

A TAXOMETRIC ANALYSIS OF PEDOPHILIA

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## ABSTRACT

Sexologists continue to lack understanding about a fundamental aspect of pedophilia: do men with pedophilia represent a unique group distinguished by their sexual interests, or are they high-scorers on a continuum of sexual interest in children? No existing evidence points conclusively to pedophilia having either a categorical or continuous latent structure, but each possibility has different implications for our understanding of the etiology of the disorder, which populations are appropriate for pedophilia research, and treatment development. This central question about the construct of pedophilia may be aided by taxometrics, the statistical procedures that provide evidence for whether particular disorders are categorical or continuous. The present research utilized three taxometric procedures to analyze the latent structure of pedophilia in a sample of 371 convicted child sex offenders who completed the Multiphasic Sex Inventory (MSI), a self-report measure designed specifically to assess sex offenders. Results across the three procedures converged to indicate that pedophilia (as measured by the MSI) is dimensional. Theoretical and clinical implications of such findings are discussed.

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## INTRODUCTION

Pedophilia, as currently defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR), has two main diagnostic criteria: an intense sexual interest in pre-pubescent children and either having acted on such interest or being distressed by it. It is one of the very few disorders for which clinically significant distress or impairment is not necessary in order for a diagnosis to be given. Our current diagnostic criteria make moral and legal sense given that, as a culture, we do not condone and, in fact, generally outlaw sexual acts involving children. From a psychopathological perspective, however, our current definition of pedophilia is vague, at best.

For the first diagnostic criterion, an *intense* sexual interest in pre-pubescent children, the quantifiable degree of sexual interest in children that might typify pedophilia is simply not mentioned. This omission increases the difficulty of making this diagnosis. For example, in the case of child sex offenders with female victims, particularly incestuous offenders, such men may be sufficiently aroused by prepubescent girls to commit their offenses without their arousal being either recurrent or sufficiently intense to qualify as a preference (Seto, Lalumière, & Kuban, 1999). Are such men pedophilic? On the other hand, following the second diagnostic criterion, and defining men with pedophilia as individuals who sexually offend against children would, in the vast majority of cases, limit our understanding of pedophilia to men who have been apprehended, tried for, and found guilty of, child molestation. Yet, it is widely believed that a minority of men who commit such offenses are ever even identified, and even fewer found guilty in court (Goldman & Padayachi, 2000). In

addition to these limits to our understanding of pedophilia resulting from the criteria required by the DSM-IV definition is an even more basic unanswered question: do men with pedophilia represent a unique group distinguished by their sexual interests, or are they the high-scorers on a continuum of sexual interest in children?

Taxometrics, the family of statistical procedures to assess whether particular disorders are categorical or continuous, may aid in answering this central question about pedophilia. Taxometrics has provided conceptually useful results in other realms of psychopathology, and may be able to serve the same purpose for pedophilia. Perhaps, for instance, pedophilia is dimensional and varies continuously throughout the population, as does psychopathy (Edens, Marcus, Lilienfeld, & Poythress, 2006). Individuals with either pedophilia or psychopathic personality features are often found in the criminal justice system as a result of their illegal acts. Our collective discomfort with such individuals may play a role in cultural assumptions about how both men with pedophilia and individuals with psychopathy simply must somehow be markedly different from the rest of us. The evidence for psychopathy, however, does not support such assumptions, and we may find that neither does evidence for pedophilia. No clear evidence for whether pedophilia as a dimension or as a taxon exists at present.

In the absence of empirical evidence about the latent structure of pedophilia, how has this disorder been conceptualized and operationalized? To date, two alternative methods have become common. Some research has relied on the second DSM-IV-TR criterion: whether an individual has committed a sexual offense against a child. Other research has relied on the first DSM-IV-TR criterion: a demonstrated (via the phallographic technique of penile plethysmography) greater sexual interest in pre-pubescent children than in older minors or adults. Both methods have considerable limitations.



The most serious challenge to using known sexual behavior as one of the main diagnostic criterion for pedophilia comes from research on groups of adjudicated child sex offenders. Such research has shown clearly that not all (or even most) convicted child sex offenders have strong pedophilic sexual interests if that interest is operationalized in terms other than simply having sexually offended against a child. For example, one study examined the entire offense histories, including the situational context, presence of a predatory style of offending, and preferences for gender and age of victim, of 5,223 convicted child sex offenders, and found fewer than half (roughly 43%) to have, by the authors' definition, pedophilic interest (Maletzky & Steinhauser, 2002). Two additional studies utilized phallometric responses (changes in penile blood flow in response to various erotic stimuli) and found that between 40 and 50% of child sex offenders displayed pedophilic interest (Blanchard, Klassen, Dickey, Kuban, & Blak, 2001; Seto & Lalumière, 2001). Across studies, a conservative estimate suggests that perhaps 50% or less of men who sexually offend against children are pedophilic (Seto, 2008). It is clearly not accurate then to assume that all child sex offenders are pedophilic.

Assuming that pedophilia can be assessed solely by phallometric responses (and that those responses serve as an adequate operationalization of an intense sexual interest in children) is still potentially limiting or even inaccurate. Determining pedophilic interest with phallometric techniques is not simply a matter of men displaying any *absolute* arousal to depictions of prepubescent children. Even among convicted child sex offenders, the diagnostic consistency of pedophilia based on minimal phallometric responses is no better than chance (Lykins, et al., 2009). Further, recent findings indicate that pedophilic men show significantly lower absolute levels of arousal than nonpedophilic men to all stimuli, including stimuli depicting prepubescent children (Blanchard, et al., 2009). Thus, even if we arbitrarily

chose some absolute level of arousal (high enough to ensure the interpretability of the phallometric responses) to prepubescent children as our “cut-off” for denoting pedophilic interest, that cut-off would be applicable only to pedophilic men.

