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## Research Paper

## Skin picking behaviors: An examination of the prevalence and severity in a community sample

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## ABSTRACT

Body-focused repetitive behaviors such as skin picking have gained recent attention in the psychiatric literature. Prevalence of skin picking has not been well researched and is difficult to estimate; however, consequences of such behaviors can include severe medical complications and impaired social and occupational functioning. Given this, this study examined: (1) the prevalence and severity of skin picking in a nonclinical community sample, and (2) associations between skin picking and other measures of psychological functioning. Three hundred and fifty-four participants completed measures of psychological functioning and skin picking frequency and severity. A total of 62.7% endorsed some form of skin picking and 5.4% reported clinical levels of skin picking and associated distress/impact. Direct associations were found between skin picking and depressive, anxiety, and obsessive-compulsive symptoms, which may support the emotional regulation model of pathological skin picking. To establish proper diagnostic classification of pathological skin picking and optimize treatment planning and outcome, further investigation of functional relationships between skin picking and affective distress is needed.

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Body-focused repetitive behaviors (BFRBs) have recently gained attention in the psychiatric literature given their prevalence, considerable associated impairment (Bohne, Wilhelm, Keuthen, Baer, & Jenike, 2002; Teng, Woods, Twhig, & Marcks, 2002), and possible link to other obsessive-compulsive spectrum disorders (Bienvenu et al., 2000; Hollander, 1993; Hollander & Wong, 1995; Jaisooriya, Reddy, & Srinath, 2003). “Nervous habits” such as nail-biting, hair pulling, and skin picking are often seen by healthcare practitioners as common and benign, but awareness of the impairment linked to these behaviors is limited (Arnold, Auchenbach, & McElroy, 2001; Bohne, Keuthen, & Wilhelm, 2005). Due to the variance in criteria defining the BFRBs and under-reporting of symptoms, prevalence rates have been difficult to determine. At least one BFRB was reported by 13.7% of 105 college students, nail-biting being the most common (Teng et al., 2002). While suspected to regulate negative affective states (Christenson, Ristvedt, & Mackenzie, 1993; Diefenbach, Mouton-Odum, & Stanley, 2002; Keuthen et al., 2000), BFRBs often directly result in significant distress and impaired social or occupational functioning as a result of their wounds or attempts to conceal them (Christenson,

Mackenzie, & Mitchell, 1991; Flessner & Woods, 2006; O’Sullivan et al., 1997; Wilhelm et al., 1999). Further, many people report that their BFRB causes such shame and embarrassment that they withdraw from social activities (Keuthen et al., 2000; Stemberger, Thomas, Mansueto, & Carter, 2000; Wilhelm et al., 1999; Woods, Fuqua, & Outman, 1999). Together, BFRBs have been unofficially grouped under the obsessive-compulsive spectrum (Arnold et al., 1998; Hollander, 1993; Hollander & Wong, 1995; Stein et al., 1995), which includes conditions associated with OCD on one anchor point to behaviors characteristic of impulse-control disorders (ICDs), such as pathological gambling.

Of the BFRBs discussed, trichotillomania is the only condition given distinct classification in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-R; American Psychiatric Association, 2000). Trichotillomania, affecting an estimated 1–3% of the general population, is listed as an ICD and characterized by repetitive hair pulling which results in noticeable hair loss most commonly from the scalp, eyebrows, and eyelashes (Christenson et al., 1991). The behavior can result in serious physical consequences. For example, irreversible damage to hair roots due to repetitive pulling can cause permanent baldness, and the chewing and eating of pulled hair can lead to dental complications and gastrointestinal blockage (O’Sullivan et al., 1997). Like other disorders marked by impulsivity, individuals with trichotillomania typically experience an increase in

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psychological tension (i.e., anxiety or frustration) prior to performing the impulsive act, and have feelings of pleasure, relief, or gratification while engaging in the behavior. However, the criteria for trichotillomania are not universally applicable to all who engage in clinically significant hair pulling (Christenson et al., 1991; du Toit, van Kradenburg, Niehaus, & Stein, 2001) as some individuals only report habit-driven hair pulling in the absence of a precipitating psychological tension. Whether considered impulsive or compulsive in nature, pathological hair pulling cooccurs with a range of disorders, including OCD, major depressive disorder and generalized anxiety disorder (Lochner, Simeon, Niehaus, & Stein, 2002). Despite uncertainty over the classification of trichotillomania as an ICD, as the most thoroughly studied of the BFRBs, it can serve as a model by which we may understand other types of self-injurious behaviors.

