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Abstract
In this study, a group of child molesters were compared to a control group for the obsessive-compulsive disorder. Child molesters had a higher average score than control participants on the five subcategories of OCD that are distinguished by the Padua Inventory-Revised (impulses, washing, checking, rumination and precision). Both groups did not differ significantly**.** High-schizotypal child molesters showed more symptoms on three subscales than low scorers (impulses, precision and rumination). Only the variable impulses offered a significant contribution to the prediction of high-schizotypal or low-schizotypal within the child molester condition.

Introduction

In the past twenty-five years a large amount of empirical research on psychological and social factors among child molesters has been established. A dominant line of research has been characterized by research on, for example, negative childhood experiences, affective and social disorders, personality disorders and adult attachment (e.g., Bogaerts, Declercq, Vanheule, 2005). Several studies have shown that inadequate childhood attachment, adult attachment and personality disorders are very common to child molesters (Raymond, Coleman, Ohlerking et al., 1999; Hillbrand, Foster, Hirt, 1990; Stinson, Becker, Tromp, 2005). Offenders whose behavioral manifestation is pedophilic belong to various personality groups, often mixed, making the assessment of their psychodynamics complex. Occasionally, these personalities may, under stress, decompensate into psychotic thinking and behavior, reaching paranoid and omnipotent and destructive behavior, as in the case of the sexual serial killer (Palermo, 2004).

Behind the paraphilic behaviors lie the personalities of the offenders, with their peculiar feelings and emotions, their fears, their anticipated feelings of rejection, their suspiciousness, their obsessive fantasies and compulsions, and their anxieties. Most of the sexual molesters share a need for power and control, deviant sexual paraphilic behavior and a tendency to aggression in order to obtain their sexual gratification. It can be theorized that their aggressive sexual drives

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may be due to the proximity of sexual and aggressive centers in the hypothalamic portion of the brain.

In various studies regarding the personalities of sexual offenders or child molesters (e.g., Dunsieth et al., 2004; Packard, Rossner, 1985; Rector, Richter, Bagby, 2005) personality disorders were highly represented. Prentky, Knight and Lee (1997) found several types of personality disorders present in child molesters, including the narcissistic and the sadistic. A detailed study by Harsch, Bergk, Steinert, Keller and Jockusch (2005) pointed out the prevalence of personality disorders among sexual offenders in forensic units, in imprisoned sexual offenders, and among imprisoned violent sexual offenders. Among the forensic-unit sexual offenders (n=40) personality disorders were found to be eighty-five percent. One schizotypal personality disorder was found in the imprisoned violent sexual offenders (n=20).

In this study, the relationship between sexual child abuse and the obsessive-compulsive disorder (OCD) is examined in a group of child molesters. The relationship between OCD and the schizotypal personality disorder (SPD) is also investigated. OCD is a mental disorder classified as an anxiety disorder. Diagnostic criteria for OCD, according to the Diagnostic and Statistical Manual of Mental Disorders (APA, 2000) are the occurrence of either obsessions or compulsions. Obsessions are defined as recurring and incessant thoughts, impulses or ideas that are perceived as obtrusive and improper and cause anxiety or distress. The patient realizes that these thoughts arise from his own mind and attempts to ignore or suppress them or to neutralize them with other thoughts or actions. Obsessions are generally fearful in type and the performance of compulsions can lead to a (temporary) anxiety reduction (van Balkom, van Oppen, 1996). Obsessions and compulsions can manifest in different ways. They can be overt, typically including hand washing or verification activities, but also covert ones, such as counting and repeating thoughts *(van Balkom, van Oppen, 1996).* Compulsions are described as recurrent behaviour or psychological activities that are often performed by the patient in response to an obsession. Compulsions have the aim of avoiding or reducing perceived harm or preventing a feared occurrence or situation, but compulsions are exaggerated and not related to the feared situation in a realistic way. The patient realizes that the obsessions and compulsions are irrational and exaggerated. The obsessive or compulsive symptoms take up at least one hour a day, or interfere with the usual behaviour, professional functioning, social activities or relationships of the patient.

