrated limited success when compared to placebo (Woods, Flessner, et al., 2006). Cognitive-behavior therapy (CBT) has had more success, demonstrating superiority over wait-list controls (van Minnen, Hoogduin, Keijsers, Hellenbrand, & Hendriks, 2003; Woods, Wetterneck, & Flessner, 2006), pill placebo (Ninan, Rothbaum, Martsteller, Knight, & Eccard, 2000), and supportive therapy (Diefenbach, Tolin, Hannan, Maltby, & Crocetto, 2006). Nevertheless, it is recognized that even with effective CBT, TTM symptoms remain and the risk of relapse is high (e.g., Diefenbach et al, 2006; Woods, Wetterneck, et al., 2006). To date, few studies have investigated the efficacy of behavioral or pharmacotherapy in children with TTM (Franklin, Ledley, Cardona, &

Hajcak, 2005). Recognizing the limits of current treatments for TTM, researchers have begun to investigate the etiological and maintaining factors in the hope that a better understanding of the disorder will yield treatment advances (Woods, Wetterneck, et al., 2006).

A recent area of focus has involved examining possible styles of TTM, including the distinction between "automatic" and "focused pulling" (Christenson & Mackenzie, 1994; Christenson, Mackenzie, & Mitchell, 1991; Diefenbach, Mouton-Odum, & Stanley, 2002; du Toit, van Kradenburg, Niehaus, & Stein, 2001). Automatic pulling has been defined as pulling occurring primarily out of one's awareness. Examples include pulling hair while engaging in sedentary activities (e.g., watching television, reading a book, etc.) and not recognizing that pulling has occurred until it has been completed (e.g., seeing hair on lap or clothing, parents informing the child that hair is missing, etc.). In comparison, focused pulling has been described as pulling with an intentional quality and may include situations in which an individual pulls in response to negative emotional states (e.g., anxiety, stress, anger, etc.), an intense thought or urge, or in an attempt to establish symmetry. Current research supports the notion that at least some focused pulling episodes may represent an attempt to decrease negative impact or regulate an aversive private experience, such as anxiety, stress, or specific cognitions (Begotka, Woods, & Wetterneck, 2004; Diefenbach et al., 2002; Woods et al., 2006).

Christenson et al. (1991) examined 60 adults with chronic hair pulling and found that 5% reported pulling completely out of awareness, and 15% reported pulling in which the focus of attention was directly on hair pulling, but the majority of participants (80%) reported pulling that ranged from complete to incomplete awareness. In a subsequent study, Christenson and Mackenzie (1994) noted that up to 25% of clients experience primarily focused pulling. Nevertheless, both of these estimates were based on either informal assessment (Christenson et al., 1991) or anecdotal information (Christenson & Mackenzie, 1994) rather than on data gathered using a psychometrically sound instrument.

To date, only one study has systematically examined the relative prevalence of focused and automatic pulling styles in adults with TTM. du Toit et al. (2001) examined hair pulling in a sample of 47 self-referred, adult patients suffering from either TTM or chronic hair pulling (i.e., without tension and/or relief reported when pulling). Patients were asked to rate their pulling from entirely "automatic" (score of 0) to entirely "focused" (score of 4) with results indicating that 34% ($n = 16$) of participants characterized their pulling as primarily focused, 47% ($n = 22$) as primarily automatic, and

19% as equally automatic and focused. Notably, a large percentage of participants ($n = 38$; 81%) reported predominantly focused or automatic pulling. The findings by du Toit and colleagues contrast with substantially lower rates provided from earlier, less systematic studies (Christenson et al., 1991; Christenson & Mackenzie, 1994). However, the validity of the Likert scale developed by du Toit and colleagues (2001) is unclear, thus requiring caution when interpreting the study's results.

Recognizing the limitations imposed on the study of focused and automatic pulling by the lack of a psychometrically sound measure, Flessner, Woods, Franklin, Cashin, and Keuthen (in press) developed the Milwaukee Inventory for Subtypes of Trichotillomania–Adult Version (MIST-A); a 15-item scale designed to assess pulling styles in adults with TTM. As part of a larger study examining the functional impact of TTM in adults, Flessner and colleagues (in press) recruited 1,697 participants age 18 and older reporting symptoms of TTM via the Internet (Woods et al., 2006). This sample was randomly split ($n = 848$ and $n = 849$) and resultant data sets were used for two separate sets of analyses (exploratory and confirmatory analyses, respectively). Exploratory analyses (e.g., exploratory factor analysis) revealed a 10-item focused and 5-item automatic pulling scale both demonstrating acceptable internal consistency ($\alpha = 0.77$ and $\alpha = 0.73$, respectively), construct validity, and discriminant validity. Subsequent confirmatory analyses (e.g., confirmatory factor analysis) supported the measure's factor structure. In a follow-up study, Flessner, Conelea et al. (2006) used data obtained from the MIST-A to ascertain the relative prevalence of these pulling styles. Results indicated that 28.3% ($n = 480$) of participants were classified as predominantly automatic, 19.7% ($n = 335$) mixed (high levels of both automatic and focused pulling), and 14.4% ($n = 245$) predominantly focused pullers with a large portion of participants (37.5%, $n = 637$) demonstrating moderate levels of both focused and automatic pulling styles. Although demonstrating somewhat lower estimates of predominantly focused and automatic pulling than previous research (Christenson & Mackenzie, 1994; du Toit et al., 2001), the findings by Flessner et al. (in press) highlight the frequency with which individuals with TTM experience at least moderate levels of both focused and automatic pulling (e.g., 57.2%), which may have important implications for specific behavioral intervention(s) used to treat the disorder.