As a result of the pitfalls of using *absolute* levels of arousal to assess pedophilic interest, most researchers have operationally defined pedophilia as a demonstrated higher level of arousal to stimuli depicting prepubescent children *relative* to stimuli depicting adults, although how much higher varies somewhat across studies (Blanchard, et al., 2001; Harris, Rice, Quinsey, Chaplin, & Earls, 1992; Lalumière & Harris, 1998; Seto, Lalumière, & Blanchard, 2000). The use of relative levels of arousal to children may enable the comparison of pedophilic and nonpedophilic men that using absolute levels of arousal does not. In two preliminary studies of community samples of heterosexual men, for instance, a majority displayed at least some absolute arousal to depictions of prepubescent girls, but for approximately 75% of those individuals, such arousal was quite low relative to the arousal they exhibited to pubescent girls or adult women (Hall, Hirschman, & Oliver, 1995; Seto & Lalumière, 2001). Nevertheless, without knowing more about levels of pedophilic interest in community samples of men, even a relative level of arousal used as a “cut-off” for identifying pedophiles among groups of child sex offenders is somewhat arbitrary. The utility of phallometric responses for diagnosing pedophilia will remain limited until we have more information about how pedophilic interest is distributed in the general population, and a clearer sense of what degree of pedophilic interest (whether absolute or relative) constitutes a *clinically significant* level of it (e.g., putting them at substantial risk for sexually offending).

The differences in how pedophilia is defined across research studies—whether based on sexual offense history or phallometric responses—actually reflect two different conceptualizations of the same disorder. Research that assumes all child sex offenders are

pedophilic treats pedophilia as a distinct category, and assumes that pedophilia is the only, or at least the primary, motive for child sex offenses. In such research, the presence or absence of sexual offenses against children is then used as the sole diagnostic criterion for defining whether men have pedophilia. By treating pedophilia as a disorder that is either present or absent, the possibility that levels of pedophilia vary dimensionally throughout the population is conceptually ignored. The practice of equating child sex offenders with pedophiles may also make pedophilia seem more categorical than continuous by selectively sampling from the extreme end of a continuum of sexual interest in children; those who have actually sexually offended against children (Ruscio & Ruscio, 2004). Furthermore, even if men with pedophilia are qualitatively different from men without pedophilia, using child sex offense convictions as the sole diagnostic criterion for labeling an individual as pedophilic limits the ability to determine whether there are different levels of severity among men with pedophilia. It is certainly possible that pedophiles represent a distinct taxon of men, but assuming that pedophilia is a taxonic form of psychopathology is not equivalent to having sound evidence that it is.

Phallometric research that relies on relative levels of arousability, on the other hand, has treated pedophilia as a dimensional construct best represented by those phallometric responses. Researchers must then choose a point along the continuum of phallometric responses to serve as a somewhat arbitrary cut-off for identifying men with clinically significant pedophilia. Putting aside the issue of assigning arbitrary cut-offs to dimensional constructs, of course pedophilia appears to vary dimensionally when it is assessed using a measure that yields dimensional scores, such as relative levels of arousability. The potential problem comes from assuming that pedophilia varies continuously across such dimensional measures when the distribution of pedophilic interest has not been adequately examined.

Pedophilia might indeed be taxonic, with distinct groups of pedophilic and non-pedophilic men, but relative levels of arousability may vary enough within the two groups that the construct appears to be dimensional instead of categorical.

Based on the current known information regarding the nature of pedophilia, it is impossible to know which conceptualization—pedophilic men representing the high end of a continuum of sexual interest in children versus pedophilic men constituting a distinct group of men characterized by that interest—better captures the disorder. Current methods of operationalizing pedophilia may be obscuring existing evidence regarding its latent structure. Relying on sex offense status as a diagnostic criterion may minimize the appearance of dimensional variation, whereas relying on phallometrically-assessed sexual interest in children may overemphasize the presence of some variation, without examining possibly discontinuities in that variation. As a result, in order to both better conceptualize and operationalize the disorder, current understandings of pedophilia might benefit greatly from taxometric analyses.

The taxometric method would enable us to determine if men with pedophilia differ from other child sex offenders (and from the general population) in degree, or in kind. Differences in degree would indicate that pedophilia varies dimensionally, whereas differences in kind would indicate that men with pedophilia belong to a taxon (although the taxon could have variability within it) of individuals identifiably distinct from men without pedophilia. Taxometrics can shed light on whether either of the current conceptualizations accurately captures pedophilia; if researchers are succeeding in “carving nature at its joints” (one cannot, it seems, write of taxometrics without adding to the nearly infinite number of times Plato has been so quoted).

What might taxonic results mean? In the case of pedophilia, taxonic results would not necessarily mean that all men in the taxon have pedophilia. A taxon is only as sensitive as the variables (in taxometrics, such variables are called indicators) used to detect it. When indicators are capable of detecting subclinical or prodromal symptoms, any taxon that is discovered may not be of individuals with a specific disorder, but instead a taxon of individuals *at risk* for that disorder. For schizophrenia, for example, the results of multiple taxometric analyses have indicated that there appears to be a distinct taxon not of individuals with schizophrenia, but of schizotypy: people *at risk* for schizophrenia-spectrum disorders (Lenzenweger & Korfine, 1992; Tyrka, et al., 1995). The same might certainly be true for pedophilia: there may be a broad taxon not of men with pedophilia, but of men *at risk* for exhibiting clinically significant levels of pedophilic interest. Regardless of how broad the taxon, however, taxonic results would indicate that there is a discontinuity between men at risk for pedophilia and those not at risk. The focus of etiological research on pedophilia might then turn to why the discontinuity exists: what diatheses (e.g., neuropsychological differences, early sexual abuse) are responsible for the discontinuity? Furthermore, taxonic results would tell us which populations might be most appropriate for research on pedophilia. If a large percentage of child sex offenders do not belong to a taxon of individuals distinguished by their pedophilic interest (e.g., nonpedophilic incest offenders), their inclusion in studies on pedophilia is unhelpful, and likely detrimental, to the strength of the conclusions about pedophilia than can be drawn from such studies. In terms of treatment, taxonic results would suggest that whereas nonpedophilic child sex offenders certainly need treatment, it need not focus on a primary sexual interest in children.

