Neurotizismus, Missbrauchsverhalten und Pädophilie

Inauguraldissertation
zur
Erlangung der Würde
einer Doktorin der Philosophie
vorgelegt der
Fakultät für Psychologie
der Universität Basel

von

Coralie Boillat, M.Sc.

aus le Bémont (JU)

Basel, Juni 2017
Originaldokument gespeichert auf dem Dokumentenserver der Universität Basel
edoc.unibas.ch

UNI
BASEL

Genehmigt von der Fakultät für Psychologie

auf Antrag von

Prof. Dr. rer. nat. Dipl.-Psych. Rolf-Dieter Stieglitz
Prof. Dr. med. Marc Graf

Basel, den _____

_____
Prof. Dr. phil. Roselind Lieb

UNI
BASEL

Inhaltsverzeichnis

DANKSAGUNG

An dieser Stelle möchte ich denjenigen Personen danken, welche mich fachlich wie auch menschlich wesentlich während meiner Promotionszeit unterstützt haben:

Allen voran danke ich Herrn PD Dr. phil. Timm Rosburg für seine unermüdlichen Hilfestellungen und Denkanstösse, ohne die meine Dissertationsschrift vermutlich nicht in dieser Form und bestimmt nicht zu diesem Zeitpunkt vorliegen würde. Danke!

Mein weiterer Dank gilt Herrn Professor Dr. med. Marc Graf, welcher mein Interesse an der Pädophilie geweckt und mich ermutigt hat zu diesem Thema zu promovieren.

Ich danke meinen Forschungskollegen, den EEG-Fachfrauen, den Praktikanten und Studierenden, welche u.a. bei der Studienplanung, Datenerhebung, Dateneingabe und Datenauswertung mitgewirkt haben und dadurch die Durchführung der MIPS-Studie überhaupt realisierbar gemacht haben.

Ebenso danke ich Herrn Professor Dr. rer. nat. Rolf-Dieter Stieglitz für seine Betreuung, Unterstützung und Hilfestellungen auf meinem Weg zur Promotion.

Von Herzen möchte ich meinem Lebenspartner, meiner Familie und meinen Freunden einen grossen Dank aussprechen für ihr Verständnis meiner teilweise begrenzten zeitlichen Ressourcen und für ihre mentale Unterstützung während der letzten Jahre.

Des Weiteren möchte ich Herrn Professor Dr. med. Marc Graf und Herrn Professor Dr. rer. nat. Rolf-Dieter Stieglitz für die Begutachtung meiner Dissertation sowie Herrn Professor Dr. phil. Rainer Greifeneder für die Bereitschaft zur Übernahme des Vorsitzes der Promotionskommission danken.

Schliesslich danke ich dem Bundesamt für Justiz, welches die Studie gefördert hat, in deren Rahmen diese Dissertation entstanden ist.

ERKLÄRUNG ÜBER DIE SELBSTSTÄNDIGKEIT

Ich erkläre hiermit, dass die zur Promotion eingereichten Zeitschriftenbeiträge in Zusammenarbeit mit den jeweiligen Koautoren angefertigt wurden. Es handelt sich hierbei um drei Originalarbeiten, die zur Veröffentlichung an „peer-reviewed“ Zeitschriften eingereicht bzw. bereits veröffentlicht wurden. Ich bestätige hiermit, den für Erst- oder Mitautorenschaft notwendigen Beitrag geleistet und die vorliegende Inauguraldissertation selbstständig verfasst zu haben. Es wurden hierfür keine anderen als die angegebenen Quellen und Hilfsmittel verwendet. Die Arbeiten wurden von keinem der Beteiligten an anderer Stelle publiziert, zur Publikation eingereicht, oder einer anderen Prüfungsbehörde als Qualifikationsarbeit vorgelegt.

Es handelt sich hierbei um folgende Zeitschriftenbeiträge:

Publikation 1:
Boillat, C., Schwab, N., Stutz, M., Pflueger, M. O., Graf, M., & Rosburg, T. (2017). Neuroticism as a risk factor for child abuse in victims of childhood sexual abuse. *Child Abuse & Neglect*, *68*, 44-54.

