Behavioural treatment of trichotillomania: Two-year follow-up results

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Abstract

Post-treatment evaluation studies of behaviour therapy (BT) for trichotillomania (TTM) have shown that BT is successful in reducing symptoms in this impulse-control disorder. The present study was aimed at investigating gain maintenance at long-term follow-up. TTM-related symptoms and other symptom characteristics were evaluated in 28 patients suffering from TTM before and after brief BT and at a 3-month and 2-year follow-up. The manual-based BT consisted of self-control procedures offered in six sessions. Pre-post effect sizes for TTM symptoms at post-treatment evaluation and at the two follow-ups were 2.91, 1.47, and .87. Compared to the post-treatment effects, the 3-month and 2-year follow-up effect sizes had decreased by 49% and 70%, respectively. Better 2-year follow-up results were associated with lower pre-treatment levels of depressive symptoms and with complete abstinence from hairpulling immediately after treatment.

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Introduction

Brief behaviour therapy (BT) and serotonin re-uptake inhibitors (SRIs) have both been reported to be effective in the treatment of trichotillomania (TTM). However, better post-treatment outcomes were found for brief BT in the two randomized controlled studies that directly compared the effects of the two treatments (Minnen, Van Hoogduin, Keijsers, Hendriks, & Hellenbrand, 2003; Ninan, Rothbaum, Marsteller, Knight, & Eccard, 1993). Brief BT, therefore, seems to be the treatment of choice for TTM. Nevertheless, the findings of studies that investigated whether the positive treatment responses of BT are maintained in the long run have been inconsistent. Azrin, Nunn, and Frantz (1980) reported an excellent gain maintenance at 4 and 22 months for 19 TTM patients treated with habit reversal training. Rosenbaum and Ayllon (1981) found similar positive effects for their follow-up assessments at 6 and 12 months in 4 patients treated with the same procedure. In contrast, Mouton and Stanley (1996) obtained considerable relapses after 4 weeks and 6-months in 5 patients treated with habit reversal, as did Lerner, Franklin, Meadows, Hembree, and Foa (1998) in their 3.7-year follow-up assessment of 13 patients. These findings suggest that in TTM initial positive responses may be difficult to maintain after treatment (Diefenbach, Reitman, & Williamson, 2000; Keuthen, Aronowitz, Badenoch, & Wilhelm, 1999).

Adequate insight into the factors that foster or impede treatment gain maintenance is lacking. So research is aimed at identifying relapse-prone patients prior to treatment which would allow therapists to tailor treatments to the patient’s needs in such a way as to reduce the risk of relapse. Based on the literature and clinical observations, the present study focuses on three pre-treatment symptom characteristics and two treatment process issues in relation to long-term treatment outcome.

TTM symptom duration and age at onset were previously found to be unrelated to long-term treatment outcome (Keuthen, O’Sullivan, Goodchild, et al., 1998; Lerner et al., 1998) and they were currently not investigated. Lerner et al. reported that pre-treatment levels of TTM symptom severity and depression were positively related to higher levels of TTM symptoms at their long-term follow-up. In contrast, Keuthen, O’Sullivan, Goodchild, et al., (1998) and Keuthen, Fraim, Deckersbach et al. (2001) reported higher levels of pre-treatment depression in treatment responders than non-responders 6 years after BT and/or SRI treatment. Neuroticism has frequently been related to poorer gain maintenance in relapse-prone disorders such as pathological gambling (e.g., Echeburua, Fernandez-Montalvo, & Beaz, 2001), substance abuse (e.g., Fisher, Elias, & Ritz, 1998; McCormick, Dowd, Quirk, & Zegarra, 1998) and recurrent depression (e.g., Angst, 1999; Gormley, O’Leary, & Costello, 1999; Scott, 1988; Surtees, & Wainwright, 1996). Since negative affectivity triggers hairpulling in TTM patients (Christenson, Ristveldt, & Mackenzie, 1993), neuroticism may also be a predictor of relapse after initial successful treatment of TTM.