Pathological skin picking, also referred to as psychogenic excoriation or dermatillomania, involves intentional, repetitive scratching or picking at normal skin, or skin with minor blemishes, scabs or insect bites, resulting in noticeable injury (Wilhelm et al., 1999). Those who engage in skin picking use their fingers or instruments (e.g., pins, tweezers) to manipulate areas most commonly found on the face, back, neck, or scalp (Arnold et al., 1998; Bohne et al., 2002; Keuthen et al., 2000; Wilhelm et al., 1999). Approximately 2–4% of the population demonstrates pathological skin picking (Keuthen et al., 2000) with associated tissue damage, including infections, ulcerations, and disfiguring scars, being seen in many patients (Greisemer, 1978).

Despite similarities between trichotillomania and skin picking with regard to demographics, personality traits, patterns of psychiatric comorbidity, and their tendency to coexist (Christenson et al., 1991; Lochner et al., 2002; Odlaug & Grant, 2008), skin picking is only given vague classification in the DSM-IV-TR under ICD-NOS (American Psychiatric Association, 2000). In the last decade, research findings have more clearly addressed the impulsive and compulsive features of pathological skin picking although controversy remains about the link between “compulsive–impulsive” disorders (Arnold et al., 2001; Dell’Osso, Altamura, Allen, Marazziti, & Hollander, 2006; Mataix-Cols, Pertusa, & Leckman, 2007; Storch, Abramowitz, & Goodman, 2008). Arnold et al. (2001) propose the inclusion of psychogenic excoriation in the DSM-V, allowing for compulsive, impulsive, and mixed subtypes.

Discrimination between disorders featuring compulsivity and those marked by impulsivity is complicated, especially in light of recent attention to compulsive aspects of pathological hair pulling (Grant & Potenza, 2006; Stein et al., 1995). Historically, conditions associated with the obsessive–compulsive spectrum have been grouped together according to their clinical characteristics, responses to different treatments, and patterns of familial transmission (Hollander, 1993; Hollander & Wong, 1995). Until recently, however, BFRBs have been largely unstudied, and their relationship with OCD is not yet clarified. In one study, BFRBs resembled ICDs (as opposed to OCD); participants who engaged in these behaviors felt their urges more suddenly, and acted on those urges as soon as possible, while participants with OCD were more capable of delaying their actions and spent more time thinking about them (Ferrão, Almeida, Bedin, Rosa, & Busnello, 2006). In contrast, BFRBs have been determined in a familial study to be more strongly related to OCD than ICDs with relatively low base rates such as kleptomania and pyromania. In a sample of first-degree relatives of subjects receiving treatment for OCD, 17% reported some form of “grooming disorder” such as skin picking or hair pulling at some point during their lifetime, compared to only 10% of family members in a randomly selected, nonclinical control group (Bienvenu et al., 2000). In their investigation of subclinical self-harm among college students, Croyle and Waltz (2007) noted that both mild (e.g., skin picking, nail-biting) and more significant forms of self-harm were both directly associated with features of

impulsivity and compulsivity. These findings provide preliminary support for the idea of a compulsive–impulsive continuum; however, while compulsivity and impulsivity may appear as opposites in terms of self-regulation and anticipated consequences, research suggests a complex overlap between the two (Grant & Potenza, 2006). Precisely where the BFRBs belong diagnostically will be determined by more research on their etiologies, demographic characteristics, patterns of comorbidity, and responses to treatment.