The creation of the MIST-A provided the first opportunity for researchers to reliably and accurately assess focused and automatic pulling in adults with TTM and is currently being used in studies to reexamine the prevalence

of and psychological factors related to these different pulling styles (Flessner, Conelea et al., 2006). Unfortunately, the use of the MIST-A in children and adolescents is limited by its normative age range (≤ 18 years of age). Despite the fact that TTM is apparently a pediatric onset disorder (e.g., Cohen et al., 1995), knowledge about pulling styles in children with TTM is limited, as only one very small *n* study has examined the issue. Reeve, Bernstein, and Christenson (1992) studied the clinical characteristics of 10 children with TTM (6 to 15 years of age) and found that none described hair pulling in a compulsive manner. Although this description was meant to highlight potential differences between TTM and obsessive-compulsive disorder (OCD) and did not include a direct assessment of pulling styles, literature has used similar terminology to describe at least one facet of focused pulling in adults with the disorder (e.g., pulling with an almost compulsive quality; Christenson & MacKenzie, 1994). Although these findings imply that focused pulling is extremely rare in children with TTM, Flessner et al. (in press) noted that such results may also indicate that very young children are unable to identify compulsive or focused pulling or that the emergence of focused pulling may follow a developmental trend. To further answer these questions, a measure assessing pulling styles is needed for children with TTM.

The aim of the current research was to develop the Milwaukee Inventory for Styles of Trichotillomania-Child Version (MIST-C), a measure assessing the degree to which children engage in different styles of pulling. Specifically, the current study sought to not only develop but also examine the psychometric properties of the MIST-C. To obtain a sufficient sample of child participants with symptoms of TTM, we used an Internet sampling procedure similar to procedures used in other studies (Flessner et al., in press; Flessner, Conelea et al. 2006; Woods, Flessner, et al., 2006).

Method

Participants

This research was part of the Child and Adolescent Trichotillomania Impact Project (CA-TIP), which was designed to examine the functional impact of TTM in children and was approved by the University of Wisconsin–Milwaukee's Institutional Review Board. A total of 336 children between 10 and 17 years of age and their parents (defined for the purposes of this study as the primary caregiver—biological or surrogate adult—who raised the child) were recruited through a link established with

the Trichotillomania Learning Center's (TLC's) homepage (www.trich.org).[1] Duplicate surveys (e.g., surveys containing identical information on all items) were excluded from all subsequent analyses, and respondents were included in all subsequent analyses only if (a) the child was between 10 and 17 years of age, (b) both the child and one of his or her parents completed the survey (described below), and (c) the child met diagnostic criteria for TTM (APA, 2000, p. 677) as modified for the purposes of this study.

Modified diagnostic criteria required respondents (child and/or his or her parent) to indicate that the child (a) pulls his or her hair resulting in noticeable hair loss (parent *or* child report), (b) *never/almost never* (0%-10% of the time) pulls his or her hair because voices (like an imaginary friend) tell him or her to and *never/almost never* (0%-10% of the time) pulls because he or she believes small bugs are crawling on him or her (child report), (c) has not always pulled as the result of physical causes (e.g., skin conditions, physical illness, or injury) or the use of medications, drugs, or alcohol (parent report), and (d) hair pulling results in at least "mild to moderate" impairment (a score of 3 or greater on a 9-point Likert scale) in day-to-day, social, interpersonal, or academic functioning (child *or* parent report).

Children. A total of 164 children met modified diagnostic criteria for TTM.[2] The sample was 10.4% boys (n = 17) and 73.2% girls (n = 120). Gender identifying information was not obtained for 27 respondents because of an early error in data collection.[3] Participants represented a range of ethnicities, including 86.6% (n = 142) Caucasian, 5.5% (n = 9) Hispanic/Latino, 3.6% (n = 6) multiracial, and 0.6% (n = 1) African American. Participants ranged in age from 10 to 17 years old (M = 14.3, SD = 2.33) and their median grade completed was 11th grade. Per parental report, 68.9% (n = 113) had previously been diagnosed with TTM and 40.9% (n = 67) had been diagnosed with another psychiatric disorder with mood (e.g., depression, bipolar disorder, etc.), anxiety (e.g., OCD, social phobia, panic disorder, etc.), and attention-deficit hyperactivity disorder among the most common other diagnoses.[4]

Parents. The child's primary caregiver (parent) represented a range of relationships to their children, including 89.0% (n = 146) biological mother, 5.5% (n = 9) biological father, 3.7% (n = 6) foster mother, and 1.8% (n = 3) maternal relative and ranged in age from 29 to 70 (M = 44.3, SD = 6.63). Parents also represented a range of ethnicities, including 91.5% (n = 150) Caucasian, 4.3% (n = 7) Hispanic/Latino, 2.4% (n = 4) other, and 0.6% (n = 1) African American. The median income was $50,000 to $75,000, and

the modal degree completed was a high school or GED equivalent. A total of 79% ($n = 130$) were married, 18.2% ($n = 28$) divorced or separated, and 1.2% ($n = 2$) widowed.