Obsessive-Compulsive Disorder in Relation to Schizophrenia Spectrum Disorders

Previously published studies have found associations between the schizotypal personality disorder (SPD) and obsessive-compulsive dimensions in both clinical OCD populations (Tallis, Shafran, 1997; Torres et al., 2006) and in non-clinical populations (Dinn, Harris, Aycicegi, Greene, Andover, 2002). Patients with SPD experience a profound pattern of social and interpersonal constraints characterized by an acute sense of discomfort with and a reduced ability to form intimate relationships. SPD is also involved in cognitive and perceptual distortions, and peculiarities in behaviour. Some of the following symptoms may be present: odd beliefs or magical thinking that influence behaviour (superstitions, telepathy, ecc.),

foreign observations or body sensations, strange thoughts and speech, paranoid ideas, strange expressions of feeling, eccentric/odd behaviour or appearance, the absence of intimate friends. These patients also suffer from excessive social anxiety that does not diminish in a familiar environment, which has more to do with suspicion than with a negative self-image (DSM-IV-TR; APA, 2000). Although the prevalence of SPD in OCD varies considerably (0-50%), researchers are consistent in demonstrating that OCD patients with a schizotypal personality disorder have a less favourable course and a worse prognosis than those with 'pure' OCD (Matsunaga et al., 2000). The comorbidity of schizotypal and obsessive-compulsive symptoms worsens the number of obsessive-compulsive symptoms and facilitates earlier emergence of OCD (Sobin et al., 2000).

The obsessive-compulsive personality disorder belongs to the Axis II Cluster C of the DSM-TR (APA, 2000) and, as stated above, symptoms include recurrent obsessions and compulsions. The obsessions include inappropriate sexual thoughts, intrusive and ego-dystonic, causing intense anxiety. The compulsions consist in the unreasonable acting out of the obsessive sexual thoughts, which temporarily reduces the marked distress they cause. Obsessive-compulsive disorders are frequently accompanied by depression, and depressed persons in general may, at times, develop obsessive ideas. Sexual offenders with an obsessive-compulsive personality have a need for control that may be easily satisfied through their circuitous manipulative sexual behaviour with children, who may oppose only minimal resistance.

In this study, we also examine the relationship between sexual child abuse and OCD comparing a group of male child molesters with a matched control group. Although research into the prevalence of OCD in child molesters is very limited, we expect that OCD is more common in the group of child molesters than in the control group. Indeed, previous studies comparing the prevalence of OCD in the general population (2.4% - 3%) (van Balkom, van Oppen, 1996; Deelman, Eling, De Haan, Jennekens, Van Zomeren, 2004) with the prevalence of OCD in child molesters (11%) (Raymond et al., 1999) suggests that OCD is more common in child molesters than in normal subjects. It is also expected that the groups differ in the subtypes of the obsessive-compulsive disorder. Although many researchers have found a clear association between OCD and SPD, this relationship has not been examined in relation to sexual child abuse. In this study we examine the relationship between the obsessive-compulsive disorder and the schizotypal personality disorder in a group of male child molesters. We hypothesize that these two disorders are positively related to each other within the group of child molesters. We also examine what types of obsessive-compulsive thoughts and behaviours (measured by the five PI-R subscales) differentiate between high-and low-schizotypal child molesters, and if these relevant variations contribute significantly to the prediction of SPD in child molesters.