Unfortunately, the majority of available research has been based on clinical samples, and nonclinical studies on skin picking have used college students. As such, current data may not be applicable to the general population. Further study is necessary to produce reliable estimates of skin picking in nonclinical samples and examine connections between the BFRBs (especially skin picking) and affective distress. Clarifying these relationships will help provide the framework to develop treatment options and prevention techniques for people who engage in these behaviors. With this and diagnostic issues in mind, the purposes of this study were to first investigate the prevalence and severity of skin picking in a nonclinical community sample. We expected skin picking to be relatively common in this sample, but that only a small percentage of individuals would endorse significant associated impairment. Secondly, this study examined the relationship of skin picking with impulsivity, anxiety, obsessive–compulsive, and depressive symptoms. We expected direct relations among skin picking and criterion variables. Finally, this study evaluated any differences in the severity of these symptoms in those with clinical and nonclinical levels of skin picking. Again, we expected that those with clinical levels of skin picking would endorse elevated levels of impulsivity, anxiety, obsessive–compulsive, and depressive symptoms.

## 1. Method

### 1.1. Participants and procedures

The first author and trained assistants completed confidentiality training modules in social and behavioral research as required for study approval by the Institutional Review Board. Prior to data collection, assistants were familiarized with the study protocol, in which the definition of skin picking was operationalized as any intentional scratching or picking (with fingers or other tools) at normal skin, or skin with minor blemishes, scabs or insect bites, resulting in noticeable injury. The first author or trained assistants approached participants randomly in a variety of public settings located in the Southeastern United States. Current endorsement of skin picking behaviors did not affect selection of participants, given the convenience nature of the sample. If a person was interested in participating, s/he was given a brief overview of the study and informed that any manipulation of regular or irregular skin that resulted in damage would be considered skin picking in this research. If still interested, participants were taken aside to complete the battery of assessments individually and without distraction. Informed consent was acquired from each subject prior to completing measures with the understanding that participation was completely voluntary, confidential, and uncompensated. Participants' identities remained anonymous. Contact information for the investigators was provided if subjects had further questions or concerns regarding their participation.

A total of 354 subjects (148 men, 201 women, 5 unspecified) provided verbal informed consent and were recruited for the study. Ages ranged from 18 to 84 years ( $M = 32.3$ ,  $S.D. = 15.0$  years) and racial/ethnic breakdown was 79.1% Caucasian ( $n = 280$ ), 6.8% Hispanic ( $n = 24$ ), 6.5% African-American ( $n = 23$ ), 4.2% Asian ( $n = 15$ ), and 2.5% other ( $n = 9$ ). Participants were given an unlimited

**Table 1**  
Means and standard deviations for study variables for the total sample and gender.

Variable	Males	Females	t-value	Total
(1) SPS total	2.07 (2.62)	3.51 (4.01)	-3.82*	2.89 (3.54)
(2) SPIS total	.91 (3.43)	2.91 (7.42)	-3.06*	2.09 (6.14)
(3) OCI-R total	9.96 (10.11)	12.11 (11.85)	-1.79	11.25 (11.19)
(4) OCI-R obsessing	1.61 (2.39)	1.91 (2.73)	-1.06	1.79 (2.59)
(5) OCI-R checking	1.59 (2.01)	1.88 (2.46)	-1.19	1.76 (2.28)
(6) OCI-R washing	.92 (1.70)	1.43 (2.30)	-2.29*	1.23 (2.10)
(7) OCI-R hoarding	2.11 (2.42)	2.80 (2.87)	-2.30*	2.51 (2.70)
(8) OCI-R ordering	2.47 (2.91)	2.94 (3.07)	-1.42	2.76 (3.02)
(9) OCI-R neutralizing	1.26 (2.22)	1.17 (2.06)	.36	1.21 (2.12)
(10) BAI total	7.29 (8.32)	12.02 (10.94)	-4.39*	10.04 (10.22)
(11) BDI-II total	6.99 (7.35)	9.01 (8.87)	-2.25*	8.11 (8.30)
(12) BIS-15 total	31.98 (6.49)	32.05 (6.97)	-.10	32.05 (6.77)
(13) BIS-15 attentional	10.05 (2.67)	10.57 (3.20)	-1.61	10.36 (3.00)
(14) BIS-15 motor	9.47 (2.95)	9.67 (2.94)	-.62	9.60 (2.93)
(15) BIS-15 NP	12.46 (3.48)	11.82 (3.44)	1.72	12.09 (3.46)

Note. Mean and (Standard Deviation). SPS = Skin Picking Scale Total; SPIS = Skin Picking Impact Scale Total; OCI-R = Obsessive-Compulsive Inventory-Revised Total; BAI = Beck Anxiety Inventory Total; BDI-II = Beck Depression Inventory Total; BIS-15 = Barratt Impulsivity Scale-Short Form Total; BIS-15 NP = Barratt Impulsivity Scale Non-Planning Subscale Total.