What might dimensional results mean? In terms of etiology, if pedophilia exists along a continuum, there is no need to look for risk factors that cause a discontinuity between

those with pedophilia and those without it. Instead, risk factors for pedophilia would likely be better understood as existing across continuums of their own, and interacting with one another: pedophilia is not an either/or form of psychopathology based on the presence or absence of certain risk factors, but instead, levels of pedophilia occur as a result of the “additive contribution of many small influences” (Ruscio, Haslam, & Ruscio, 2006).

Although untangling the types, amounts, and interactions of those small influences would be no small task, dimensional results mean the opposite of taxonic results in terms of what populations might allow us to better understand pedophilia. If levels of pedophilia exist throughout the general population, researching individuals with various levels of sexual interest in children could be informative about individuals with particularly high levels of such interest. In terms of treatment, research might focus on factors that restrain men in the community from acting on their pedophilic interest, and how to utilize those factors in treatment with men who have acted on such interest.

No taxometric analysis of pedophilia has yet been conducted, so hypothesizing about the likelihood of either taxonic or dimensional results would be premature. Genetic and neurodevelopmental research, however, has provided evidence of specific risk factors for, and neurological correlates of, pedophilia that may be suggestive of the existence of a taxon. An early and small study of heritability that included both pedophilic and other paraphilic men found evidence for a pedophilic-specific genetic predisposition (Gaffney, Lurie, & Berlin, 1984). Further evidence for underlying differences and deficits in the neurological structure and neuropsychological function of pedophiles comes from a variety of studies. A recent meta-analysis concluded that sex offenders with child victims have lower levels of intelligence than both sex offenders without child victims and nonoffending men, although no distinction was made between pedophilic and nonpedophilic child offenders (Cantor,

Blanchard, Robichaud, & Christensen, 2005). In addition, when compared with non-pedophilic child sex offenders, pedophilic child sex offenders have demonstrated a higher incidence of non-right-handedness (Cantor, Klassen, et al., 2005), a greater likelihood of having experienced head injuries before the age of 13 (Blanchard, et al., 2002; Blanchard, et al., 2003), lower verbal intelligence (Whittaker, 2007), lower volumes of white matter in cortical areas associated with the processing of sexual stimuli (Cantor, et al., 2008), increased amygdala activation in response to unfamiliar children (Sartorius, et al., 2008), increased difficulty recognizing facial and prosodic affect (Suchy, Whittaker, Strassberg, & Eastvold, 2009a), decreased activation across multiple brain regions when processing erotic adult stimuli (Walter, et al., 2007), slower overall processing speed (Suchy, Whittaker, Strassberg, & Eastvold, 2009b), and delayed recall memory (Cantor, et al., 2004).

At first glance, the neurological and neuropsychological research described above might seem to suggest that pedophilia is perhaps taxonic. Indeed, some of these deficits and differences may be categorical (i.e., either someone has the deficit or they do not). However, if there is a single underlying cause for all these deficits, none has thus far been identified in pedophilia. The possibility remains that even if each known neurological/neuropsychological deficit is in fact categorical (and they may very well not be), those factors may each contribute a small amount of variance to a dimension of pedophilia.

At present, no research points definitively—or even suggestively—to whether pedophilia has either a categorical or continuous latent structure. Evidence either for or against taxonicity, however, would have implications for how pedophilia is conceptualized, operationalized, researched, and even treated. The goal of the present research is to serve as an initial application of taxometric analyses on a sample of adjudicated child sex offenders to conduct a preliminary investigation into the latent structure of pedophilia

## METHODS

### **Participants**

Participants were 371 men, ages 19 to 75 ( $M = 36.38$ ,  $SD = 11.90$ ), convicted of, and in treatment for, a sexual offense against a minor (a child or adolescent under the age of 18). All offenders were recruited during their mandated (as a term of their parole) stay in one of three residential treatment centers, run by the Utah Department of Corrections, contracting (for assessment and treatment) with the Center for Family Development (CFD), a major Utah provider of sex offender treatment and assessment services.

### **Measures**

Participants completed an assessment battery of both general personality and sex offender specific measures as a routine part of their treatment program, including those measures to be utilized in the taxometric analyses, described below. We conceptualize pedophilia as similar to the current DSM-IV-TR definition: a sexual interest in prepubescent children often strong enough to motivate actual sexual offenses against such children, present in roughly 50% of child sex offenders (Seto, 2008). Based on this definition and the data available for the present research, we operationalized pedophilia as measurable in several ways: the offense characteristics, as measured quantitatively by the Screening Scale for Pedophilic Interest (SSPI; described below), and offenders' self-reported thoughts, feelings, attitudes, and fantasies related to sexual behavior, as measured by three selected scales of the Multiphasic Sex Inventory (MSI; also described below).