Instruments

Trichotillomania Impact Survey for Children (TISC). The TISC was developed in stages. In the first stage, the first three authors (CAF, DWW, and MEF) developed a set of questions and chose standard measures to assess a broad range of areas of importance to children with TTM (e.g., phenomenology, functional impact, pulling severity, etc.). The TISC contained both a parent and child section.

Parent section. The parent section of the TISC included questions assessing demographic characteristics, the child's history of hair pulling (e.g., age of onset, sites of pulling, percentage of hair missing, etc.), functional impact (e.g., social impact, performance at school, etc.), and treatment history (e.g., medications used, treatment providers knowledge about TTM, etc.). In addition, the parent section included several parent-report scales, such as the Family Assessment Measure: General Scale (FAM) (Skinner, Steinhauer, & Sitarenios, 2000), the Parent Report on Child's Anxiety Symptoms (PROCAS) (March, Parker, Sullivan, Stallings, & Conners, 1997), Attitude Towards My Child Rating Checklist (scale developed as part of the Trichotillomania Impact Project for Children [TIP-C]), and the Trichotillomania Scale for Children–Parent Version (TSC-P) (Diefenbach, Tolin, Franklin, & Anderson, 2003).

Child section. The child section of the TISC included questions assessing the phenomenology and history of the child's hair pulling (e.g., sites pulled from, sensations preceding and/or following pulling episodes, etc.) and functional impact (e.g., Does hair pulling make it hard for you to study?). In addition, the child section included several self-report scales, such as the Child Depression Inventory (CDI) (Kovacs, 1992), Multidimensional Anxiety Scale for Children (MASC) (March, 1998), the TSC–Child Version (TSC-C) (Diefenbach et al., 2003), items used in the creation of the MIST-C, and the Body Esteem Scale for Adolescents and Adults (Mendelson, Mendelson, & White, 2001).

In the second stage of development, the TISC was sent to two experts in the field of TTM for feedback regarding survey items, item wording, and survey structure. Last, we sent the survey to members of the TLC–Scientific Advisory Board for comment and placed a finalized version of the TISC online via a link to the TLC homepage.

Analysis of construct validity. To aide in examination of the MIST-C's construct validity, relevant criterion measures from the TISC were selected, including the PROCAS, CDI, MASC, and 3 items from the TISC assessing phenomenological characteristics associated with TTM. What follows is a description of the MIST-C and rationale for the criterion measures used as part of this study.

MIST-C. The MIST-C is a 36-item self-report scale modeled after the MIST-A (Flessner et al., in press) to assess the degree to which children with TTM engage in automatic and/or focused pulling. Items of the MIST-C were developed based on clinical experience and research examining styles of pulling. The scale was examined by several experts in the field of TTM as part of the TISC review process with the final items included in the scale rated from 0 (*not true of any of my hair pulling*) to 9 (*true for all of my hair pulling*). Initial items of the MIST-C can be found in Table 1.

MASC. The MASC is a 39-item self-report scale assessing anxiety that yields an overall and four subscale scores (Social Anxiety, Separation Anxiety, Harm Avoidance, and Physical Symptoms). MASC items are rated on a 4-point Likert scale with scores ranging from 0 (*never true about me*) to 3 (*often true about me*). Research has demonstrated varying degrees of internal consistency for the overall MASC score (α = 0.89-0.90), Social Anxiety (α = 0.82-0.84), Separation Anxiety (α = 0.70-0.75), Harm Avoidance (α = 0.64-0.74), and Physical Symptoms subscales (α = 0.79-0.85) (March, 1998; March et al., 1997; Wood, Piacentini, Bergman, McCracken, & Barrios, 2002). However, each of these scales has demonstrated acceptable test–retest reliability (3 months; March, 1998; March et al., 1997). In addition, the MASC has demonstrated adequate convergent and divergent validity (March, 1998; March et al., 1997; Wood et al., 2002).

PROCAS. Items constituting the PROCAS are identical to MASC items except that nouns and pronouns are altered to match the parent's perspective (e.g., "My child . . ." rather than "I . . ."). To date, norms have not been published for this measure. March et al. (1997) found that parent–child agreement ranged from $r = 0.18$ (father–child, MASC total score) to $r = 0.71$ (mother–child, Physical Symptom subscale) with mothers, in comparison to fathers, demonstrating an increased likelihood to report anxiety in their child (March et al., 1997; Wood et al., 2002). Subsequent research has demonstrated acceptable to very good internal consistency for parent-report of the Harm/Avoidance ($\alpha = 0.68$), Separation Anxiety ($\alpha = 0.72$), Physical Symptom ($\alpha = 0.81$), and Social Anxiety ($\alpha = 0.85$) subscales.