\*  $P < .05$ .

amount of time to complete basic demographic information and the following self-report measures (Table 1).

## 1.2. Measures

**Skin picking scale (SPS).** The SPS is a 6-item measure of skin picking severity designed after the Yale-Brown Obsessive-Compulsive Scale (Keuthen et al., 2001b). Items are rated from 0 to 4 (extreme) and assess the specifics of skin picking behavior, such as frequency and intensity of urges. Sensitivity and specificity analyses conducted by Keuthen et al. (2001b) determine a total score of seven to differentiate between those who engage in pathological skin picking and those who engage in non-self-injurious forms of skin picking. Excellent psychometric properties have been noted including good internal consistency ( $\alpha = .80$ ), moderate correlations with self-reported duration of skin picking episodes (Keuthen et al., 2001b), and a moderate association with the Focused subscale of the focused subscale of the Milwaukee Inventory for the Dimensions of Adult Skin Picking (Walther, Flessner, Conelea, & Woods, in press).

**Skin picking impact scale (SPIS).** Modeled directly after the Trichotillomania Impact Scale (O'Sullivan et al., unpublished), this 10-item questionnaire measures the psychosocial impact of skin picking over the previous week (Keuthen et al., 2001a). Items describe commonly experienced psychosocial consequences of skin picking (i.e., "I hate the way I look because of my skin picking," or "It takes me longer to go out because of my skin picking"). Each item is rated 0 (none) through 5 (severe). Based on a sample of 28 severe self-injurious and 77 non-self-injurious skin pickers, a total score of seven on this scale has also been determined as an appropriate cutoff point to differentiate between self-injurious and non-self-injurious skin picking. The SPIS has shown excellent internal consistency in individuals with self-injurious skin picking and those with non-self-injurious skin picking ( $\alpha$ 's = .93 and .88, respectively). Additionally, the measure differentiates between those with and without self-injurious skin picking, and for those with self-injurious skin picking, the SPIS was moderately related to depressive and anxiety symptoms, and the average self-reported duration of daily skin picking (Keuthen et al., 2001a).

**Beck Depression Inventory, second edition (BDI-II).** A commonly used measure of depression severity in adults, this 21-item multiple choice questionnaire is designed to assess various

components of depression (Beck, Steer, & Brown, 1996). For each choice, a number is assigned (0–3) which corresponds to the severity of the given symptom. Total scores greater than twenty suggest that the participant is experiencing clinical depression. Considerable psychometric data support the validity and reliability of this measure (Beck et al., 1996; Storch, Roberti, & Roth, 2004).

**Beck Anxiety Inventory (BAI).** The BAI is a 21-item inventory which was developed to differentiate between anxiety and depression more reliably than other self-report measures of anxiety (Beck, Epstein, Brown, & Steer, 1988). Each item describes a psychophysiological symptom commonly associated with anxiety, such as trembling or difficulty in breathing. Participants rate how much they have been distressed by that symptom over the past month on a 4-point scale. Total scores range from 0 to 63, higher scores indicating higher levels of anxiety in the last week. The BAI has sound psychometric properties (Beck et al., 1988; Creamer, Foran, & Bell, 1995).

**Obsessive-Compulsive Inventory-Revised (OCI-R).** The OCI-R is an 18-item inventory developed from the earlier OCI, and regarded by Foa et al. (2002) as an improvement relative to the OCI in terms of simplified scoring and clarification of subscales. Each item on the inventory describes a symptom commonly associated with obsessive-compulsive disorder, and subjects rate from 0 to 4 the degree to which each item has caused distress in the last month. The total score is then divided into subscales which reflect the severity of symptoms within the following six dimensions of OCD: washing, checking, ordering, obsessing, hoarding, and neutralizing. As in the original OCI, the OCI-R has excellent psychometric properties (Abramowitz & Deacon, 2006) and successfully differentiates between individuals with OCD and individuals with other anxiety disorders, or none at all (Foa et al., 2002). Consistent with Foa et al. (2002), we defined clinically significant OCD symptoms as a total score greater than 21.