## **SSPI**

The SSPI (Seto & Lalumière, 2001) is a scale consisting of four dichotomous items which yields scores from 0 to 5, based on the presence or absence of four possible characteristics of child sex offenses: (1) having had a victim aged 11 or younger, (2) having had a male victim (scored as 2 points if present), (3) having had multiple victims, and (4) having had an extrafamilial victim. The SSPI has been demonstrated to be a valid screening tool (e.g., SSPI scores have been found to be significantly and positively correlated with phallometrically-assessed pedophilic interest, Seto, Harris, Rice, & Barbaree, 2004).

## **Victim Age**

In the case of the variable of victim age that was utilized to calculate SSPI scores, conversion from an ordinal to dichotomous variable masks considerable variation across participants. Victim age alone is inversely related to phallometrically-assessed pedophilic interest (Freund & Watson, 1991); so in addition to its contribution to SSPI scores, victim age was also considered for retention in the analysis.

## **MSI**

The MSI (Nichols & Molinder, 1984) is a 300-item, true-false self-report instrument, designed specifically for assessing sex offenders. It is composed of 20 scales, including scales for evaluating sexually deviant behaviors, cognitions, and attitudes.

**MSI Child Molest Scale.** The Child Molest (CM) Scale is a 40-item scale, covering five aspects of child molestation: fantasy (“I have daydreamed about sex play with a child”), cruising (“Sometimes I have hung around schools and playgrounds just to watch some of the children at play”), sexual assault (“I have touched a child’s private parts in a sexual way”), aggravated assault (“A child has put my penis in their mouth”), and incest (“Sometimes I

have not been able to stop myself from sexually touching one or more of the children in my family”). The MSI has been found to have good internal reliability, with the CM Scale in particular having the highest internal consistency ( $\alpha = .90$ ; Kalichman, Henderson, Shealy, & Dwyer, 1992), in addition to high test-retest reliability ( $r = .78$ ; Simkins, Ward, Bowman, & Rinck, 1989). Further, the CM Scale yields significantly higher scores from child sex offenders than other types of sex offenders (Dowling, Smith, Proeve, & Lee, 2000), is significantly and positively correlated with phallometrically-assessed pedophilic interest (Tong, 2007), and significantly and negatively correlated with victim age (Kalichman, et al., 1992). One study found that CM Scale scores were more highly correlated with having offended against a child than phallometric responses or self-reported fantasies, and was the only measure of pedophilic interest significantly able to distinguish child sex offenders from other sex offenders (Stinson & Becker, 2008).

**MSI Sexual Obsessions Scale.** The Sexual Obsessions (SO) Scale is a 20-item scale which Schlank (1995) notes simultaneously assesses both sexual obsessions (“I think about sex 80% of the time”), as well as the capacity to exaggerate sexual problems (“There have been times that thinking about sex has almost driven me crazy”). The SO Scale, like the CM Scale, has high internal consistency ( $\alpha = .86$ ; Kalichman, et al., 1992) and test-retest reliability ( $r = .80$ ; Simkins, et al., 1989). Unlike the CM Scale, the SO Scale does not directly assess pedophilic interest. However, child sex offenders who have both extrafamilial and intrafamilial victims have been shown to have significantly higher SO Scale scores than offenders who have only one type of victim. Similarly, child sex offenders who have both male and female victims have been shown to have significantly higher SO Scale scores than offenders with only one gender of victim (Simkins, et al., 1989).

**MSI Cognitive Distortions/Immaturity Scale.** The Cognitive Distortions/Immaturity (CDI) Scale is a 20-item scale that measures an offender's sense of personal accountability ("Children today do more sexual things than when my parents were growing up") and their perception of themselves as a victim ("In some ways I was used by the person who reported me"). Like both the CM and SO Scales, the CDI Scale has high test-retest reliability ( $r = .71$ ; Simkins, et al., 1989). The CDI Scale is only moderately internally consistent ( $\alpha = .53$ ; Kalichman, et al., 1992), however, which may reflect that items on the scale are actually capturing a more diffuse construct than some of the other MSI scales.

Although neither the SO or CDI scales directly assess pedophilic sexual interest, both scales have demonstrated significant relationships with offense characteristics associated with pedophilia (Simkins, et al., 1989): specifically, having extrafamilial victims, having male victims, or having multiple victims (Freund & Blanchard, 1989; Freund & Watson, 1991; Seto & Lalumière, 2001).

## **Procedures**

Upon entry into each treatment unit, all participants completed a battery of self-report inventories, including the MSI. Participants also completed semi-structured clinical interviews to assess the characteristics of their index offense (the conviction for which they were currently undergoing treatment), as well as any additional sexual offenses. SSPI scores and victim ages were based upon both clinical interviews and file reviews.

## **Taxometric Procedures**

To analyze the present data, we used three of the several taxometric procedures developed by Meehl and colleagues, employing taxometric software programs created by Ruscio (2010): "Mean Above Minus Mean Below a Cut" or MAMBAC (Meehl & Yonce,

1994), “Maximum Covariation” or MAXCOV (Meehl & Yonce, 1996), and “Latent Mode Factor Analysis” or L-Mode (Waller & Meehl, 1998). All three procedures produce two types of information: first, providing evidence as to whether the structure in question (pedophilia) appears taxonic or dimensional, and second, if the structure does appear taxonic, yielding estimates of the base rate of the taxon of men with pedophilia within our larger sample of child sex offenders. By utilizing MAMBAC, MAXCOV, and L-Mode, results can be compared not only within procedures, because both MAMBAC and MAXCOV analyze all available variables in all possible combinations to create multiple permutations of the taxometric analyses, but also across the three procedures, with agreement both within and across procedures providing stronger evidence for the obtained results.