In our investigation, we addressed the potential role of two-treatment process issues in long-term BT treatment outcome. Lerner et al. (1998) reported on two patients who had achieved total abstinence from hairpulling at treatment completion. Both patients showed little recurrence of symptoms at the long-term follow-up. Complete abstinence following treatment may thus be associated with better long-term effects than partial symptom reduction.
The second issue concerns the change processes during BT. BT applications aimed at nervous habits are rooted in learning theory (see e.g., Azrin & Nunn, 1973; Keuthen et al., 1999; Mansueto, Stemberger, Thomas, & Golomb, 1997). By interrupting the chain of conditioned and discriminant stimuli, urge, hairpulling behaviour, and gratification following hairpulling, classical and operant conditioning of hairpulling behaviour weakens over time. In a previous study (Minnen et al., 2003) session-to-session outcome measurements had revealed marked reductions of hairpulling even after the first few treatment sessions in many of the TTM patients. Based on this observation, we pondered whether brief BT results in the patient’s increased effort to resist the urge to pull hair from the start of treatment, but not in a timely reduction of the urge to pull hair. Patients remain prone to relapse as long as the urge to give in to the habit remains unchanged (see e.g., Muraven & Baumeister, 2000).

In the present study, TTM patients were treated with a brief, manual-based BT. Follow-up data were collected 3 months and 2 years after treatment. We sought to answer the following 4 questions: (1) How well are TTM patients able to maintain their post-treatment results in the long term? (2) Do higher levels of pre-treatment TTM symptoms, depression, and neuroticism predict more severe TTM symptoms in long-term follow-up? (3) Does complete abstinence from hairpulling at treatment conclusion predict better long-term results than partial symptom reduction? (4) Does BT change the patient’s ability to resist pulling hair right from the start of the treatment while their urge to do so reduces only slowly over the course of treatment?

Method

Patients

All patients participating in the present study were sufferers from TTM who had contacted a university outpatient clinic of their own accord after seeing a Dutch television show in which the BT program for TTM was mentioned and who had subsequently joined a randomized, waiting-list controlled study into the effects of BT versus fluoxetine (FL, Van Minnen et al., 2003). Inclusion criteria were as follows: primary diagnosis of trichotillomania according to DSM-IV (American Psychiatric Association, 1994) and absence of organic brain disease, suicidal intent, or past or present psychosis. Patients using antidepressants, patients who had previously used FL at a dose of 60 mg/d without result, patients that had previously been treated with BT comprising homework assignments, self-monitoring tasks, and interventions aimed at the stimulus-response chain, and women who were (trying to become) pregnant or lactating were excluded.

Eligible respondents received a standardized clinical interview in which diagnostic criteria were verified (DSM-IV), clinical features established and inclusion and exclusion criteria checked. A second standardized clinical interview was conducted by two of our group to confirm the diagnoses and inclusion and exclusion criteria. After a detailed description of the study, the patients gave their written informed consent. Following this intake procedure the patients took part in a pre-treatment assessment during which they completed a number of questionnaires.
Subsequently, patients were randomly assigned to either the BT or the FL group, or to a 12-week waiting-list control condition.

The sample of the present study consisted of 28 patients who received the intake procedure as described above. Of this total, 15 patients were directly randomly assigned to the BT condition in the randomized controlled study (Minnen et al., 2003). One patient prematurely abandoned treatment because of the long commute to the clinic. Five other patients first completed the waiting-list condition and were subsequently randomly assigned to BT. The remaining nine patients either refused first or second random assignment or were excluded from the randomization because they were (trying to become) pregnant or lactating at the time. They were consequently offered BT. Their program was identical to the treatment the 14 patients in the Van Minnen et al. study had received and was administered by the same therapists. The patients who were randomly assigned to BT \( (n = 19) \) and those that had received BT after refusing or exclusion from randomization did not differ with respect to their pre-treatment levels of TTM symptoms \( (t(26) = -.30, \ p = .76) \), depressive symptoms \( (t(26) = -.41, \ p = .48) \), or general psychopathology \( (t(24) = -.71, \ p = .40) \).