**Barratt Impulsiveness Scale-Short Form (BIS-15).** The BIS-15 is a recently validated, 15-item revision of the longer Barratt Impulsiveness Scale (Spinella, 2007). Considered a well-known measure of impulsivity in clinical and community samples, the BIS reliably measures three subscales: attentional impulsiveness (BISa) involves the ability to maintain concentration, motor impulsiveness (BISm) refers to the process of acting without thinking, and nonplanning impulsiveness (BISnp) is characterized by inversely scored questions such as "I am a careful thinker" or "I plan for job security" (Patton, Stanford, & Barratt, 1995; Spinella, 2007). Each item is rated on a 4-point scale, 1 corresponding with "rarely or never" engaging in the given behavior and 4 with "almost always." The factor structure of the BIS-15 showed increased intrascale reliability relative to the full-length BIS in a nonclinical, community sample (Spinella, 2007).

**Table 2**  
Pearson correlation coefficients for various measures of psychological functioning.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) SPS	1.00						
(2) SPIS	.649**	1.00					
(3) OCI-R	.361**	.385**	1.00				
(4) BAI	.392**	.428**	.620**	1.00			
(5) BDI-II	.368**	.361**	.511**	.644**	1.00		
(6) BIS-15	.303**	.209**	.380**	.359**	.402**	1.00	
Mean	2.89	2.09	11.25	10.04	8.11	32.05	1.03
Standard deviation	3.54	6.14	11.19	10.22	8.30	6.77	3.26
Range	0–18	0–42	0–61	0–48	0–57	16–50	0–23

Note. SPS = Skin Picking Scale Total Score; SPIS = Skin Picking Impact Scale Total Score; OCI-R = Obsessive-Compulsive Inventory-Revised Total Score; BAI = Beck Anxiety Inventory Total Score; BDI-II = Beck Depression Inventory Total Score; BIS-15 = Barratt Impulsivity Scale-Short Form Total Score.

\*\*  $P < .01$ .

## 2. Results

### 2.1. Prevalence and severity

A total of 62.7% ( $n = 222$ ) of the sample endorsed some form of skin picking, defined as any picking, rubbing, or scratching with either fingers or tools at skin regardless of being 'normal' or 'irregular.' The most common sites reported by all participants included the face (41.8% of the total sample,  $n = 148$ ), cuticles and nails (33.1%,  $n = 117$ ), arms (22.6%,  $n = 80$ ), scalp (16.9%,  $n = 60$ ), and hands and feet (16.1%,  $n = 57$ ). In the total sample, 11.2% reportedly engaged in clinically significant skin picking, defined as scoring a total of seven or above on the SPS (Keuthen et al., 2001b). Of those who reported any skin picking ( $n = 222$ ), 17.6% engaged in self-injurious forms of the behavior, as defined by SPS criteria alone. Without regard to severity of skin picking itself, 8.6% of the total sample ( $n = 354$ ) reported significant levels of distress associated with their behaviors, as evidenced by total scores of seven or more on the SPIS (Keuthen et al., 2001a). Within those who reported any skin picking ( $n = 222$ ), 13.1% ( $n = 29$ ) also reported significant psychosocial impact associated with the behavior. Both self-injurious skin picking and significant associated impact were reported by 5.4% ( $n = 19$ ) of the total sample.

Women reported higher rates of skin picking and associated impact; 76.9% of self-injurious pickers in the sample, as defined by the SPS, were female. Of all females in the sample, 15.0% engaged in clinically significant skin picking compared to only 6.1% of males. Independent  $t$ -tests revealed significant gender differences on SPS ( $t = -3.82$ ,  $P < .05$ ; Cohen's  $d = .41$ ) and SPIS ( $t = -3.06$ ,  $P < .05$ ; Cohen's  $d = .33$ ) total scores. Age was not associated with skin picking severity or associated impact ( $P > .05$ ).