Publikation 2:
Boillat, C., Deuring, G., Pflueger, M. O., Graf, M., & Rosburg, T. (*in press*). Neuroticism in child sex offenders is associated with more pronounced sexual dysfunctions, cognitive distortions, and psychological complaints. *International Journal of Law and Psychiatry*.

Publikation 3:
Rosburg, T., Pflueger, M. O., Mokros, A., Boillat, C., Deuring, G., & Graf, M. (*submitted*). Indirect and neuropsychological indicators of pedophilic sexual interest and offending. *Sexual Abuse.*

Basel, 26.06.2017

Coralie Boillat

ZUSAMMENFASSUNG

Die aktuelle empirische Datenlage ermöglicht es (noch) nicht, eine pädosexuelle Präferenz valide zu erfassen. Die damit einhergehende erschwerte Prognosestellung kann einerseits bei einer zu restriktiven Beurteilung zu einer (längeren) Inhaftierung der betroffenen Personen, andererseits bei einer zu liberalen Einschätzung aber auch zu einem erhöhten Risiko von zusätzlichen Opfern durch einen (erneuten) Kindsmissbrauch führen. Diese unbefriedigende Sachlage war Ansporn für die MIPS (prognostisch und therapeutisch potenziell relevante messbare Indikatoren bei pädosexuellen Sexualstraftäter)-Studie, mit deren Daten sich die vorliegende Dissertationsschrift befasst.

In der **ersten Publikation** wird der Zusammenhang von erlebtem sexuellem Missbrauch in der Kindheit mit Missbrauchsverhalten im Erwachsenenalter untersucht. Es zeigte sich, dass das erlebte Missbrauchsprofil als Ganzes, und weniger sexuelle Missbrauchserfahrung im Spezifischen massgebend für den Zusammenhang mit aktivem sexuellem Missbrauchsverhalten an Kindern ist. Dieser Zusammenhang wird durch den vermittelten Einfluss einer neurotischen Persönlichkeitsausprägung verstärkt.

Die **zweite Publikation** teilt die Gruppe der pädosexuellen Studienteilnehmer in je eine Gruppe mit hohen bzw. tiefen Neurotizismuswerten ein und vergleicht die zwei Gruppen hinsichtlich ihres Missbrauchsverhaltens sowie berichteter psychologischer und somatischer Probleme. Die Resultate der Untersuchung veranschaulichen, dass Neurotizismus bei pädosexuellen Personen eher mit sexuellen Dysfunktionen und kognitiven Verzerrungen sowie somatischen und psychischen Beschwerden als mit erhöhtem Missbrauchsverhalten assoziiert ist.

Die **dritte Publikation** zeigt, dass Sexualstraftäter mit einer pädosexuellen Ausrichtung mit einer 86%igen Genauigkeit anhand impliziter und neuropsychologischer Testverfahren von einer teleiophilen Kontrollgruppe sowie Straftäter mit begangenem Kindsmissbrauch mit einer 74%igen Genauigkeit anhand neuropsychologischer Tests von Kinderpornographie-Konsumenten differenziert werden können. Diese Resultate zeigen, dass objektive, standardisierte Untersuchungen forensische Psychiater und Psychologen bei der Einschätzung einer pädosexuellen Präferenz wesentlich unterstützen können.

Zusammenfassend liefern die Daten der vorgelegten Dissertationsschrift einen Beitrag zum Ziel, eine pädosexuelle Präferenz valide erfassen und somit ungerechtfertigte negative Legalprognosen sowie weitere Übergriffe auf Kinder reduzieren zu können.

1. EINLEITUNG

Sexueller Kindsmissbrauch ist ein weltweit verbreitetes Problem mit schwerwiegenden Folgen für die Opfer ("World Health Organisation: Child and Adolescent Health. Europe.," 2016). Eine Metaanalyse von 65 epidemiologischen Studien, durchgeführt in 22 Ländern, nennt für die Erfahrung von sexuellem Missbrauch vor dem 18. Lebensjahr eine Prävalenz von 7.9% bei Männern und 19.7% bei Frauen (Pereda, Guilera, Forns, & Gómez-Benito, 2009). In der Schweiz erfolgten im Jahre 2016 1,6% (7'329) aller Verurteilungen aufgrund von Straftaten gegen die sexuelle Integrität, wovon 16,8% sexuelle Handlungen mit Kindern (Art. 187 StGB) betrafen ("BFS - Polizeiliche Kriminalstatistik (PKS) 2016," 2017).