### **MAMBAC**

This procedure utilizes two quantitative variables at a time. Each variable must be considered a valid indicator of the conjectured taxon. One variable then serves as the input indicator ( $x$ ), while the other serves as the output indicator ( $y$ ). A series of cuts (50, in the present study) are then made along the input indicator (the  $x$ -axis) at regular intervals, and at each cut, the mean scores of the output indicator both above and below the cut are calculated. Finally, the difference between the mean above the cut and the mean below the cut is computed, and the differences between means across all 50 cuts are graphed along the  $y$ -axis. Variables are rotated to create all possible unique combinations of input and output indicators, yielding multiple distinct MAMBAC analyses, which have been found to yield clearer results than summing variables to form composite output indicators (Walters & Ruscio, 2009). The appearance of the graph will vary based on the latent structure of the construct in question: a taxonic structure will yield a peaked graph, with the location of the peak providing an estimate of the taxon base rate; conversely, a more dimensional structure

will yield a concave, flat, or irregular graph without a peak. The logic behind the MAMBAC procedure is that if a taxon and its complement do indeed exist within the dataset, the difference between the means of indicator scores above and below a cut will be greatest (will, in fact, “peak”) at the cut-point along the  $x$ -axis that most accurately divides the taxon and its complement.

### **MAXCOV**

This procedure requires at least three valid quantitative variables to serve as indicators. One variable serves as the input indicator ( $x$ ), and the  $x$ -axis is divided into a series of overlapping segments (the segments are referred to as “windows;” 50 windows, with .90 overlap, will be used in the present study) are created along the  $x$ -axis. The covariance between the two remaining variables (now serving as the output indicators) in each window is then computed and graphed along the  $y$ -axis. The variables are rotated to create all possible unique combinations of input and output indicators, yielding multiple distinct MAXCOV analyses. As with the MAMBAC procedure, the appearance of the MAXCOV graph will vary based on the latent structure of the construct in question: a taxonic structure will yield a peaked graph, with the location of the peak providing an estimate of the taxon base rate; conversely, a more dimensional structure will yield a concave, flat, or irregular graph without a peak. The logic behind the MAXCOV procedure is that if a taxon and its complement do indeed exist within the dataset, the covariation between two indicators will peak in the window along the  $x$ -axis that contains equal numbers of taxon and complement members (effectively, the cut-point that most accurately divides the taxon and its complement).

### **L-Mode**

This procedure utilizes all available quantitative variables at a time as indicators. L-Mode factor analyzes all the indicators. Scores on the first principal factor are then graphed along the  $x$ -axis, and the relative frequencies of those factor scores are graphed along the  $y$ -axis. Similar to graphs created by both the MAMBAC and MAXCOV procedures, the appearance of the L-Mode graph will vary based on the latent structure of the construct in question: a taxonic structure will yield a bimodal graph, while a more dimensional structure will yield a unimodal graph. The logic behind the L-Mode procedure is that if a sample includes both a taxon and its complement, the taxon group members and the complement group members will have two different modal factor scores on the same latent construct.

The software written by Ruscio (2010) also creates simulated taxonic and dimensional data sets during the analyses that match the existing data set on characteristics such as skew and indicator correlations, but vary in terms of latent structure. Simulated data is of particular use in interpreting ambiguous taxometric graphs. For the present study, each of the three procedures were used to analyze, in addition to the existing data set, an additional 100 comparison samples of simulated taxonic data and 100 comparison samples of simulated dimensional data (Ruscio, Ruscio, & Meron, 2007). The simulated data sets create a comparison curve fit index (CCFI), which is an objective measure of whether the existing results are more similar to the simulated taxonic or dimensional data. CCFI values range from 0 (strong evidence of a dimensional structure) to 1 (strong evidence of a taxonic structure), with .5 indicating ambiguous results that is evidence neither for nor against taxonicity. The CCFI has strong empirical support for its utility as a measure of consistency in taxometric analyses (Ruscio, 2007; Ruscio & Marcus, 2007; Ruscio, et al., 2007; Ruscio, Walters, Marcus, & Kacetow, 2010).

As described above, taxometric analyses generate base rate estimates of the putative taxon, but can utilize a priori base rate estimates as well. Seto (2008) has suggested 50% as a conservatively high estimate of the prevalence of pedophilia among child sex offenders. To arrive at a more precise estimate, the prevalence rates of pedophilia across four large-scale studies—identified by Seto (2008) as being particularly large samples—of a total of 6,808 child sex offenders (Blanchard, et al., 2001; Maletzky & Steinhauser, 2002; Seto & Lalumière, 2001; Seto, Murphy, Page, & Ennis, 2003) were weighted to calculate an average prevalence rate of pedophilia of 42%. All three taxometric analyses, including the analyses of the simulated data sets, were conducted using the 42% estimated taxon base rate to generate the simulated taxonic comparison data.

## RESULTS

### **Selection of Indicators and Indicator Validity**

Taxometric procedures require that the indicators used in the analyses are *valid*; that is, if a taxon does exist, the indicators would be capable of discriminating between taxon and complement. Indicator validity depends on the mean separation of each indicator (i.e., the difference between the mean indicator scores for the putative taxon and its complement). Both SSPI scores and victim age were found to have insufficient indicator validity, and were excluded from the analyses (for a more detailed discussion of the exclusion of SSPI scores and victim age, please see the Appendix). In contrast, the three MSI scales demonstrated sufficient indicator validity, and the following taxometric analyses were performed using MSI scores as the three indicators of a putative taxon of pedophilia

### **MSI Taxometric Analyses**

For the MAMBAC analyses, all pairs of the three MSI scales were used as input and output indicators, yielding six MAMBAC curves. None of the six curves had the inverted U-shaped curves typically seen in taxonic data. Figure 1 contrasts the average of the six MAMBAC curves with simulated taxonic and dimensional data sets. The actual data appear to be more similar to the simulated dimensional data than to the simulated taxonic data, with a CCFI of .316 that is also consistent with a dimensional interpretation.