METHOD

Participants

The sample consisted of 84 male child molesters recruited from either a Belgian prison (n = 33) in 1998 or an educational training program as an alternative sanction (n = 51). These child molesters were combined into one group (n = 84). The mean age of the

child molesters was 39 years and 4 months (*SD* = 10.97). Twenty-seven percent were married, 36% single, 2% widower, and 33% divorced. Twenty-four percent finished only primary school, 37% finished the first level of secondary school, 25% finished the second level of secondary school. Twelve percent attended college or university. The group of child molesters was matched with a control group of 80 adults selected in Louvain, Belgium, using a snowball sample (in a snowball sample, respondents with the targeted characteristics volunteer to participate in a study and may also refer other potentially interested respondents to the researcher). They were matched on the variables age, marital status, employment status, and educational level. However, for four child molesters, no control participants were found. Despite this, a chi-square analysis revealed no significant differences between the two groups.

Measures
Padua Inventory-Revised
Among the various obsessive-compulsive inventories we have chosen to use the the Padua Inventory-Revised (PI-R) (van Oppen et al., 1995) to measure the obsessive-compulsive disorder. This self-assessment list is an adaptation of the original Italian Padua Inventory (60 items). This revised version, consisting of 41 items, has good psychometric properties that specifically evaluate the severity of OCD symptoms and is sensitive to changes. The DSM-IV-criteria for obsessions and/or compulsions are covered by the questionnaire. The items of the PD-R are scores on a five point scale (score 0-4; score range 0-164). Five subscales are specified: (1) impulses, (2) washing, (3) checking, (4) rumination and (5) precision. Therefore, the PI-R is suitable for giving insight to the

phenomenology of obsessions and compulsions (van Balkom, van Oppen, 1996; van Balkom, de Beurs, Hovens, van Vliet, 2004).

Examples of items belonging to the subscales of the PI-R include: (1) When I look down from a bridge or tower, I feel an impulse to throw myself off. (2) I feel my hands are dirty when I touch money. (3) I check and recheck gas and water taps and light switches after turning them off. (4) When doubts and worries come to my mind, I cannot rest until I have talked them over with a reassuring person. (5) Before going to sleep I have to do certain things in a certain order. The PI-R measures the structure of obsessive-compulsive symptoms: The main types of behaviors and obsessions are clinically measured by this questionnaire, with the exception of from obsessional slowness (van Oppen et al., 1995). Nunnally (1978) argues that a minimum Cronbach's α value of .70 represents adequate internal consistency for research purposes. Alpha coefficients for the subscales of the PI-R were all higher than .70, except for precision subscale (α = .68).

Assessment of the DSM-IV Personality Disorders
The schizotypal personality disorder was measured with the ADP-IV (Schotte, De Doncker, Dmitruk, De Valck, Van Mulders, 2002), a self-assessment questionnaire that consists of 94 items and is scored on a 7-point scale. The instrument focuses on the diagnosis of personality disorders as they are defined in Axis II of the DSM-IV (APA, 1994). Both the typicality and malfunctions of personality traits can be evaluated using this questionnaire. The ADP-IV has a good differential ability on both the dimensional scales and for categorical measurements.

Alpha coefficients for the ADP-IV scales were all higher than .70, except for the obsessive-compulsive (a = .68) and the schizoid (a = .60) subscales.

Statistical Analysis

The data were analysed with SPSS, version 17.0. In preparation for the statistical analysis missing values were selected. The missing values for the subscales of the Padua Inventory-R and the schizotypal personality trait were defined by means of missing value codes. Subsequently, the internal consistency of the PI-R was calculated by means of a reliability analysis, resulting in a Cronbach's Alpha value of .83. Thus, the questionnaire was still reliable after defining the missing values (Nunnally, 1978). Subsequently, a total score on the PI-R was calculated by summing up the scores of each subject on the various subscales. The next phase studied the distribution of the dependent and independent variables.