Kindsmissbrauch wird in der Allgemeinbevölkerung oft mit Pädophilie assoziiert (Beier, Bosinski, & Loewit, 2005; Braun, Hasebrink, & Huxoll, 2003; Bundschuh, 2001; Seto, 2008), wobei nur ein Proporz von 25-50% der Sexualstraftaten an Kindern von pädosexuellen Tätern begangen wird (Schaefer et al., 2010). Dennoch gilt eine pädosexuelle Präferenz als ein wichtiger Risikofaktor für wiederholten Kindsmissbrauch (Hanson & Bussiere, 1998; Hanson & Morton-Bourgon, 2005). Daraus ist abzuleiten, dass eine pädosexuelle Präferenz auch das Risiko für einen erstmaligen Kindsmissbrauch erhöht (Mokros, Osterheider, & Nitschke, 2012). Die Rezidivraten für Sexualdelikte bei pädosexuellen Straftätern sind dabei hoch und liegen bei homosexueller Pädophilie bei über 50% und bei heterosexueller Pädophilie zwischen 25-50% (Nedopil, 2010).

Pädophilie wird in den internationalen Klassifikationssystemen unter die Störungen der Paraphilien (DSM-5; American Psychiatric Association, 2013) bzw. Störung der sexuellen Präferenz (ICD-10; World Health Organization, 1992) subsumiert. Voraussetzungen für eine Diagnosestellung einer Pädophilie (*pedophilic disorder*) gemäss DSM-5 sind über einen Zeitraum von mindestens sechs Monate wiederkehrende, sexuell erregende Fantasien, sexuelles Verlangen oder entsprechendes Verhalten mit einem präpubertären Kind (i.d.R. ≤ 13 Jahre) (Kriterium A). Die betroffene Person hat gemäss diesem Verlangen gehandelt oder dieses Verlangen verursacht Leidensdruck oder führt zu interpersonellen Schwierigkeiten (Kriterium B). Die Person muss dabei mindestens 16 Jahre alt und mindestens fünf Jahre älter als das Opfer sein (Kriterium C). Ist das Kriterium B nicht erfüllt, wird eine pädophile sexuelle Orientierung (*pedophilic sexual orientation*) festgestellt. Darüber hinaus wird spezifiziert nach der Exklusivität der devianten sexuellen Präferenz (ausschliesslich/nicht ausschliesslich sexuell an Kindern interessiert), der pädosexuellen Orientierung (hetero-/homo-/bisexuell) und dem Verwandtschaftsgrad (Inzest/kein Inzest). Die für die Artikel

verwendete Literatur basiert jedoch noch auf dem vorgängigen psychiatrischen Diagnosekatolog (DSM-IV-TR; American Psychiatric Association, 2000), welcher nicht zwischen einer Störung der Pädophilie und einer pädophilen sexuellen Orientierung differenziert.

Die Lebenszeitprävalenz der Pädophilie in der männlichen Allgemeinbevölkerung wird auf 0.5 bis 5% geschätzt (Mokros et al., 2012; Seto, 2008, 2012). Über Pädophilie bei Frauen wird in der Literatur lediglich über Einzelfälle berichtet (Braun et al., 2003; Bundschuh, 2001; Seto, 2008). Der Umfang des Dunkelfeldes dürfte jedoch sowohl bei Frauen, wie auch bei Männern um ein Vielfaches höher ausfallen (Beier, Schaefer, Goecker, Neutze, & Ahlers, 2007).