Table 1
Factor Structure Coefficients From the Principal-Axis Factor Analysis with Varimax Rotation of MIST-C Scores

Item	Factor 1 Structure	Factor 2 Structure	Communality
I pull my hair to feel better or get some relief.	**0.773**	–0.071	0.705
Pulling my hair relaxes me.	**0.699**	0.060	0.718
I experience a strong urge of feeling before I pull my hair.	**0.659**	0.074	0.694
Pulling gets rid of my bad feelings.	**0.644**	0.028	0.731
I pull my hair to control how I feel.	**0.636**	0.098	0.623
Pulling makes me feel good (at least for a little bit).	**0.630**	0.056	0.767
I have a "strange" feeling just before I pull my hair.	**0.604**	0.165	0.560
I like the feeling of pulling my hair.	**0.587**	–0.124	0.574
I think about pulling my hair before I actually pull.	**0.575**	–0.145	0.583
The bad feelings I have about pulling make me pull more.	**0.574**	0.254	0.567
It is hard for me to stop pulling my hair.	**0.535**	0.257	0.559
The feeling I get after pulling makes me want to pull more.	**0.521**	0.139	0.521
I pull my hair because of something that has happened to me during the day.	**0.510**	0.155	0.632
I pull my hair when I am stressed, angry, frustrated, or sad.	**0.499**	0.156	0.736
I pull my hair when I am anxious or upset.	**0.480**	0.222	0.738
I feel bad before I pull, but I feel worse after I pull.	**0.463**	0.125	0.506
I feel like a "zombie" when I pull my hair.	**0.432**	0.310	0.574
I use tweezers or some other tool (not my fingers) to pull my hair.	**0.428**	–0.079	0.513
After I pull my hair, the urge to pull goes away or gets "better" for at least a little bit.	**0.428**	0.040	0.554
When I am at school or work, I can't wait to get home and pull.	**0.419**	0.166	0.442
I feel better after pulling my hair than I did before I pulled.	**0.410**	0.189	0.698
I pull my hair while I am looking in the mirror.	0.382	–0.176	0.548
I pull my hair on purpose.	0.353	–0.223	0.412
I only pull when I know others won't be watching.	0.341	–0.063	0.478
I pull my hair because of how my hair feels (e.g., dry or rough) or how my hair looks (e.g., hair out of place)	0.326	–0.001	0.484
I follow specific rules for how I pull my hair.	0.324	0.161	0.469
I plan a time to pull during the day.	0.215	–0.080	0.376
I don't know that I have pulled my hair until after it has happened.	–0.095	**0.851**	0.759
I don't know I have pulled my hair until my parent(s) tell me.	–0.202	**0.782**	0.702
I usually do not know that I have pulled my hair.	–0.066	**0.758**	0.671
I feel like I am in a "trance" when I pull my hair.	0.279	**0.491**	0.581
I pull my hair when I am thinking about things that have nothing to do with my pulling.	0.282	0.361	0.603
I pull my hair when I am focusing on another activity.	0.223	0.318	0.623
I pull my hair when I am bored.	0.285	0.310	0.535
There is no real reason for my pulling.	–0.018	0.197	0.452
I can resist pulling despite the urge to pull.	–0.002	–0.131	0.292

Note: Items in bold are those items that loaded onto the respective factor using our modified diagnostic criteria and were retained in the final version of the Milwaukee Inventory for Styles of Trichotillomania-Child Version (MIST-C).

CDI. The CDI is a 27-item self-report scale assessing depression in children. The child is asked which of three descriptions best fits how he or she has been feeling over the past 2 weeks (e.g., "I do most things wrong," "I do many things wrong," or "I do everything wrong"). Because one item from the CDI relates to suicidal behavior (item 9) and the study design prohibited direct contact or intervention for potentially suicidal children, this item was excluded as part of the Web-based version of the CDI.[5] Data generally suggests good internal consistency and split half reliability for the overall CDI score (α = 0.78-0.94 and r = 0.57-0.84, respectively) (Charman & Pervova, 2001; Saylor, Finch, Spirito, & Bennet, 1984). Although the scale's test–retest (1 week and 3 week) reliability is somewhat more variable (r = 0.38-0.87 and r = 0.74-0.83) (Kaslow, Rehm, & Siegel, 1984; Saylor et al., 1984; Smucker, Craighead, Craighead, & Green, 1986), the overall CDI score has demonstrated generally good construct validity (Kovacs, 1992; Romano & Nelson, 1988; Saylor et al., 1984). However, research suggests only adequate internal consistency for the CDI's subscale scores (α = 0.62, 0.59, 0.63, 0.66, and 0.68, respectively) (Kovacs, 1992).