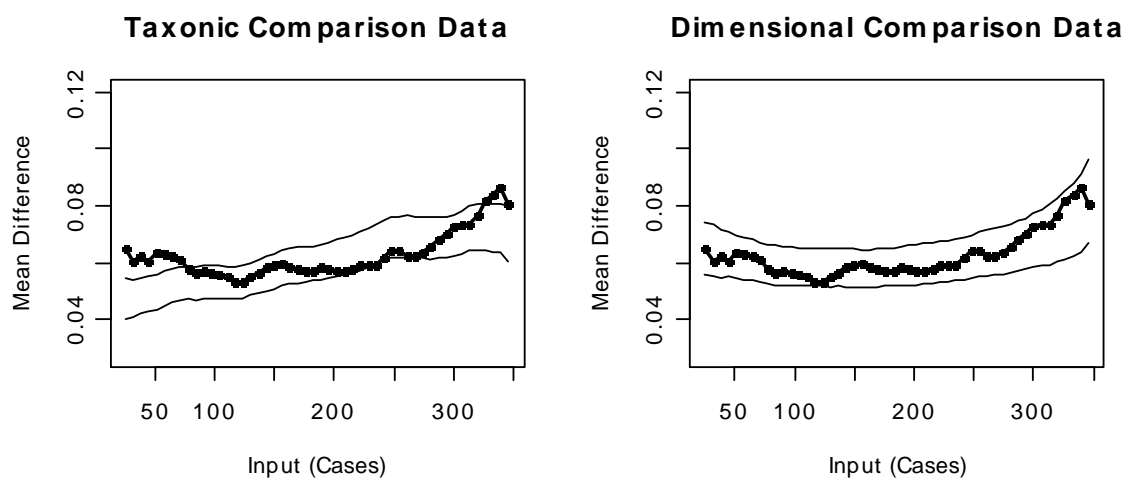
For the MAXCOV analyses, each MSI scale served as an input indicator once while the other two MSI scales served as output indicators, yielding three MAXCOV curves. Two of the three curves were flat, and the remaining curve was irregularly shaped, with a U-



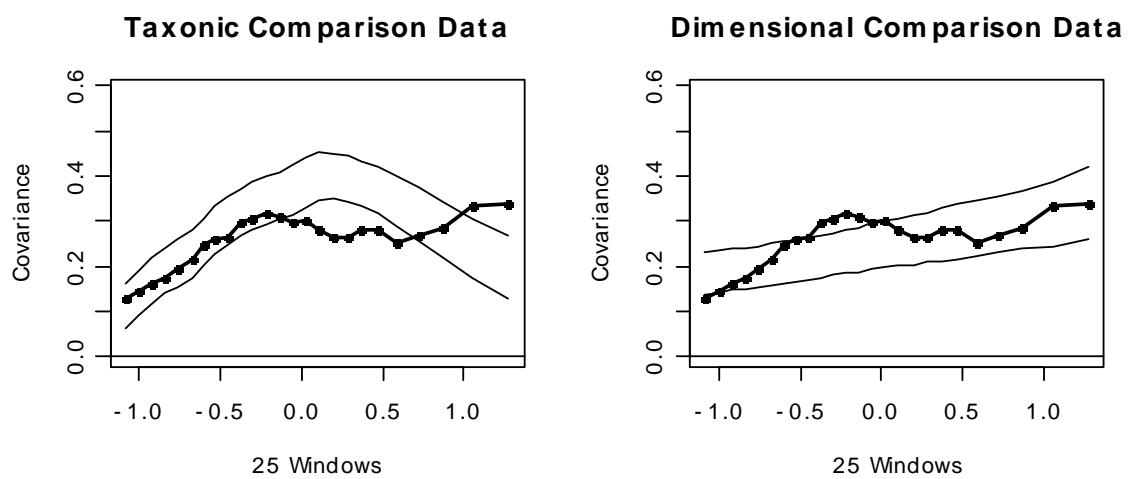
shaped curve that is the opposite of curves typically seen in taxonic data. Figure 2 contrasts the average of the three MAXCOV curves with simulated taxonic and dimensional data sets. The actual data appear to be more similar to the simulated dimensional data than to the simulated taxonic data, with a CCFI of .377 that is also consistent with a dimensional interpretation.

For the L-Mode analysis, the simulation of dimensional data yielded a unimodal curve (Figure 3), and the simulation of the taxonic data yielded a more bimodal curve. The actual data, although not unequivocally unimodal, appear to be more similar to the simulated dimensional data than to the simulated taxonic data. Additionally, the CCFI of .333 is also consistent with a dimensional interpretation.