Bei genauerer Betrachtung der diagnostischen Kriterien zeigt sich, dass nicht nur klinische Symptome, sondern auch juristische Feststellungen und gesellschaftliche Auffassungen die Diagnose mitdefinieren können (Briken, 2015). Diese Vermischung klinischer, juristischer und sozialer Bewertungen erschwert die grundsätzliche Erfassung der Störung der Pädophilie (Pumberger & Eher, 2013). Darüber hinaus wird kontrovers diskutiert, ob die Störung der Sexualpräferenz eine phänomenologisch eigenständige Kategorie oder ein Extrempol auf einem Präferenzkontinuum darstellt (Mokros, 2013). In Anbetracht dieser noch offenen Grundsatzfragen und mannigfaltigen Diagnosekriterien erstaunt es nicht, dass trotz weltweitem Forschungsinteresse die Befunde zu messbaren und objektivierbaren Indikatoren zur Erfassung einer pädosexuellen Präferenz heterogen sind oder gar gänzlich fehlen. Aktuell beziehen sich diagnostische Beurteilungen zur Störung der Sexualpräferenz auf die Selbstauskünfte der betroffenen Person, die Analyse des Tatverhaltens sowie auf indirekte Rückschlüsse aus Verhaltensbeobachtungen im klinischen Alltag. In Anbetracht der Opferprävalenz sowie der Anzahl registrierter pädosexueller Delikte, ist eine Verbesserung der bisherigen Befundlage von entscheidender Bedeutung. Durch das Messbarmachen von objektiven, von der Selbstauskunft unabhängigen Indikatoren für eine pädosexuelle Präferenz könnten Prognosen hinsichtlich Therapieerfolg und Rückfallrisiko zuverlässiger gestellt und therapeutische Interventionen effizienter eingesetzt werden.

Diese für Gerichte, Gutachter oder Therapeuten doch sehr unbefriedigende aktuelle Gegebenheit war der Anstoss für die Studie MIPS (Messbare Indikatoren Pädosexueller Straftäter). Die MIPS-Studie hatte zum einen zum Ziel, Sexualstraftäter mit einer pädosexuellen Ausrichtung (Child Sexual Offender, CSO) klinisch-psychiatrisch, neuropsychologisch und elektrophysiologisch zu charakterisieren. Zum anderen sollte die Gruppe der CSO von einer adult heterosexuellen, nicht straffälligen Kontrollgruppe (Controls,

CTL) differenziert werden. Innerhalb der CSO-Gruppe sollte im Sinne einer Binnendifferenzierung weiter unterschieden werden zwischen Kindsmissbrauchern mit einer relevanten pädophilen Ansprechbarkeit sowie einer Verurteilung oder konkreten Anhaltspunkten für einen Kindsmissbrauch (Art. 187 StGB) (Child Sexual Assaulter, CSA) und Personen, welche für den Konsum von Kinderpornographie strafrechtlich verurteilt wurden (Art. 197) oder bei welchen konkrete Hinweise für Kinderpornographie-Konsum vorlagen (Child Sexual Exploitation Material, CSEM). Der Ablauf der Untersuchung ist in Tabelle 1 ersichtlich.

Alle Teilnehmer waren männlich, im Alter zwischen 18 und 55 Jahre und ohne neurologische oder psychiatrische Defizite oder Medikamenteneinnahme, welche das kognitive Leistungsvermögen für die Untersuchung hätte beeinträchtigen können.

Im Rahmen der vorgelegten Dissertation galt mein primäres Interesse den Daten aus der klinisch-psychiatrischen Exploration, da ich mir hierzu von möglichen Befunden die grösste praxisbezogene Relevanz erhoffte.

Während meiner Analyse der psychiatrischen Daten erwies sich Neurotizismus zunehmend als eine wichtige Persönlichkeitseigenschaft bei pädosexuellen Sexualstraftätern. Neurotizismus ist eine von drei Dimensionen eines Persönlichkeitsmodells, welches der Psychologe Hans Jürgen Eysenck bereits vor über 60 Jahren entwickelt hat. Sie ist durch emotionale Labilität, Ängstlichkeit, tiefes Selbstwertgefühl und hohe Sensibilität, aber auch durch Nervosität und Unruhe gekennzeichnet (Eysenck, 1950).