### 2.2. Correlations among study measures

Participants endorsing clinically significant skin picking on the SPS generally scored higher on each of the other assessments (Table 3). The SPS total score was moderately correlated with total scores for the OCI-R ( $r = .361$ ,  $P < .01$ ), BAI ( $r = .392$ ,  $P < .01$ ), BDI-II ( $r = .368$ ,  $P < .01$ ), and BIS-15 ( $r = .303$ ,  $P < .01$ ). Both the BISa and BISm subscales showed a moderate correlation with SPS total scores ( $r = .392$ ,  $P < .01$ ;  $r = .204$ ,  $P < .01$ , respectively); however, the association between the BISnp subscale and SPS total score was not significant ( $r = .08$ ,  $P > .05$ ) (Table 2).

Gender differences were also found within correlational patterns. Using Fisher  $r$  to  $z$  transformations, the association between the SPS and SPIS total scores was more robust for women than men ( $r_{male} = .500$ ,  $P < .01$ ;  $r_{female} = .675$ ,  $P < .01$ ), while the relationship of the SPS total score to the BAI ( $r_{male} = .423$ ,  $P < .01$ ;  $r_{female} = .342$ ,  $P < .01$ ) and BDI-II total scores ( $r_{male} = .442$ ,  $P < .01$ ;  $r_{female} = .319$ ,  $P < .01$ ) was more robust in men than women.

### 2.3. Multivariate analyses

A 2 (presence or absence of significant OCD symptoms)  $\times$  2 (gender) multivariate analysis of variance (MANOVA) was conducted to examine the effect of clinically significant scores on the OCI-R and gender on the total scores for other measures of psychological functioning. A significant multivariate main effect was found for gender [ $F(6,330) = 4.01$ ,  $P = .001$ , Wilks' Lambda = .932]. Significant univariate effects of gender were found for anxiety [ $F(6,330) = 20.15$ ,  $P < .001$ ]; depressive symptoms [ $F(6,330) = 4.59$ ,  $P < .05$ ]; and skin picking severity [ $F(6,330) = 5.61$ ,  $P < .05$ ], with women scoring higher than men. Similarly, a significant multivariate effect was found for the presence or absence of significant OCD symptoms [ $F(6,330) = 20.39$ ,  $P < .001$ , Wilks' Lambda = .730]. Significant univariate effects were found as those with clinically

**Table 3**

Differences in study variables as a function of skin picking severity.

Variable	Nonsignificant Skin picking	Significant Skin picking	$t$ -value	Cohen's $d$ Effect size
(1) SPS total	.78 (2.60)	12.49 (12.97)	-14.01*	2.39
(2) OCI-R total	9.91 (9.51)	22.08 (16.85)	-6.79*	1.16
(3) BAI total	8.82 (9.21)	19.97 (12.68)	-6.74*	1.16
(4) BDI-II total	7.15 (7.08)	15.62 (12.59)	-6.33*	1.08
(5) BIS-15 total	31.53 (6.52)	36.56 (6.93)	-4.51*	.77

Note. Mean and (Standard Deviation). SPS = Skin Picking Scale Total Score; OCI-R = Obsessive-Compulsive Inventory-Revised Total Score; BAI = Beck Anxiety Inventory Total Score; BDI-II = Beck Depression Inventory Total Score; BIS-15 = Barratt Impulsivity Scale-Short Form Total Score.

\*  $P < .01$ .

significant OCD symptoms reported higher levels of anxiety [ $F(6,330) = 98.70$ ,  $P < .001$ ]; depressive symptoms [ $F(6,330) = 48.49$ ,  $P < .001$ ]; skin picking severity [ $F(6,330) = 26.71$ ,  $P < .001$ ]; impulsivity [ $F(6,330) = 45.00$ ,  $P < .001$ ]; and psychosocial impact associated with skin picking [ $F(6,330) = 18.86$ ,  $P < .001$ ]. Finally, no significant multivariate effect was found for the interaction of presence of significant OCD symptoms and gender [ $F(6,330) = .937$ ,  $P > .05$ , Wilks' Lambda = .983].