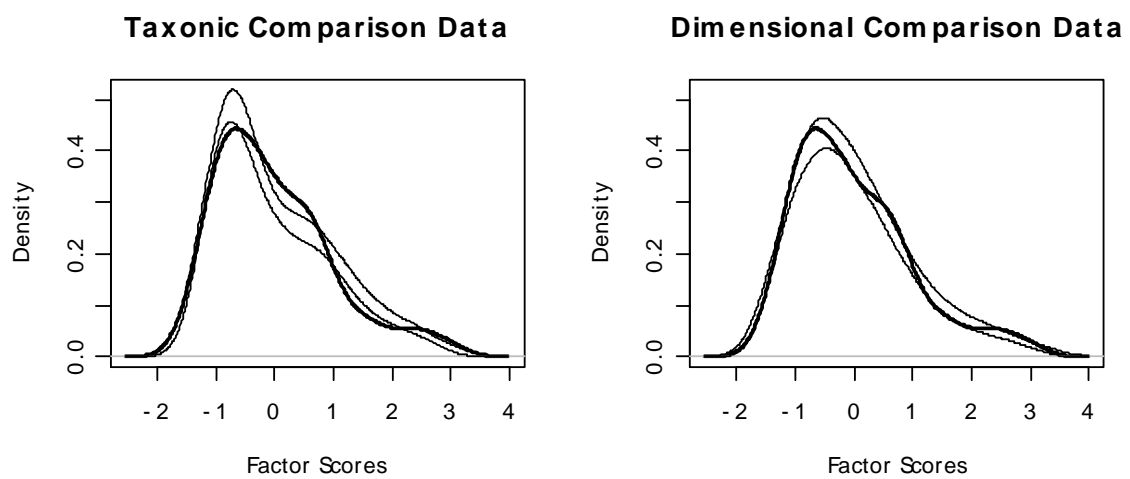
Overall, the average CCFI (i.e., the objective measure of whether the existing results are more similar to the simulated taxonic or dimensional data) for the three procedures (.342) was well below the .45 CCFI threshold for dimensional data. A large recent Monte Carlo study has indicated that when all three CCFI values for MAMBAC, MAXCOV, and L-Mode fall below .45 or above .55 (as was the case for the present results), data sets are correctly identified as either taxonic or dimensional 99.9% of the time (Ruscio, et al., 2010).



**Figure 1.** Average MAMBAC curve compared to simulated taxonomic and dimensional data. The dark line represents the actual data, and the lighter lines represent one standard deviation above and below the average for each type of simulated data.



**Figure 2.** Average MAXCOV curve compared to simulated taxonomic and dimensional data. The dark line represents the actual data, and the lighter lines represent one standard deviation above and below the average for each type of simulated data.



**Figure 3.** Average L-Mode curve compared to simulated taxonic and dimensional data. The dark line represents the actual data, and the lighter lines represent one standard deviation above and below the average for each type of simulated data.

## DISCUSSION

This study is the first taxometric investigation of the latent structure of pedophilia. Utilizing three scales of the MSI as indicators of pedophilia in three taxometrics procedures, our results converged to suggest that pedophilic interest (as captured by the MSI) is best conceptualized as a dimensional construct. Among this large sample of child sex offenders, variability in pedophilic traits seems to reflect differences in degree (i.e., more or less pedophilic) rather than differences in kind (i.e., pedophile versus non-pedophile).

To the extent that these three MSI scales capture pedophilic interest, pedophilia appears to be similar to psychopathy. Both nosologic categories encompass both psychological components (i.e., pedophilic interest and psychopathic personality traits, respectively) and behavioral manifestations (e.g., child sex offenses and antisocial behaviors, respectively). Given that the behaviors associated with both disorders are frequently both criminal and morally objectionable, people may have long drawn comfort from the idea that there is something distinctly different about the career criminals and chronic child molesters of our society. The mounting evidence from taxometric studies (largely utilizing criminal offenders and self-report questionnaires, as did the present study) is that a sharp divide between individuals with psychopathy and those without may be cultural lore, but not an empirical reality, given that psychopathy appears to vary dimensionally (e.g., Edens, et al., 2006; Edens, Marcus, & Vaughn, 2010; Guay, Ruscio, Knight, & Hare, 2007; Marcus, John, & Edens, 2004). This study is the first evidence that dimensional variation may best characterize pedophilia interest, as well.

An immediate implication of this study relates to the use of the MSI or any other measure that assesses pedophilic interest in classification and research. First, given the dimensional results of our analyses, any MSI-based (or, perhaps, phallometrically-based) “cut-off” score to identify pedophiles would necessarily be an arbitrary cut-point. Scores on all three MSI scales varied considerably in our sample; however, no naturally occurring bimodal distribution appeared to exist, and therefore no obvious cut-off between a taxon and its complement. If replications of the present study strengthen the current finding that pedophilic interest is dimensional, no assessment instrument that yields continuous measurements can be effectively used to identify men belonging in the current tidy diagnostic category of pedophilia found in the DSM-IV-TR. Second, the present study provides sufficient evidence to discourage using MSI scores (and potentially phallometric data, as well, should it appear similarly dimensional in nature) to dichotomize child sex offenders into “pedophiles” and “nonpedophiles” for the purpose of research. Psychological literature is replete with warnings about the loss of power that frequently occurs when continuous distributions are dichotomized (e.g., (Cohen, 1983; MacCallum, Zhang, Preacher, & Rucker, 2002).

Such clear implications against using the assessment tools we have for diagnostic and research classifications do not preclude assessment-based cut-offs in all circumstances. For example, one might easily imagine identifying an MSI-based or phallometrically-based level of pedophilic interest above which treating such interest is a necessary focus of child sex offender treatment, and below which treatment time might be better spent focusing on other aspects of sexual offending. Similarly, the limited utility of assigning single cut-off scores to dimensional measurement tools does not mean that such tools are not potentially useful for purposes such as predicting recidivism (for a meta-analysis of recidivism prediction, see

Hanson & Morton-Bourgon, 2005). Simply put, taxometric analyses indicate how our measurement tools are most and least effectively employed.

### **Limitations**

Several significant limitations of this study are worth noting. The first pertains to sample size. The 371-person sample in this study is relatively large in the broader body of psychopathology research utilizing clinical samples. In terms of taxometric research, however, it is just above the minimally acceptable 300 cases that Meehl (1995) recommended based on Monte Carlo research (Meehl & Yonce, 1994, 1996), and is below the sample sizes found in published and unpublished taxometric studies (Haslam & Kim, 2002). Therefore, simply replicating the results of the present study with larger sample sizes will be an important advancement in this avenue of research.