Specific items from the TISC. Several items from the child section of the TISC were used as criterion measures of construct validity. These items

specifically addressed domains pertinent to automatic and/or focused pulling and were rated from 1 (0%-10% of the time) to 5 (90%-100% of the time). Questions included, "How often do you *know* when you are pulling?" (e.g., awareness of pulling; hereafter referred to as item 1), "How often do you feel like your heart is beating really fast, or you start sweating before you begin pulling or if you try to stop yourself from pulling?" (e.g., physical anxiety; hereafter referred to as item 2), and "How often do you worry or get scared that something bad will happen if you do not pull right away or in a certain way?" (e.g., mental anxiety; hereafter referred to as item 3).

Rationale for inclusion of criterion measures. Research examining adults with TTM suggest that focused pulling may represent an attempt to decrease levels of negative affect or regulate aversive private experiences (e.g., anxiety, stress, depression, etc.) (Begotka et al., 2004; Diefenbach et al., 2002; Woods, Wetterneck, et al., 2006). Conversely, research has failed to demonstrate a relationship between negative affect and automatic pulling (Flessner et al., in press). Therefore, to examine the construct validity of the MIST-C, we examined the relationship between participants' scores on the automatic and focused pulling scales of the MIST-C and participants' overall CDI scores, overall PROCAS scores, and MASC total and subscale scores.

Because automatic pulling is best characterized by pulling out of one's awareness (Christenson & Mackenzie, 1994), item 1 from the TISC was selected as a criterion measure of pulling awareness. Conversely, items 2 and 3 were developed based on prior research suggesting that one facet of focused pulling may include the regulation of aversive private experiences (Begotka et al., 2004; Woods, Wetterneck, et al., 2006) and that anxiety may serve as a stimulus cue for focused pulling (Diefenbach et al., 2002). Consequently, we believe that item 1 and items 2 and 3 provide adequate, face valid, criterion measures of automatic and focused pulling, respectively.

Procedure

The TISC was linked to the TLC Web site for a 3-month period, and e-mails directing participants to the survey link were sent from the TLC to individuals on its contact list. Prior to completing the TISC, respondents were informed of the project's requirements and that submission of the survey indicated consent to participate in research. The child's parent was asked to complete his or her section of the TISC first. After the parent completed his or her section, he or she was asked to leave the room to allow his or her child to complete the TISC in privacy (unless the child was confused about an item's wording and asked for assistance). The entire survey took approximately 45 and 60 minutes for the parent and child to complete, respectively. The TISC was developed and data were collected and stored using surveymonkey.com.[6] The first author subsequently downloaded these data into a format suitable for analysis using the Statistical Package for the Social Sciences, version 13.0 (SPSS-13.0).

Results

Exploratory factor analysis. Principal axis factor analysis was conducted on scores from each item of the MIST-C for the 164 respondents meeting inclusion criteria. Because it is unclear whether the same two-factor solution demonstrated for adults with TTM (Flessner et al., in press) is relevant for children, a scree test and parallel analysis were used to determine the MIST-C's underlying factor structure (Bryant & Yarnold, 1995). Varimax rotation was performed and the factor matrix was studied. Results obtained using the scree test and parallel analysis revealed disparate factor solutions. Specifically, parallel analysis revealed more factors than could be interpreted. As a result, findings from the scree test were interpreted and revealed a two-factor solution. Factor 1 ("focused" pulling scale), with eigenvalue = 8.34, accounted for 23.2% of the variance and consisted of 21 items. Factor 2 ("automatic" pulling scale), with eigenvalue = 3.44, accounted for 9.6% of the variance and consisted of 4 items. Items were selected as representative of either Factor 1 or Factor 2 if the item displayed a factor structure coefficient of 0.40 or higher (Stevens, 2002; Tabachnick & Fidell, 2001). Factor structure coefficients are presented in Table 1.

Because the MIST-C was designed to assess styles of pulling, the empirical evidence supporting or refuting the utility of the MIST-C's two distinct scales is of greater importance than empirical evidence supporting or refuting a total score. Therefore, subsequent psychometric analyses pertain only to these distinct scales and do not include discussion as to the psychometric properties of an overall MIST-C score.

Internal consistency. Internal consistency coefficients (Cronbach's alphas) were obtained for scores from both the focused and automatic pulling scales of the MIST-C. These scores are reported in Table 2. Results indicated that the focused pulling scale ($\alpha = 0.90$) demonstrated excellent internal consistency, and the automatic pulling scale ($\alpha = 0.80$) demonstrated good internal

consistency (Nunnally & Bernstein, 1994). These results yield a 25-item version of the MIST-C consisting of a 21-item focused pulling scale with scores ranging from 0 to 189 and a 4-item automatic pulling scale with scores ranging from 0 to 36. Higher scores indicate increasingly focused or automatic pulling, respectively.

Means and standard deviations. The MIST-C does not provide an overall score. Instead, the MIST-C yields two distinct scale scores. The average score on the focused scale of the MIST-C was 95.9 (SD = 35.5), and the average score on the automatic pulling scale of the MIST-C was 13.3 (SD = 8.7).