A 2 (presence or absence of clinically significant skin picking)  $\times$  2 (gender) MANOVA was conducted. A significant multivariate main effect was found for gender [ $F(6,330) = 2.45$ ,  $P < .05$ , Wilks' Lambda = .957]. Follow-up univariate tests revealed significant effects of gender on psychosocial impact associated with skin picking [ $F(6,330) = 6.39$ ,  $P < .05$ ]. Similarly, a significant multivariate effect was found for the presence or absence of clinically significant skin picking [ $F(6,330) = 23.84$ ,  $P < .001$ , Wilks' Lambda = .698]. Significant univariate effects were found as those with clinically significant skin picking on the SPS also reported higher levels of anxiety [ $F(6,330) = 37.92$ ,  $P < .001$ ]; depressive symptoms [ $F(6,330) = 32.96$ ,  $P < .001$ ]; obsessive-compulsive symptoms [ $F(6,330) = 43.66$ ,  $P < .001$ ]; impulsivity [ $F(6,330) = 21.79$ ,  $P < .001$ ]; and psychosocial impact associated with skin picking [ $F(6,330) = 110.43$ ,  $P < .001$ ]. No significant multivariate effect was found for the interaction of presence or absence of clinically significant SP and gender [ $F(6,330) = 2.01$ ,  $P > .05$ , Wilks' Lambda = .965].

## 3. Discussion

Within a nonclinical community sample, this study examined prevalence rates of skin picking behaviors and correlations with affective distress. Consistent with studies finding that skin picking is relatively common and largely benign (Bohne et al., 2002; Hajcak, Franklin, Simons, & Keuthen, 2006; Keuthen et al., 2000), most participants endorsed the behavior in some form. Body sites most susceptible to skin picking closely matched those referenced in Keuthen et al. (2000), and included the face, cuticles and nails, arms, scalp, and hands and feet. A total of 5.4% of the sample reported clinically significant self-injurious skin picking and associated psychosocial impairment, which is also consistent with Keuthen et al. (2000). That women represented the vast majority of those with clinically significant skin picking is consistent with others (Arnold et al., 1998; Bohne et al., 2002; Hajcak et al., 2006; Lochner et al., 2002; Wilhelm et al., 1999), and may suggest a gender preponderance to this condition and/or be secondary to societal demands that value appearance in females. Indeed, correlational analyses showed that skin picking severity was more robustly associated to skin picking impact for women relative to men. Overall, the relatively high number of people in this sample who endorsed skin picking and its psychosocial sequelae suggests that the condition is grossly under-recognized and therefore, unlikely to receive appropriate treatment.

Significant correlations between skin picking behaviors and anxiety, depressive, impulsive, and obsessive-compulsive symptoms support previous research in clinical as well as nonclinical student samples (e.g., Hajcak et al., 2006; Keuthen et al., 2001b; Lochner et al., 2002). Although the correlational nature of this study limits inferences that can be made, one possible interpretation is that those with high rates of obsessive-compulsive symptoms are at increased risk for problematic skin picking behaviors through common neurobiological and behavioral mechanisms (for a review, see Arnold et al., 2001). For example, preoccupation with appearance, such as in body dysmorphic disorder, may predispose an individual toward ritualistic skin picking. Another possibility is that skin picking behaviors contribute to internalizing symptoms by virtue of their impairment and associated distress. Improvement in skin picking behaviors and reduction of lesions, while independent of mood, have been reported in patients treated with serotonin reuptake inhibitors (Arnold et al., 1999; Bloch, Elliott, Thompson, & Koran, 2001; Kalivas, Kalivas, Gilman, & Hayden, 1996; Simeon et al., 1997). Finally, associations between skin picking and attentional and motor impulsivity may be illustrated by behaviors performed thoughtlessly, or while trying to concentrate on a task. On balance, correlations between skin picking severity and other study variables were largely uniform and moderate, suggesting that skin picking may be related more generally to psychopathology rather than a specific construct such as impulsivity or obsessive-compulsive symptoms. Further research is warranted by the possibility that skin picking behaviors, like trichotillomania, may be multidimensional with regard to both impulsive and compulsive features.