Participants were three male patients \( (10.7\%) \) and 25 female patients with an average age of 29.1 years \( (SD = 13.7) \), ranging from 16 to 57 years. Four patients were diagnosed with a comorbid mood disorder, 4 patients with another habit disorder, and 1 patient with an anxiety disorder. The average age at onset of the first TTM symptoms was 12.8 years \( (SD = 6.8) \); the average duration of symptoms prior to treatment was 18.6 years \( (SD = 14.8) \). Nine patients \( (32.1\%) \) reported to be consciously aware of their hairpulling behaviour most of the time, 15 patients \( (53.6\%) \) were sometimes aware and at other times unaware of their hairpulling; the remaining 4 patients were said to be unaware of their habit most of the time. Twelve patients \( (42.9\%) \) pulled hair from the scalp and 7 patients \( (25.0\%) \) from their eyebrows or lashes, or both. The remaining 9 patients pulled hair from various parts of the body in various combinations. Sixteen patients \( (64.2\%) \) performed oral rituals following hairpulling like stroking their lips with the extracted hairs and biting or swallowing the roots. All patients reported experiencing relief, pleasure, lust, or comfort during their hairpulling bouts and feeling guilty, ashamed, unpleasant, or angry after the hairpulling episode.

Pre-and post-treatment outcomes were available for all patients, but regrettably not all follow-up data were complete. We had omitted to collect the 3-month follow-up data for the 5 patients who had received BT after the initial waiting-list control condition. In another 4 patients the 3-month follow-up data could not be collected. As regards the gain maintenance outcome at two years, the data of 2 patients could not be traced and 2 patients had refused further collaboration at some point during the follow-up.

**Treatment**

The manual-based BT comprised 6 individuals, 45-min treatment sessions held every other week (Hoogduin, Hagenaars, Minnen, & Keijsers, 2004). The treatment was aimed at self-control; through self-monitoring the patients learned to control unwanted behaviour in their own environment. The main components were stimulus control (organizing the environment), stimulus-response interventions (interrupting the response chain by other or
incompatible activities (see also Azrin & Nunn, 1973), and response consequences (self-rewards).

In the first session the therapist explained the treatment rationale and helped the patient devise a behaviour chain. Throughout the treatment the patient carried out a daily homework assignment that involved keeping an hourly record of the number of hair pulled and the total amount of time spent on hairpulling. The patient was also requested to save the pulled hairs in an envelope and to hand this to the therapist at the next session. The outcome of the assignment was discussed and graphically displayed during session 2. Conscious awareness of hairpulling behaviour was increased by introducing several aids such as a strong perfume applied to the wrists or band-aids around the fingers, or tinkling bracelets worn around the wrists. These aids all signaled the patients that they were reaching for their hair or that they had started pulling out hair. Additionally, most patients were instructed to put on gloves in high-risk situations (stimulus control), which, besides increasing awareness, also prevented them from actual hairpulling. In the third session, the patient and therapist together selected stimulus-response interventions such as going for a walk, calling a friend or cleaning the kitchen. The patients were permitted to give in to the urge to pull their hair provided that they had first completed one of the activities, thereby postponing the unwanted behaviour. Furthermore, response consequences in the form of useful but tedious or unpleasant tasks (cleaning the bathroom, a 30-min jog) were jointly drawn up. These followed whenever the hairpulling exceeded mutually agreed levels. In sessions 4 and 5 the stimulus-response interventions and response consequences were discussed and extended. In the final session, relapse prevention was addressed. The therapist explained that it is very common for those in therapy to experience setbacks at some point but that a complete relapse can be prevented by the use of a relapse-prevention guide. The guide listed high-risk situations together with measures to be taken, which were based on the interventions that had proven effective for the patient during the treatment, including the reinstatement of the daily recording of their hairpulling behaviour.

**Therapists**

The therapists, one male and 4 female, were graduate students in clinical psychology who were fulfilling their practical training at the university outpatient clinic. They were adequately trained in the treatment program and supervised weekly by one of us.

**Assessors and assessment schedule**

Four graduate students fulfilling their practical training in clinical psychology and all blind to the treatments progress, carried out the assessments. The post-treatment assessment took place 2 weeks after the sixth and final treatment session, i.e., 12 weeks after the start of the treatment. Three months after the post-treatment assessment patients were invited for the first follow-up evaluation. During these successive assessments, the Massachusetts General Hospital Hairpulling Scale (MGHHS), Beck depression inventory (BDI) and symptom checklist (SCL-90) were completed (for full details of all measures used see below). Two years after the post-treatment assessment, patients were requested by post to again complete the MGHHS and BDI. When the
lists were not returned, the patients were contacted by phone and asked if they would be willing to complete the lists. Additionally, the therapists administered the MGHHS at the end of each treatment session.