Mein zweites Interesse galt den impliziten Testverfahren, da diese automatisiertes Verhalten messen, welches dem Bewusstsein weniger zugänglich und somit schwieriger fälschbar ist. Bei den Berechnungen zur Diskrimination der untersuchten Gruppen zeigten sich die Variablen aus den impliziten Tests (zusammen mit Daten aus der neuropsychologischen Untersuchung) als relevante Diskriminatoren zur korrekten Gruppenzuordnung der einzelnen Studienteilnehmer hinsichtlich ihrer sexuellen Präferenz.

Tabelle 1: Ablauf der zweitägigen Untersuchung.

Tag 1	**Tag 2**
Klinische Exploration:	
- Demographische Daten	*Neurophysiologie:*
- Biografie	- Impulsivität/Antwortunterdrückung
- Familienanamnese	*Implizite Verfahren:*
- Sexualanamnese / Sexuelle Ausrichtung	- Impliziter Assoziationstest
- Suchtmittel	- Semantische Misattributionsprozedur
- Kritische Lebensereignisse	- Bildbetrachtungszeitmessung
- Persönlichkeitsprofil/-störungen	*Virtuelle Realität ('Strandspaziergang')*
Neuropsychologie:	*Aufdeckung der Coverstory*
- Aufmerksamkeit	*Explizite Verfahren:*
- Arbeitsgedächtnis	- Beurteilung des Stimulusmaterials
- Episodisches Gedächtnis	- Missbrauch und Vernachlässigung im Kindesalter
- Exekutivfunktionen	- Psychosexuelle Merkmale und Verhaltensauffälligkeiten
- Risikoverhalten	
- Intelligenz	
- Motorik	

1.1. Ziele und Hypothesen

Wie aus der Einleitung hervorgeht, ergibt sich die Notwendigkeit von objektiv messbaren Eigenschaften, welche einerseits für eine pädosexuelle Präferenz klassifizieren, andererseits aber auch kindsmissbrauchsbegünstigende Faktoren repräsentieren:

Ziel der ersten Studie (**Artikel 1**) war die Untersuchung des Einflusses von Neurotizismus auf den Zusammenhang von sexueller Missbrauchserfahrung und sexuellem Missbrauchsverhalten bei pädosexuellen Kindsmissbrauchern. Die Hypothese war, dass der Zusammenhang von erlebtem sexuellem Missbrauch und sexuellem Kindsmissbrauch bei männlichen pädosexuellen Sexualstraftätern dann eher zum Tragen kommt, wenn die Missbrauchserfahrung zu einer neurotischen Persönlichkeitsentwicklung beigetragen hat.

Die zweite Studie (**Artikel 2**) hatte zum Ziel, die Beziehung von erhöhten Neurotizismuswerten bei Kindsmissbrauchern mit deren Missbrauchsverhalten, sexuellen Dysfunktionen, kognitiven Verzerrungen und psychologischen Beschwerden zu analysieren. Die Hypothese dabei war, dass Kindsmissbraucher mit erhöhten Neurotizismuswerten

schwerwiegenderes Missbrauchsverhalten aufweisen, über mehr sexuelle Dysfunktionen berichten, stärkere kognitive Verzerrungen bezüglich ihrer Delikte zeigen und über mehr psychische und körperliche Beschwerden klagen.

Ziel der dritten Studie (**Artikel 3**) war die Extraktion eines möglichst kleinen Variablensets, welches eine Differenzierung von Sexualstraftätern mit einer pädosexuellen Ausrichtung und nicht straffälligen teleiophilen Kontrollprobanden sowie von übergriffigen Kindsmissbrauchern und Kinderpornographie-Konsumenten erlaubt.