The correlation between OCI-R and BIS-15 scores suggest that, as proposed by Grant and Potenza (2006), an overlap exists between impulsivity and obsessive-compulsive symptoms. However, this finding does not negate the qualitative differences between these constructs, particularly in regards to the ego syntonic/dystonic nature of each and associated treatment seeking behaviors. Within the context of BFRBs, characteristic differences in motivation and control can signify dissimilar attitudes and approaches toward treatment. Ferrão et al. (2006) note that individuals who engage in more impulsive types of behaviors may be more reluctant to seek treatment than individuals experiencing distress from obsessive-compulsive symptoms, as the former is more readily recognized and accepted by medical professionals and society in general than the myriad of conditions which may be classified as impulse control disorders. Furthermore, gratification achieved through an impulsive behavior tends to be reinforcing, contributing to limited motivation to change or seek treatment. In contrast, compulsive behaviors characteristic of OCD function to alleviate obsessional anxiety; OCD symptoms, by definition, are ego-dystonic and often a primary cause for seeking mental health care.

This study has several limitations that warrant comment. First, response options on the SPS were limiting for participants who engage in more automatic forms of skin picking and could not acknowledge any preceding “urges” or feelings of tension. The extent to which a preceding urge is necessary for a diagnosis is debatable, as many people report habitual skin picking behaviors with accompanying impairment/distress. Indeed, it is possible that like trichotillomania, skin picking could have multiple dimensions (i.e., focused/automatic, impulsive/compulsive; Walther et al., *in press*). Second, the correlational design of this study limits speculation on causal factors affecting skin picking behaviors. The SPS addressed general frequency and intensity of urges, but did not specifically assess levels of tension or distress during the course of skin picking, and participants were not directly questioned on the rationale behind the behaviors. While these associations may support the emotional regulation model of pathological skin picking as proposed by Wilhelm et al. (1999), we

are unable to determine if skin picking results in anxiety or depression or vice versa. Third, only self-report measures were used, which may inflate correlations among variables. Keuthen et al. (2001a) suggest that the SPS and SPIS be used as tools in combination with a full clinical evaluation, including an assessment of underlying dermatological or neuropsychiatric origin. Each of these potential limitations can be addressed by more comprehensive assessments conducted in clinical settings.

Findings from this study have significant clinical implications. With regards to assessment, prevalence data indicate that skin picking is quite common in nonclinical individuals, particularly women. Screenings of such symptoms may be one helpful manner of identifying those with problematic levels of symptoms. Similarly, educational efforts at informing people about the nature and treatment options for BFRBs may improve treatment knowledge and access.

Regarding treatment, these data suggest that a sizable percentage of subjects (~5%) may warrant intervention for their skin picking. Habit-reversal training has demonstrated effectiveness in the treatment of pathological skin picking (Arnold et al., 2001; Kent & Drummond, 1989; Rosenbaum & Ayllon, 1981; Teng, Woods, & Twohig, 2006; Twohig & Woods, 2001) and is the treatment of choice in trichotillomania (Bloch et al., 2007). Unfortunately, dissemination of this intervention remains limited, although new developments in online treatment options are promising (Flessner, Mouton-Odum, Stocker, & Keuthen, 2007). Preliminary data on Acceptance and Commitment Therapy (ACT) in female college students who chronically pick their skin shows considerable promise as a treatment approach (Twohig, Hayes, & Masuda, 2005). With regards to pharmacological intervention, a number of open trials (e.g., Arnold et al., 1999; Bloch et al., 2001; Keuthen et al., 2007a,b) and a limited number of controlled trials (e.g., Simeon et al., 1997) have suggested that treatment with selective serotonin reuptake inhibitors (SSRI) can reduce skin picking symptoms in various patient populations (for a review, see Arnold et al., 2001). The common use of SSRIs in skin picking and OCD may suggest a link between the two disorders; however, it may also be that SSRIs address depressive and anxiety symptoms that are indirectly linked to skin picking symptoms (Storch et al., 2008). Convincing data in support of SSRIs in skin picking are lacking and until these data are available, making diagnostic shifts in the DSM-V based on this information is premature. Regardless of eventual classification of skin picking as an ICD or otherwise, further research on established correlations and functional relationships will shed light on the etiology of pathological skin picking, and contribute to more effective treatment options for those who engage in the behaviors.

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