**Measures**

The primary outcome measure (a) was the MGHHS, a self-report measure for the assessment of hairpulling symptoms over the past 7 days (*Keuthen, O’Sullivan, & Sprich-Buckminster, 1998*). The MGHHS consists of 7 items ((1) urge frequency, (2) urge intensity, (3) ability to resist urge, (4) pulling frequency, (5) attempts to resist hair pulling, (6) successful resistance to pulling, (7) distress resulting from pulling), each item ranging from 0 (no symptoms) to 4 (severe or highly frequent symptoms). The MGHHS has been demonstrated to have good psychometric properties (*Keuthen, et al., 1995; O’Sullivan et al., 1995*). For the present study the scale was translated into Dutch. Cronbach’s alpha of the Dutch version was .77 (*Van Minnen et al., 2003*), reflecting adequate internal consistency.

Two secondary outcome measures were used: (a) the Dutch version of the BDI, a self-report measure of depressive symptoms consisting of 21 items with a score range of 0–63. Higher scores indicate more psychopathology. Internal consistency and convergent validity of the Dutch BDI are good (*Bouman, 1994*). And (b) the Dutch version of the SCL-90, which comprises 90 items regarding general symptoms of psychopathology with a score range of 90–450, higher scores indicating more psychopathology. Psychometric properties of the Dutch SCL-90 are good (*Arrindell & Ettema, 1986*).

Pre-treatment measures that were used to predict follow-up results were: (1) the MGHHS for initial TTM symptom severity, (2) the BDI for levels of depressive symptoms, and (3) the neuroticism subscale from the Dutch version (*Sanderman, Arrindell, Ranchor, Eysenck, & Eysenck, 1995*) of the Eysenck Personality Questionnaire-Revised Short Scale (EPQ-RSS; *Eysenck & Eysenck, 1991*) to measure emotionality. The EPQ-RSS contains 4 subscales, each comprising 12 yes/no questions. High scores on the neuroticism subscale indicate anxiety and moodiness, a tendency to worry and to emotionally react to all sorts of stimuli and situations. Internal consistencies (alpha-coefficients) of the neuroticism subscale vary from .80 to .84. The EPQ and the EPQ-RSS have been widely used in clinical and non-clinical populations (*Eysenck & Eysenck, 1991*).

**Statistics**

Post-treatment and follow-up outcome measures were established by means of one-way analyses of variance (ANOVA) for repeated measurements. Outcome variables were analysed separately to distinguish the effects on the primary measure (MGHHS) from those on the secondary measures (BDI, SCL-90). For the prediction of the 2-year gain maintenance, we followed a method recommended by *Steketee and Chambless (1992)*: we predicted MGHHS scores at 2-year follow-up and included MGHHS pre-treatment scores as one of the independent variables. We also restricted ourselves to a small number of relevant predictors. Prediction of follow-up results was conducted by way of stepwise multiple linear regression analyses. All tests were two-tailed.
Results

With respect to the first research question, Table 1 presents the mean pre- and post-treatment assessment ratings and the 3-month and 2-year follow-up scores for the primary and secondary outcome measures. Pre-treatment-to-post-treatment and pre-treatment-to-follow-up effect sizes for each of the outcome measures are also listed. We used Cohen’s d for one-sample repeated measures (Cohen, 1988) to calculate the effect sizes.

MGHHS pre-treatment assessment scores, post-treatment assessment scores and 2-year follow-up scores were entered into a one-way analysis of variance for repeated measurements. There was a significant time effect ($F[2,22] = 42.11, p < .0001$) and linear ($F[1,23] = 8.33, p < .01$) and quadratic ($F[1,23] = 64.45, p < .0001$) contrast. These findings indicate a significant decline in hairpulling symptoms from the start of treatment to the 2-year follow-up, with a statistically significant decrease of symptoms at post-treatment assessment and a renewed increase of symptoms between the post-treatment and 2-year follow-up evaluation. Of the 28 patients, 7 were symptom free at post-treatment measured by the MGHHS, and another 15 patients had improved 50% or more. At the 2-year follow-up only 3 of the 24 patients (for whom all data were available) were still symptom free and only 6 had maintained an improvement rate of 50% or more. In addition, two patients reported considerably more (> 30%) TTM symptoms at 2-year follow-up compared to their symptom level at the start of the treatment.