Construct validity. Spearman rank order (i.e., ordinal data) and Pearson product moment (i.e., interval/ratio data) correlations were conducted to examine the strength of the relationship between MIST-C scale scores and scores from the CDI, PROCAS, MASC (including subscales), and several specific questions from the TISC (e.g., items 1, 2, and 3). Due to the number of correlational analyses conducted (n = 20), an alpha level of 0.0025 was used to determine statistical significance. Results from these analyses are presented in Table 3.

Automatic pulling scale. Spearman rank order correlations revealed a strong, negative correlation between scores on the automatic pulling scale and the proportion of time children reported awareness of pulling (item 1; r (136) = –0.61, $p \leq .001$), indicating that as scores on the automatic pulling scale increased children reported less awareness of hair pulling. No statistically significant relationships were found between scores on the automatic pulling scale and self-reported physical anxiety (item 2) or mental anxiety (item 3) preceding or during pulling episodes. Pearson product moment correlations revealed a statistically significant weak to moderate relationship between scores on the automatic pulling scale and the Physical Symptoms subscale of the MASC (r [135] = 0.27, p = .002) indicating that as scores on the automatic pulling scale increased children reported more physical symptoms of anxiety. Additional Pearson product moment correlations revealed no statistically significant relationship between scores on the automatic pulling scale and PROCAS, CDI, and MASC total scores or remaining MASC subscale scores.

Focused pulling scale. Spearman rank order correlations revealed a moderate, positive correlation between scores on the focused pulling scale and children's self-report of physical anxiety (item 2; r [136] = 0.33, $p \leq .001$) indicating that as scores on the focused pulling scale increased children

Table 2
Internal Consistency Coefficients (Cronbach's Alphas) for Both the "Focused" and "Automatic" Pulling Scales of the MIST-C

Scale	α Corrected-Item Correlation	α With Item Deleted
"focused" pulling scale	0.903	
1. I pull my hair to feel better or get some relief.	0.700	0.89
2. Pulling my hair relaxes me.	0.680	0.894
3. I experience a strong urge of feeling before I pull my hair.	0.643	0.895
4. Pulling gets rid of my bad feelings.	0.629	0.896
5. I pull my hair to control how I feel.	0.619	0.896
6. Pulling makes me feel good (at least for a little bit).	0.633	0.895
7. I have a "strange" feeling just before I pull my hair.	0.604	0.896
8. I like the feeling of pulling my hair.	0.512	0.899
9. I think about pulling my hair before I actually pull.	0.505	0.899
10. The bad feelings I have about pulling make me pull more.	0.587	0.897
11. It is hard for me to stop pulling my hair.	0.533	0.898
12. The feeling I get after pulling make me want to pull more.	0.470	0.900
13. I pull my hair because of something that has happened to me during the day.	0.503	0.899
14. I pull my hair when I am stressed, angry, frustrated, or sad.	0.498	0.899
15. I pull my hair when I am anxious or upset.	0.478	0.900
16. I feel bad before I pull, but I feel worse after I pull.	0.437	0.901
17. I feel like a "zombie" when I pull my hair.	0.409	0.902
18. I use tweezers or some other tool (not my fingers) to pull my hair.	0.368	0.903
19. After I pull my hair, the urge to pull goes away or gets "better" for at least a little bit.	0.432	0.901
20. When I am at school or work, I can't wait to get home and pull.	0.401	0.901
21. I feel better after pulling my hair than I did before I pulled.	0.427	0.901
"automatic" pulling scale	0.798	
1. I don't know that I have pulled my hair until after it has happened.	0.783	0.655
2. I don't know I have pulled my hair until my parent(s) tell me.	0.701	0.708
3. I usually do not know that I have pulled my hair.	0.699	0.707
4. I feel like I am in a "trance" when I pull my hair.	0.329	0.888

reported more physical sensations prior to or when trying to resist pulling. No statistically significant relationships were found between scores on the focused pulling scale and self-reported awareness of pulling (item 1) or mental anxiety (item 3).

Table 3
Correlations Between the "Automatic" and "Focused" Pulling Scales of the MIST-C and Criterion Measures of Construct Validity

Criterion Measure	"Automatic" Pulling Scale	"Focused" Pulling Scale
Item 1: How often do you *know* when you are pulling?	–0.61*	0.13
Item 2: How often do you feel like your heart is beating really fast, or you start sweating before you begin pulling, or if you try to stop yourself from pulling?	–0.04	0.33*
Item 3: How often do you worry or get scared that something bad will happen if you do not pull right away or in a certain way?	0.001	0.24
PROCAS total score	0.11	0.19
CDI total score	0.12	0.41*
MASC total score	0.16	0.36*
Physical Symptoms subscale total	0.27*	0.40*
Harm Avoidance subscale total	–0.01	0.17
Social Anxiety subscale total	0.06	0.37*
Separation and/or panic	0.11	0.09

Note: MIST-C = The Milwaukee Inventory for Styles of Trichotillomania-Child Version; PROCAS = Parent Report on Child's Anxiety Symptoms; CDI = Child Depression Inventory; MASC = Multidimensional Anxiety Scale for Children.
* $p \leq .0025$.

