



An investigation of impulsivity in young adults exhibiting body-focused repetitive behaviors



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ABSTRACT

Prefatory research provides rationale for the body focused repetitive behavior cluster (BFRB; e.g. skin picking, nail biting), however little is known concerning the etiologies of these behaviors. While research suggests impulsivity impairment amongst several BFRBs, research has yet to examine multiple impulsivity domains or examine impulsivity within a nail biting or comorbid BFRB context. As such, this study sought to examine two facets to impulsivity (motor inhibition and delay discounting) amongst young adults exhibiting subclinical BFRBs (nail biting, skin picking, comorbid nail biting and skin picking). One hundred and thirty-two participants (37 demonstrating nail biting, 36 demonstrating skin picking, 19 demonstrating comorbid skin picking and nail biting, 40 controls) completed an assessment battery including self-reports (Monetary Choice Questionnaire, MCQ) and neurocognitive measures (Stop Signal Task, SST). Analyses revealed that individuals exhibiting comorbid BFRBs demonstrated significantly increased SST reaction time (controlling for stress) and stop signal delay (controlling for stress and medication use) compared to controls. Additionally, nail biters demonstrated significantly increased discounting (controlling for age) of MCQ medium and large rewards compared to controls. Group classification did not significantly predict remaining outcomes. Analyses indicated relationships between BFRB severity and task performance. Findings suggest important insights into the neurobiology of BFRBs.

1. Introduction

Emerging literature classifies pathological repetitive grooming processes under the broad umbrella term of body focused repetitive behaviors (BFRBs; McGuire et al., 2012; Teng, Woods, Marcks, & Twohig, 2004). Such behaviors include but are not limited to nail biting and skin picking. Rationale for such classification stems from prefatory research demonstrating several observed commonalities amongst BFRBs, including shared phenomenological (e.g. repetitive grooming behaviors focused on the body, similar psychosocial and negative physical impairment, etc.), neurological (e.g. frontal-striatal circuitry) and functional factors (e.g. behaviors in response to anxiety; Teng, Woods, Twohig, & Marcks, 2002). Collectively, BFRBs occur with frequent comorbidity, are often evident in several psychological disorders (e.g. autism spectrum disorders, body dysmorphic disorder, other specified obsessive compulsive disorder, etc; Bodfish, Symons, Parker, & Lewis, 2000; Esbensen, Seltzer, Lam, & Bodfish, 2009), and have been linked to significant psychosocial impairment, including emotional distress and impaired social and occupational functioning (Hayes, Storch, & Berlanga, 2009; Snorrason et al., 2012; Stemberger,

Thomas, Mansueto, & Carter, 2000). What is more, in a previous study of 439 college students, 13.7% of participants reported engaging in at least one BFRB daily (Teng et al., 2002). Substantial overlap reasonably suggests that these behaviors may be differing manifestations of similar underlying processes, however relatively little is known concerning the etiologies of these behaviors. Such limitations prohibit a comprehensive understanding of this cluster and warrant further research seeking to identify BFRB pathogenesis.

Notably, identification of plausible similarities and differences (e.g. in etiology) amongst these behaviors may provide critical information from a clinical research perspective. For example, recent developments at the National Institute of Mental Health (NIMH) have detailed a new approach to psychopathology, seeking to identify brain-behavior relationships that exist across disorders, rather than such relationships idiosyncratic to discrete diagnoses (Research Domain Criteria; RDoc). Etiological research within the BFRB cluster is consistent with bolstering tenants set forth through RDoc by potentially identifying cross cutting mechanisms (and highlighting those that are not) and perhaps further supporting grouping of the BFRB cluster and future transdiagnostic research. What is more, further characterization of the unique

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and common neurobiology underlying BFRBs may lend itself to more efficacious interventions for these behaviors.

One domain or process in particular that may underlie BFRBs and several other repetitive behaviors is impulsivity. Impulsivity has been defined as a predisposition towards rapid and unplanned reactions, with no regard for the negative consequences of such behaviors (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001) and consists of multiple dimensions, including, but not limited to, motor inhibition and delayed discounting (Evenden, 1999; Pinto et al., 2014). Motor inhibition (i.e. ability to inhibit a previously triggered motor command) is often assessed using Stop-Signal paradigms, during which individuals are required to make or inhibit simple motor responses (i.e. pressing a button) on various computer trials (Logan, Schachar, & Tannock, 1997). Despite contradictory evidence (Snorrason, Smári, & Ólafsson, 2011), findings within the literature suggest impaired motor inhibition (i.e. increased stop signal reaction time and SST directional errors; Chamberlain, Fineberg, Blackwell, Robbins, & Sahakian, 2006; Grant, Odlaug, & Chamberlain, 2011; Odlaug, Chamberlain, & Grant, 2010) amongst individuals demonstrating BFRBs, including skin picking. Of note, a significant drawback to such research is the lack of studies assessing motor inhibition in relation to adults who bite their nails. As the most prevalent of BFRBs and a behavior often comorbid with skin picking (Snorrason et al., 2012) this represents a striking gap in the literature. What is more, considering frequent comorbidity found amongst these behaviors, research has yet to examine potentially critical differences and similarities (e.g. in impulsivity) in individuals demonstrating one BFRB versus multiple BFRBs. Collectively, such limitations suggest the need for further research within this domain (i.e., motor inhibition in relation to nail biting and other BFRBs) and is one aim of this investigation.