The second limitation pertains to how the present study operationalized pedophilic interest. By including only MSI scales as indicators, this study shares a common limitation of many taxometric studies: mono-operation bias (Edens, et al., 2006). Taxometric methods are ideally performed with multimethod assessments of the construct in question (Meehl, 1995). It is certainly possible that there are other relevant aspects of the construct of pedophilia that are best assessed via methods other than self-report. To that end, a fruitful direction for future taxometric analyses of pedophilia will be to include additional indicators.

### **Future Directions for Research**

An uncharted and potentially critical area of exploration that would address the mono-method limitation of the present research would be including phallometric data as physiological indicators of pedophilia. Perhaps the primary advantage of including phallometric data is that it has long been considered the gold standard for assessing sexual

preference in men (e.g., Blanchard, et al., 2009; Lykins, et al., 2009). Phallometric data also has the added advantage for taxometrics of being measured continuously.

Just as the present research shows that the dimensional nature of the MSI scores renders it inappropriate for cut-off scores designating the presence of pedophilia, taxometric research on phallometric data would also provide information on how such phallometric data is best used. If phallometric data appears taxonic, a “pedophilia cut-off” at some as-yet-unknown level may indeed be worth determining; if phallometric data appears dimensional, that would amount to further evidence suggesting that attempts to make clear-cut distinctions between “pedophiles” and “nonpedophiles” are not reflective of pedophilia’s actual latent continuous structure. Including phallometric data in a taxometric analysis will be no small feat given that the procedures cannot tolerate missing data. Phallometric data was collected on all the men in the present sample, but as is often the case (Blanchard, et al., 2009), fewer than half of the men achieved levels of absolute arousal high enough for their data to be interpretable. Nonetheless, the precision and utility of phallometric data make it an option worth pursuing.

Although the present study indicates that several important aspects of pedophilia (self-reported interest in children, sexual obsessiveness, cognitive distortions, and immaturity) appear to vary dimensionally, such evidence does not preclude the possibility that the larger construct of pedophilia is actually composed of several smaller subconstructs, each with a different latent structure. For example, suppose that the MSI scales represent the subconstruct of the “internal experience of pedophilia,” and phallometric data represents the subconstruct of “physiologically-based pedophilic responsiveness.” The dimensional latent structure of the internal experience of pedophilia may have no bearing on the potentially



taxonic latent structure of physiologically-based pedophilic responsiveness, and both constructs may play an important role in fully understanding pedophilia as a whole.

A particular strength of this study also presents another area for future research. If a taxon of men with pedophilia as captured by the MSI exists, the sample in which such a taxon would be most easily detected is exactly the sample used: convicted child sex offenders, where the base rate of pedophilic men would be at its highest. That no evidence of such a taxon was found in our sample strongly suggests that one does not exist. What the dimensional nature of MSI scores does underscore is the importance of replicating the present findings in the general population. If MSI scores varied dimensionally in our sample of child sex offenders, one might also expect MSI scores (and by extension, pedophilic interest) to vary dimensionally in the general population as well. Preliminary research on community samples supports this hypothesis (Hall, et al., 1995; Seto & Lalumière, 2001). More research, however, is necessary to determine with what frequency and intensity pedophilic interest varies in the general population.

Another important reason for extending the present research to the general population is that even if further research confirms that pedophilic interest is dimensional, such interest is far from necessary or sufficient for child sex offending (Beier, et al., 2009; Hartley, 2001). There may be other meaningful distinctions between men who engage in sexual contact with children and those who do not. Furthermore, those distinctions may well be qualitative (i.e., taxonic) in nature. If such distinctions do exist, they would not have been apparent in the present sample of child sex offenders, but might emerge in broader samples including nonoffending individuals.

### Summary

This study represents the first attempt to utilize taxometric procedures to elucidate the latent structure of pedophilia. Results indicated that several aspects of pedophilia, comprised of self-reported interest in children, sexual obsessiveness, cognitive distortions and immaturity, vary dimensionally. Our initial research question was whether men with pedophilia represent a unique group distinguished by their sexual interest or are simply the high-scorers on a continuum of sexual interest in children. The aspects of pedophilia tapped by the MSI identify not the pedophiles, but the “highly pedophilic.” Additional research into other components of pedophilia (e.g., phallometric data or behavioral observations) is needed to better understand whether this dimensionality fully characterizes pedophilia, or whether the disorder includes both dimensional and taxonic components. Given the many implications of either possibility, future taxometric analyses may play an important role in our understanding and treatment of pedophilia.

## APPENDIX

To calculate mean separations, the sample was divided into a putative pedophilic taxon and a putative non-pedophilic complement based on the estimated taxon base rate of 42 percent. The calculated mean separation of SSPI scores (.92) and victim age (.71) were considerably lower than the 1.25 minimum value recommended by Meehl (1995). Given the problematically low degrees of separation of both SSPI scores and victim age, the two indicators were excluded from the final analyses. In contrast, the three MSI scales demonstrated sufficient indicator validity (i.e., mean separation values of 1.43, 1.72, and 1.46) and were retained in the analyses.

Another important consideration is the nuisance covariation between indicators (i.e., the correlation between indicators within both the putative taxon and its complement). The three MSI scales had acceptably high average overall covariance ( $r = .36$ ) in the overall sample, indicating that the scales appear to be measuring related constructs without being redundant. Average covariance among members of the putative taxon ( $r = -0.04$ ) and the putative complement ( $r = -0.02$ ) was considerably lower than the nuisance covariance cutoff value of .30 recommended by Meehl (1995).

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