Pearson product moment correlations revealed moderate, statistically significant relationships between scores on the focused pulling scale and CDI total score, $r\,(136) = 0.41$, $p \leq .001$, MASC total score, $r\,(135) = 0.36$, $p \leq .001$, the MASC's Physical symptoms subscale, $r\,(135) = 0.40$, $p \leq .001$, and the MASC's Social Anxiety subscale, $r\,(135) = 0.37$, $p \leq .001$, indicating that as scores on the focused pulling scale increased children reported experiencing more symptoms of depression and anxiety. No statistically significant relationships were found between scores on either the focused pulling scale and the PROCAS total score or the MASC's Harm Avoidance or Separation and/or Panic subscales. Taken together, these results provide preliminary evidence, suggesting that both the automatic and focused pulling scales of the MIST-C are accurate measures of their respective constructs.

Discriminant validity. In an attempt to further examine whether the focused and automatic pulling scales truly examine different styles of TTM, a Pearson product moment correlation was conducted to examine the relationship between these scales' total scores. Results demonstrated no statistically significant relationship between the focused and automatic pulling scales, $r\,(135) = 0.15$, $p = .08$, providing support for the notion that these two scales measure disparate dimensions of TTM.

Discussion

This study investigated the development and psychometric properties of the MIST-C, an instrument designed to assess styles of pulling in children with symptoms of TTM. It is the first study to provide systematic, empirical evidence supporting the existence of focused and automatic pulling styles in children. Although Reeve and colleagues (1992) found that none of the children they assessed reported engaging in pulling of a compulsive nature (i.e., focused pulling), the authors did not use an instrument specifically designed to reliably and accurately assess pulling styles. The results of our analyses revealed a 25-item measure consisting of two distinct scales. Both the focused and automatic pulling scales demonstrated very good internal consistency and good construct validity. Results also revealed no significant relationship between scores on these respective scales, providing empirical support for the notion that these scales measure disparate dimensions of TTM. This finding is convergent with findings from research conducted with adults, wherein two distinct styles of TTM labeled automatic and focused pulling were identified (Christenson et al., 1991; Christenson & Mackenzie, 1994; Flessner et al., in press).

The development of the MIST-C provides researchers and clinicians with a means by which to reliably and accurately assess pulling styles in children with TTM in a time-sensitive and efficient manner (i.e., less than 5 minutes). Researchers examining TTM in adults have postulated that modifying treatment based on the function of an individual's hair pulling may improve treatment outcome (Christenson & MacKenzie, 1994; Diefenbach et al., 2002; Franklin, Tolin, & Diefenbach, 2006). For example, it may be the case that children engaging in predominantly automatic pulling may be best served by treatment strategies aimed at increasing a child's awareness of pulling and disrupting the chain of habitual responding (e.g., habit reversal training; Azrin & Nunn, 1973). Conversely, children engaging in predominantly focused pulling may be best served by strategies addressing negative private experiences exacerbating a pulling episode (e.g., stress, symptoms of anxiety and depression, etc.), such as Cognitive

Behavior Therapy (CBT). Still other children may experience both automatic and focused pulling. In cases such as these, the child may be best served by a combined treatment approach incorporating habit reversal training within the context of CBT. A similar approach to combined treatment has recently demonstrated efficacy in the treatment of adults with TTM (e.g., acceptance-enhanced behavior therapy; Woods, Wetterneck, et al., 2006). Although studies have yet to formally investigate these hypotheses in children, the incorporation of the MIST-C as part of a comprehensive assessment battery (e.g., self-report, clinical interview, functional assessment, etc.) may provide a psychometrically acceptable tool for doing so, and information from the MIST-C may then be used to better formulate hypotheses or generate alternative hypotheses regarding the existence and treatment of distinct pulling styles in children with TTM. Consequently, the use of the MIST-C may help to enhance the effectiveness of interventions provided by practicing clinicians treating children with this often misunderstood disorder.

Researchers have noted similarities between TTM and a variety of other psychiatric disorders, including body dysmorphic disorder, bulimia nervosa, hypochondriasis, impulse-control disorders, OCD, skin picking, and tic disorders (Jaisoorya, Janardhan-Reddy, & Srinath, 2003; Lochner, Simeon, Niehaus, & Stein, 2002; Mackenzie, Ristvedt, Christenson, Smith Lebow, & Mitchell, 1995). As a result, the MIST-C, or a measure similar to the MIST-C, may help to answer important questions relating to the course of not only TTM but other psychiatric conditions as well. For example, a client with Tourette's syndrome may not experience or may be unaware of the urges or feelings preceding some tics (e.g., mouth grimacing, eyebrow raising, etc.) but may be quite aware of urges preceding other tics (e.g., throat clearing, head jerking, etc.).