The Kolmogorov-Smirnov normality test was performed for the schizotypal trait variables, the total score on the PI-R and the scores on the subscales of the PI-R. Information regarding outliers was obtained via box plots. No scores were eliminated. Subsequently, the scores of the group of child molesters on the schizotypal personality trait were divided into two categories based on the median: high versus low. Independent Samples T-Tests were conducted to test whether child molesters and individuals in the control group differed on the total score of the PI-R and on the subtypes of the obsessive-compulsive disorder. To test whether SPD showed a positive correlation with OCD and the subcategories of OCD that are distinguished by the PI-R within the group of child molesters, the correlation was calculated between the total score on the PI-R and the raw scores on the schizotypal trait. To investigate whether high-schizotypal child molesters score significantly higher on the PI-R than low-schizotypal child molesters, Independent Samples T Test were used. Based on the T Test, the variables (subscales of the PI-R) that proved to differ between groups were selected and introduced in a logistic regression model. Binary logistic regression analysis was used to estimate odds ratios (OR) for each of the independent variables in the model. In this way the unique contribution of the differentiating variables in forecasting high-schizotypal or low-schizotypal within the group of child molesters was determined.

RESULTS

Child molesters did not differ significantly from the control group for the obsessive-compulsive disorder (see Table I). Although the child molesters had a higher average score than control participants on both the total PI-R and the subcategories of OCD that are distinguished by the PI-R (impulses, washing, checking, rumination and precision), the groups did not differ significantly ($p > 0.05$).

Table I: Scores of 84 child molesters and 80 control participants on the Padua Inventory-R

	Child molesters (n = 84)		Control condition (n = 80)					
	M	SD	M	SD	Significance			
Total PI-R	41.67	20.11	36.98	20.24	t =	1.489	P =	.138
Subscales PI-R								
Impulses	3.54	3.37	3.38	3.56	t =	.308	P =	.759
Washing	6.95	6.38	5.95	4.69	t =	1.151	P =	.252
Checking	9.90	5.76	8.38	5.31	t =	1.766	P =	.079
Rumination	16.41	6.28	14.68	7.49	t =	1.605	P =	.110
Precision	5.10	3.93	4.60	3.68	t =	.832	P =	.406

A significant positive correlation (r = .40, p = .000) was found between the schizotypal personality trait and the obsessive-compulsive disorder in the pedosexual condition. When the scores on the schizotypal trait were classified into two categories (low versus high) based on the median, the high-schizotypal child molesters (H-ST) scored significantly higher on the total PI-R than child molesters in the low-schizotypal condition (L-ST) (p = .008). See table II.

Table II: Scores of low-schizotypal versus high-schizotypal Child molesters on the PI-R

	Child molesters L-ST (n = 44)			Child molesters H-ST (n = 40)		
	M	SD		M		SD
Total PI-R	36.18	15.91		47.70	**	22.58
Subscales PI-R						
Impulses	2.37	2.60		4.80	***	3.67
Washing	5.73	5.34		8.30		7.18
Checking	8.95	5.21		10.95		6.21
Rumination	15.02	5.25		17.97	*	7.00
Precision	4.16	3.44		6.13	*	4.22

* p < .05. ** p < .01. *** p < .001.

The PI-R scales impulses, precision and rumination differentiate significantly between L-ST and H-ST. High-schizotypal child molesters showed more symptoms on all three subscales than low scorers. Subsequently the variables impulses, precision and rumination (that, based on the t-test, proved to differentiate between H-ST en L-ST) were introduced in a logistic regression model. The unique contribution of these variables to the forecasting of high-schizotypal or low-schizotypal molesters

within the pedosexual group was examined using a binary logistic regression analysis. The model correctly classified 66% of the 84 child molesters as high-schizotypal and low-schizotypal. The Hosmer and Lemeshow Test was conducted to determine whether the model is of good quality (on a 5% significance level). The constructed model in the present research is a good qualitative model (χ^2 = 4.850, p = .773); the *p*-value is greater than .05, and thus supporting the model. Nagelkerke R^2 gives an indication of the amount of variation in the dependent variable that is explained by the model. A Nagelkerke R^2 value of .191 showed that the model explained 19.1% of the variance in the dependent variable. Only one variable, PI-R subscale impulses, offered a significant contribution (β = .220, p = .038) to the prediction of high-schizotypal or low-schizotypal within the child molester condition. PI-R scale impulses was positively related tot the dependent variable in the logistic regression model (0 = low-schizotypal, 1 = high-schizotypal). A positive direction of the beta coefficient means that a high score on the subscale impulses is a strong predictor for a high score on the schizotypal personality trait. Child molesters with a high score on subscale impulses are more likely to have a high degree of schizotypal personality traits than low scorers (odds ratio = 1.25).