Paired $t$-tests revealed significant symptom reductions from pre- to post-treatment for BDI ($t[27] = 3.09, p < .01$) and SCL-90 ($t[21] = 2.62, p < .05$), but there were no significant time effects when the 3-month follow-up data (for SCL-90) or the 2-year follow-up data (for BDI) were included in the repeated measures ANOVAs (BDI: $F[2,15] = 2.50, p = .11$; SCL-90: $F[2,11] = 1.06, p = .38$).

Regarding the second research question, Table 2 offers an overview of the Pearson correlation coefficients for MGHHS at the 2-year follow-up, and the independent variables, MGHHS, BDI, and neuroticism, all measured prior to treatment. It is worth noting that the correlation between the pre-treatment BDI scores and neuroticism is high.

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>Pretreatment</th>
<th>Post-treatment</th>
<th>3-month FU</th>
<th>2-year FU</th>
<th>Pre-post effect sizes</th>
<th>Pre-3-month FU effect sizes</th>
<th>Pre-2-year FU effect sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGHHS</td>
<td>15.61 (3.73)</td>
<td>5.57 (5.19)</td>
<td>9.79 (5.39)</td>
<td>11.62 (7.21)</td>
<td>2.91</td>
<td>1.47</td>
<td>.87</td>
</tr>
<tr>
<td>BDI</td>
<td>9.46 (6.93)</td>
<td>6.29 (8.43)</td>
<td>6.83 (8.34)</td>
<td>9.12 (11.37)</td>
<td>—</td>
<td>.84</td>
<td>.99</td>
</tr>
<tr>
<td>SCL-90</td>
<td>152.50 (59.07)</td>
<td>129.62 (54.24)</td>
<td>132.67 (54.17)</td>
<td>—</td>
<td>1.16</td>
<td>.93</td>
<td>—</td>
</tr>
</tbody>
</table>

*a* $n = 26$.

*b* $n = 24$.

*c* $n = 18$.

*d* $n = 17$. 

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In a stepwise linear regression analysis the MGHHS 2-year follow-up scores were entered as the dependent variable and the MGHHS, BDI and neuroticism as independent variables. Only BDI ($\beta = .61, t = 3.59, p < .01$) was included in the regression equation. $R^2$ was .40 and the adjusted $R^2$ was .34. The model was statistically significant ($F[1,22] = 12.85, p < .01$). Higher levels of pre-treatment depression predicted higher TTM symptoms 2 years after treatment. To this prediction neither pre-treatment MGHHS ($\beta = .23, t = 1.37, p = .19$) nor neuroticism ($\beta = .12, t = .50, p = .62$) significantly added further unique contributions.

To answer the third research question, we divided the patient sample into those patients that were abstinent from hairpulling ($n = 15$) at post-treatment assessment and those patients who still pulled one or more hairs ($n = 13$). Frequency of hairpulling was established by item 4 (actual hairpulling frequency over the past 7 days) of the MGHHS. The $t$-tests for independent samples revealed that at the 2-year follow-up the MGHHS scores of the symptom-free patients ($M = 8.58, SD = 6.47$) were significantly lower ($t[23] = 2.49, p < .05$) than those of the patients who still pulled hair at treatment discontinuation ($M = 15.23, SD = 6.85$).

Regarding the fourth research question, items 1 (urge frequency) and 2 (urge intensity) of the MGHHS were averaged to comprise an urge score. Item 3 (ability to resist urge), item 5 (attempts to resist hairpulling) and item 6 (successful resistance to pulling) were averaged to compute a resistance score. Fig. 1 depicts the urge and resistance scores, and the scores on MGHHS item 4 (actual hairpulling frequency over the past 7 days) at pre-treatment measurement, at sessions 1 to 6, at post-treatment measurement, and at both follow-ups. Contrary to what we had expected, the graph clearly demonstrates that the three U-shaped patterns are very much alike; changes in urge and resistance show a similar pattern over time.