A heretofore unexamined domain of impulsivity, with respect to BFRBs, is delayed discounting. Delayed discounting is defined as one's ability to forego immediate smaller rewards in favor of delayed larger rewards (Alessi & Petry, 2003). Increased impulsivity, or steeped discounting of delayed reward, in this domain suggests that an individual exhibits preferential selection of immediate – as opposed to delayed- rewards. This domain may be particularly relevant to those who engage in BFRBs as it may provide a deeper understanding as to why such individuals choose seemingly smaller, immediate rewards (i.e. picking skin, biting nails) as compared to larger, delayed rewards (i.e. healing of scars, healthy nails). Surprisingly, delay discounting has yet to be studied to any extent amongst BFRBs. Research examining other psychiatric populations characterized by impaired impulse control (e.g., substance abuse, problematic gamblers), however, have demonstrated rapid discounting of delayed rewards (Rachlin & Green, 1972) amongst individuals diagnosed with such disorders (Alessi & Petry, 2003; Kollins, 2003; Petry & Casarella, 1999). While not specific to BFRBs, these findings provide preliminary support for the potential utility of examining delayed discounting amongst clusters of other behaviors characterized by impulsivity, namely BFRBs.

Collectively, available – albeit limited – research suggests deficits in motor inhibition among adults exhibiting BFRBs. However, limitations to prior research (e.g. discrepancy in skin picking disorder [SPD] literature, absence of studies interrogating the neurobiology of chronic nail biting and comorbid BFRBs) suggest the need for further investigation to confirm or potentially refute such findings. Additionally, lack of research seeking to explore the role that delay of gratification (i.e., delayed discounting) may play in improving the field's understanding of BFRBs necessitates research attention. As such, the current study seeks to address gaps in the existing literature by examining motor inhibition (using the Stop Signal Paradigm) and delayed discounting amongst young adults exhibiting subclinical symptoms characteristic of a subset of BFRBs (i.e. nail biting, skin picking, and comorbid nail biting and skin picking) and controls (i.e., those denying any BFRB-related symptoms). Utilizing hierarchical

regression analyses and based upon findings from prior research, we hypothesize that classification as either a skin picker, nail biter, or as exhibiting multiple BFRBs (i.e., skin picking + nail biting) will predict poorer performance on the Stop Signal Task (SST). While examination of delayed discounting amongst BFRBs is novel, based on prior research among disorders characterized by poor impulse control, we also hypothesize that classification into one of the above referenced BFRB groups will predict increased discounting of delayed rewards (i.e., greater impulsivity) compared to controls.

2. Methods

2.1. Participants

Participants described herein were recruited as part of a larger ongoing study assessing neurocognitive functioning within young adults. In total, 363 participants were recruited through several undergraduate psychology courses from a Midwestern university. Inclusion within the current study required the participant to be at least 18 years of age and provide complete data on all pertinent measures (see measures section). Participants with incomplete data (N=25) or currently using epileptic medications were excluded from this study (N=15). In total, 132 participants were selected for use within the present analyses including 37 “nail biters”, 36 “skin pickers”, 19 “nail biters & skin pickers” and 40 randomly selected controls (see Section 2.4 for a detailed description of group formation). Participant demographics are presented in Table 1.

2.2. Measures

2.2.1. Skin Picking Scale (SPS)

The SPS is a six item self-report instrument used to assess skin picking severity (i.e. urge frequency and intensity, time spent picking, interference due to picking, and distress and avoidance related to skin picking behaviors; Keuthen et al., 2001). The scale employs a 5 point Likert scale ranging from 0 (“none”) to 4 (“extreme”), with higher scores indicating increased symptom severity. Available evidence demonstrates the SPS to have strong internal consistency and construct validity (Keuthen et al., 2001). Within the present sample, the SPS indicated excellent internal consistency ($\alpha=.909$) supporting utilization within the current study.

2.2.2. Nail Biting Scale (NBS)

The NBS is a modified version of the SPS designed for use within the larger study. In particular, the NBS contains 6 self-report items assessing repetitive nail biting behavior (i.e. frequency and intensity of urges, time spent on nail biting, interference due to nail biting, and distress and avoidance). Similar to the SPS, the NBS is rated on a 5 point Likert scale, with higher scores demonstrating increased severity. Analysis of the NBS within the current sample demonstrated high internal consistency ($\alpha=.899$) supporting scale utility.

2.2.3. Depression, Anxiety, Stress Scales (DASS)

The DASS is a 21 item self-report measure used to assess depression, anxiety and stress symptoms (Lovibond & Lovibond, 1995). Responses on this measure range from 0 (“Not at All”) to 3 (“Most of the Time”), with higher scores indicating increased anxiety, depression, or stress. Prior research utilizing the DASS indicate strong internal consistency and concurrent validity (Anthony, Bieling, Cox, Enns, & Swinson, 1998). Within the current sample, Depression ($\alpha=.886$), Anxiety ($\alpha=.772$), and Stress ($\alpha=.834$) subscales demonstrated good internal consistency.

2.2.4. Monetary Choice Questionnaire (MCQ)

The MCQ is a 27-item self-report instrument designed to assess delayed discounting (Kirby, Petry, & Bickel, 1999). Within this

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