DISCUSSION
In this study the relationship between sexual child abuse and the obsessive-compulsive disorder was examined. The presence of OCD and its sub-variants, which are distinguished by the PI-R, did not differ significantly between child molesters and control participants. Another purpose of this research

was to examine the relationship between the obsessive-compulsive disorder and the schizotypal personality disorder in child molesters. In line with the expectations, OCD and SPD were significantly positively related within the child molester group. Magical thinking in OCD refers to the belief that certain thoughts or behaviour exercise a causal influence on outcomes (Evans, Milanak, Medeiros, Ross, 2002). The forms of obsessive-compulsive behaviour and thoughts in the present research that differentiate between high- and low-schizotypal child molesters are impulses, precision and rumination. Child molesters with high schizotypal symptoms had significantly higher scores on these three variants of OCD. The most striking finding in the present study is the clear relationship between schizotypal symptoms and impulses. Only OCD subtype impulses yielded a significant contribution to the prediction of SPD in child molesters. It explained 19.1% of the variance of SPD. PI-R subscale impulses contains items that refer to the occurrence of obtrusive thoughts with relation to themes such as loss of self-control and the urge to offend against the self (e.g., «in certain situations I am afraid of losing my self-control and doing embarrassing or dangerous things unintentionally» and «when I see a train approaching I sometimes think that I could throw myself under its wheels»). A possible explanation for the findings in the present research may be found in an earlier study by Tallis and Shafran (1997). They suggested that positive schizotypal symptoms may be due to the failure of inhibitory processes that normally limit the contents of consciousness. Therefore the clear relationship between schizotypal symptoms and impulses that was found in the current study should not be explained by a general

inhibition deficit, but must be interpreted in the light of a cognitive inhibition deficit (an impulse can be seen as an unacceptable urge that enters consciousness by a cognitive inhibition deficit). The scores of child molesters on SPD were also significantly related to PI-R subscales precision and rumination. These findings can be explained in the light of a cognitive inhibition deficit as well. Subscale rumination is mainly related to doubt and poor cognitive control (e.g., «Unpleasant thoughts come into my mind against my will and I cannot get rid of them») leading to intrusive thoughts. Also PI-R subscale precision includes items that are connected with unfettered access to consciousness (e.g. «I sometimes start counting objects for no reason»). PI-R subscales washing and checking are mainly related to compulsive behaviour (in contrast to obsessive-compulsive thoughts).

These subscales were not significantly related to schizotypal symptoms. It may be concluded that it is not likely that a cognitive inhibition deficit affects inhibition of behaviour. It should be noted, however, that the analysis left 81% of the variance unexplained. Logistic regression analysis tests a causal model assuming that the predictor variable (in current study obsessive-compulsive symptoms) is an antecedent rather than a possible consequence of the presence of schizotypal symptoms; the current study does not prove any causal relationships. It should be noted that causality cannot be tested with logistic regression analysis. In current study we hypothesized that obsessive-compulsive symptoms predict the degree of schizotypal features in child molesters in a cross-sectional design.

A Note on Biological factors and Neuroimaging Studies in OCD and SPD

Other factors not included in this analysis play a significant role in the etiology of the schizotypal personality disorder. Several studies have shown that the emergence of SPD is largely determined by genetic factors (Condra, Neibergs, Wei, Brennan, 2007; Ma et al., 2007), but it is not clear which genes are involved (Appels, Sitskoorn, Vollema, Kahn, 2004) and it is plausible that there are interactions between genes. Also, neurobiological abnormalities (Cadenhead, Light, Geyer, McDowell, Braff, 2002; Siever et al., 2001) and anatomic abnormalities in the brain (Siever, Davis, 2004) have been found to affect the development of schizotypal personality disorder. In SPD «the cognitive-perceptual disturbances are similar in kind to those in schizophrenia [and] ...greater schizotypal severity has been correlated with larger lateral ventricle volumes and smaller total caudate relative volume» (Goodman, Triebwasser, Shah, New, 2007, p. 104).