### Discussion

In line with previous studies (Azrin et al., 1980; Lerner et al., 1998; Mouton & Stanley, 1996; Rosenbaum & Ayllon, 1981) TTM symptoms had reduced considerably immediately after brief BT. The effect size obtained for the MGHHS was excellent. In addition, depressive symptoms and general psychopathology had also decreased.

The 3-month and 2-year follow-up evaluations, as based on the MGHHS scores, were available for 19 and 24 of the 28 patients, respectively. Compared to the post-treatment assessment

<table>
<thead>
<tr>
<th>Variables</th>
<th>MGHHS pretreatment</th>
<th>BDI pretreatment</th>
<th>Neuroticism pretreatment</th>
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<tbody>
<tr>
<td>BDI pre-treatment</td>
<td>.24</td>
<td></td>
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<td>$N = 28$</td>
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<tr>
<td>Neuroticism pre-treatment</td>
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<td>.69</td>
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<tr>
<td>$N = 28$</td>
<td>$N = 28$</td>
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<tr>
<td>MGHHS 2-year follow-up</td>
<td>.36</td>
<td>.61</td>
<td>.35</td>
</tr>
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<td>$n = 24$</td>
<td>$n = 24$</td>
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outcomes, the follow-up effect sizes had decreased by 49% and 70%, respectively. Similar to the results of Lerner et al. (1998) and Mouton and Stanley (1996), but in contrast to what Azrin et al. (1980) and Rosenbaum and Ayllon (1981) reported, the present findings suggest that gain maintenance after successful brief BT may be moderate in the long term even when relapse-prevention strategies form part of the treatment, as was the case in our BT.

To gain a deeper insight into the high relapse rates after initial successful BT treatment, we tried to predict 2-year follow-up effects by examining three pre-treatment variables most likely to be associated with TTM symptom recurrence. Symptom severity (Lerner et al., 1998) and levels of depression (Keuthen, O'Sullivan, Goodchild, et al., 1998; Keuthen et al., 2001; Lerner et al., 1998) proved prognostic of long-term TTM-treatment outcomes in several previous studies. We selected neuroticism as a third possible predictor because it has frequently been associated with relapse in relapse-prone disorders. Only pre-treatment levels of depression uniquely predicted the 2-year follow-up effects, explaining 34% of its variance.

It is unlikely that levels of depression simply co-vary with TTM symptoms. At the pre-treatment assessment, for instance, levels of depression and TTM symptom severity were only moderately correlated. The implication of these findings is that the depressive symptoms of TTM patients should be attended to first, prior to the treatment of their TTM. The relationship between depressive symptoms and TTM symptoms warrants additional investigation.

We further tested and confirmed a hypothesis we derived from Lerner et al. (1998) who argued that complete abstinence from hairpulling at treatment conclusion may be a predictor of better long-term follow-up outcomes. The patients in our study that were symptom free after completion of their BT indeed reported fewer TTM symptoms 2 years later. If replicated, this would imply that TTM treatments should be prolonged until patients are abstinent from hairpulling. The finding suggests that complete abstinence from hairpulling results in optimal operant and classical deconditioning.
Our last research question arose from previous observations that many TTM patients were able to stop hairpulling in a surprisingly early phase of treatment. We wondered whether brief BT might result in a large effort of patients to resist the urge to pull their hair right from the start of treatment, whereas their urge to pull hair remains relatively unchanged over a longer period of time. Patients would thus remain relapse-prone and especially at risk when additional demands are made on their self-control (see e.g., Muraven & Baumeister, 2000). In contrast to our expectations, the urge scores decreased as readily as the resistance scores increased over the course of the brief BT. This led us to conclude that both aspects of TTM are similarly affected over the course of the treatment. It should be noted, however, that the resistance and urge scores used in our study were not established by separate and properly validated instruments.

Two other limitations of the current study need to be addressed. In contrast to our previous study (Minnen et al., 2003), TTM symptoms were measured with a self-rated scale only, and not verified with videotape recordings of the patients’ faces and heads. Because follow-up data are difficult to obtain, often also due to the invasive nature of clinic-based assessments, we had decided to collect our data by post rather than by inviting the patients to come to our treatment centre again. Secondly, although the initial sample included 28 patients, the 3-month and 2-year follow-up data were only available for 19 and 24 patients, respectively.

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