Despite the encouraging findings described above, methodological shortcomings to the current study should be addressed. First, data were collected from a nonreferred sample of children (and their parents) with symptoms of TTM and may not represent an accurate picture of pulling styles in a clinical population. Because data were not collected via live clinical observation, we could not confirm the accuracy of the diagnostic information provided by respondents to the TISC, nor could we confirm the prevalence of possible comorbid diagnoses. Although research utilizing Internet sampling procedures with children and adolescents is still in its infancy, recent research utilizing adult samples suggests that data collected from Internet samples provide results consistent with traditional methods (Gosling, Vazire, Srivastava, & John, 2004). These same procedures have been used recently to develop and examine the psychometric properties of an adult version of

the MIST-C (e.g., MIST-A; Flessner et al., in press) and to examine the functional impact of both TTM and chronic skin picking (Flessner & Woods, 2006; Wetterneck, Woods, Norberg, & Begotka, 2006; Woods, Flessner, et al., 2006). Notably, Wetterneck and colleagues (2006) demonstrated marked similarities between data obtained via Internet sampling procedures and face-to-face clinical interviews. As a third limitation, it is worth noting that the focused and automatic pulling scales accounted for only 33% of the total variance suggesting that a variety of environmental factors (e.g., stress), biological factors (e.g., genetics), or possibly additional undiscovered styles likely influence a child's pulling. A final limitation to the MIST-C involves the scale's generalizability. Although research suggests that the onset of TTM is typically around 10 to 11 years of age (Cohen et al., 1995), pulling has been reported in children as young as 18 months (Cohen et al., 1995; Watson et al., 2000; Wright & Holmes, 2003). However, the MIST-C's utility has yet to be examined in children younger than age 10.

Despite the limitations described above, the current study provides the largest sample of children with symptoms of TTM ever collected (n = 164). Until now, no measure has been developed for the assessment of phenomenological characteristics in children with TTM (e.g., focused and automatic pulling). Therefore, the creation and validation of the MIST-C provides an important addition to aide in the comprehensive assessment of children with TTM. However, it is imperative that researchers replicate the current findings, reexamine the scale's psychometric properties (e.g., internal consistency, test–retest reliability, construct validity, etc.), and conduct a confirmatory factor analysis of the MIST-C using clinical samples of children with this disorder. Although beyond the scope of the current study, work is currently underway to examine the prevalence of these styles of pulling in children with TTM. Because individuals may engage in both focused and automatic pulling styles (perhaps even within the same pulling episode), additional research is needed to clarify whether focused and automatic pulling are best described as distinct subtypes (i.e., clients classified into distinct categories) or as dimensional constructs (i.e., clients demonstrate varying degrees of focused and/or automatic pulling). Given the relationship between focused pulling scale scores and symptoms of both anxiety and depression, future research may wish to examine the implications of focusing on comorbid affect to a greater extent throughout the assessment and treatment process. Future research should also seek to examine the development of an instrument similar to the MIST-C for use with younger children (e.g., 6 to 10 years of age) who pull their hair. It is only by continued research and the development of psychometrically sound

measures that researchers and clinicians can begin to answer important empirical questions, such as the developmental trajectory of pulling from early childhood through adolescence and into adulthood.

Notes

1. The Trichotillomania Learning Center is a large patient support organization for persons with trichotillomania (TTM).

2. A large number of participants ($n = 172$) did not meet the current study's inclusion criteria. However, the primary aim of the current study was to examine the psychometric properties of the Milwaukee Inventory for Styles of Trichotillomania-Child Version (MIST-C) using a sample of nonreferred children demonstrating symptoms (e.g., recurrent pulling of one's hair, impairment in day-to-day functioning, etc.) of TTM consistent with diagnostic criteria set forth by the DSM-IV-TR (APA, 2000). Therefore, it was decided that a conservative approach to the inclusion of participants for subsequent statistical analyses was warranted.

3. Given the large girl-to-boy ratio for individuals diagnosed with TTM cited in previous research (Christenson, Pyle, & Mitchell, 1991; Cohen et al., 1995), we do not intend to develop gender-based norms for the MIST-C. As such, participants for whom gender-identifying information was not available were included in all subsequent analyses.

4. Statistical analyses were conducted to examine whether significant differences existed (a) between parents reporting that their child had previously been diagnosed with TTM and those that did not and (b) between parents who reported that their child had been previously diagnosed with a comorbid psychiatric diagnosis and those that did not with respect to demographic characteristics and self-report measures. Due to the number of comparisons ($n = 14$), an alpha level of 0.004 was used to determine statistical significance. Results were identical for each set of analyses. Specifically, chi-square and independent samples t tests revealed no statistically significant differences with respect to gender, household income, parent's marital status, child's ethnicity, parent's highest degree obtained, Child Depression Inventory (CDI) total score, Parent Report on Child's Anxiety Symptoms total score, Multidimensional Anxiety Scale for Children total and subscale scores, and MIST-C "focused" and "automatic" scale scores.

5. Because item 9 was omitted from the CDI, the reported score for this item was prorated based on the average score obtained on the subscale to which item 9 belongs (negative self-esteem). Therefore, the CDI total score constitutes 26 items completed by each child and his or her prorated score for item 9.

6. Surveymonkey.com is an Internet-based company designed to aide researchers in the development and storage of Web-based surveys, such as the Trichotillomania Impact Survey for Children.

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