The ICD-10 classifies the schizotypal personality disorder as a mental disorder associated with schizophrenia rather than as a personality disorder as described in the DSM-IV. The significance of obsessions and compulsions in schizophrenic patients, or schizophrenic spectrum patients, has been studied by several authors who found that a substantial number of the schizophrenic spectrum patients have comorbid OCD (Berman et al., 1998). Gross-Iseroff, Hermesh, Zohar and Weizman (2003) noted that research has shown that same brain regions (orbito-frontal cortex, cingulate gyrus, medio-dorsal nucleus of the thalamus) may be shared by OCD and the schizophrenia spectrum disorders. Hugo, van Heerden, Zungu-Dirway and Stein (1999) reported

decreased blood flow in the temporal lobes and perfusion abnormalities in the frontal lobes. Dickey et al. (1999) reported a decrease in blood flow and temporal abnormalities in the MRI of schizotypal patients. The communality between OCD and schizophrenia/schizotypal disorder demonstrated in the above-reported neuroimaging studies may add support to the results of the present study. It may also be theorized that these brain abnormalities are at the basis schizo-obsessive disorder, a proposed by Gross-Iseroff et al. (2003). More research in that regard is needed.

Treatment
Given the fact that research has demonstrated that schizotypal symptoms, especially positive schizotypal symptoms, are a risk factor for treatment failure (in both traditional behavioural and pharmacological treatments) in patients with OCD, these comorbid disorders should be taken into account in the treatment of child molesters. For the treatment of both obsessive-compulsive and schizotypal symptoms in child molesters, additional intervention strategies should be developed for this population. Practising specialized psychotherapy for (positive) schizotypal symptoms beyond the treatment of OCD is conceivable (Mortitz et al., 2004). Specific cognitive techniques, such as those suggested by Beck et al. (1990), or the schema-focused approach of Young (1990), might be employed (Tallis, Shafran, 1997). Contrary to the expectations the presence of OCD and its subtypes, which are distinguished by the PI-R, did not differ significantly between child molesters and control subjects in current research. Based on the severity indications (7 categories: very low – very high) that are used for the scores on the PI-R, (van Balkom et al.,

2004) the average scores of both child molesters and normals can be classified into category 'low'. Compared to OCD patients (with an average score between 57 and 76 falling into the following categories: 'average' and 'above average') both child molesters and normals exhibit less obsessive-compulsive symptoms.

Conclusion
A limitation in the current study is the use of self-report instruments. Possibly child molesters had the expectation that admitting the presence of obsessive-compulsive symptoms could have negative consequences for them. Additional measurement methods such as interviews would be useful to eliminate eventual restrictions. It is also unclear whether the participants met diagnostic criteria such as those of the DSM-IV since questionnaires permit a screening but no certain diagnosis of mental disorders. Another shortcoming of this study is the lack of distinction between pedophiles and non-pedophiles within the group of child molesters. These two groups of child molesters obviously vary in their motivation to sexually abuse children: pedophiles are driven to commit such an offense because of strong sexual attraction to children, while sexual crimes against children by non-pedophiles are powered by non-sexual motives, such as the need for control or a desire to dispel negative feeling states. A possible explanation for the fact that the current research did not find significant differences between the scores of child molesters and normals on the PI-R is that OCD and pedophilia are strongly related and, on the contrary, the relationship between OCD and sexual child abuse in the absence of pedophilia is weaker. No scientific evidence

to this effect has yet been found. Future research should take this distinction into account.

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