2. NEUROTICISM AS A RISK FACTOR FOR CHILD ABUSE IN VICTIMS OF CHILDHOOD SEXUAL ABUSE (Artikel 1)

2.1. Theoretischer Hintergrund

Traumatische Erlebnisse, insbesondere sexuelle Missbrauchserfahrungen, sind mit gravierenden Langzeitfolgen für die Opfer assoziiert (Anda et al., 2005; Browne & Finkelhor, 1987; Glaser, 2000; Mullen, Martin, Anderson, Romans, & Herbison, 1996). Ein direkter Zusammenhang von eigener sexueller Missbrauchserfahrung in der Kindheit mit sexuellem Missbrauchsverhalten an Kindern im Erwachsenenalter wird oft beschrieben (Babchishin, Hanson, & Hermann, 2011; Glasser et al., 2001; Jespersen, Lalumière, & Seto, 2009; Seto, 2008; Seto & Lalumière, 2010; Whitaker et al., 2008), die Befunde dazu sind jedoch nicht eindeutig (Jespersen et al., 2009; Leach, Stewart, & Smallbone, 2016).

Die zentrale Bedeutung von Missbrauchserfahrung in der Kindheit auf die Persönlichkeitsentwicklung (Allen & Lauterbach, 2007; Becerra-García, García-León, Muela-Martínez, & Egan, 2013; Rogosch & Cicchetti, 2004) wie beispielsweise erhöhte Neurotizismuswerte (Gamble et al., 2006; Kendler, Gardner, & Prescott, 2006; Roy, 2002) wurde hingegen wiederholt nachgewiesen.

Neurotizismus wird seinerseits aber auch mit aktivem Kindsmissbrauch in Zusammenhang gebracht (Becerra-García et al., 2013; Dennison, Stough, & Birgden, 2001; Egan, Kavanagh, & Blair, 2005; Wilson & Cox, 1983).

Diese Befunde führten zu der Überlegung, dass die in der Literatur berichteten divergierenden Resultate des Zusammenhangs von erlebtem sexuellem Missbrauch und eigenem aktiven Missbrauchsverhalten möglicherweise durch einen mediierenden Einfluss seitens der neurotischen Persönlichkeitsausprägung einer Person erklärt werden können.

2.2. Methoden

2.2.1. Studienteilnehmer

Die deskriptiven Resultate beziehen sich auf eine Stichprobe der MIPS-Studie von n = 22 CSA, n = 20 CSEM und n = 21 CTL, die Mediations- sowie Strukturgleichungsmodelle auf n = 21 CSA, n = 20 CSEM und n = 21 CTL. Hinsichtlich der Ausbildungsjahre sowie der verbalen und nonverbalen Intelligenz waren die drei Gruppen vergleichbar, bezüglich des Lebensalters lag der Medianwert der Kontrollgruppe zehn Jahre unter dem Medianwert der beiden Indexgruppen.

2.2.2. Messinstrumente

Der *Childhood Trauma Questionnaire* (*CTQ;* Bernstein & Fink, 1998) erfasst retrospektiv das Erleben von sexuellem, physischem und emotionalem Missbrauch sowie körperliche und emotionale Vernachlässigung während der Kindheit.

Das *NEO - Personality Inventory - Revised* (*NEO-PI-R;* Ostendorf & Angleitner, 2004) misst Ausprägungen auf den fünf Persönlichkeitsfaktoren Neurotizismus, Extraversion, Offenheit für Erfahrungen, Gewissenhaftigkeit und Verträglichkeit.

Das *Multiphasic Sex Inventory* (*MSI;* Deegener, 1996) erfasst psychosexuelle Merkmale und Verhaltensauffälligkeiten bei Sexualstraftätern.

2.2.3. Analyse

Als erstes wurden die drei untersuchten Gruppen CSA, CSEM und CTL bezüglich den Fragebögen CTQ, NEO-PI-R und den Skalen *Sexueller Missbrauch an Kindern* des MSI deskriptiv beschrieben und miteinander verglichen. Im Anschluss wurde der direkte Zusammenhang von erlebtem sexuellem Missbrauch (CTQ) und sexuellem Übergriff (MSI) überprüft. Die Probanden wurden daraufhin einer Kategorie ohne sexuelle Missbrauchserfahrung oder einer Kategorie mit mindestens geringfügiger Missbrauchserfahrung zugeordnet. In einem nächsten Schritt wurden die Neurotizismuswerte (NEO-PI-R) bei Probanden mit sexueller Missbrauchserfahrung mit den Neurotizismuswerten bei Probanden ohne Missbrauchserfahrung verglichen. Nachfolgend wurde Neurotizismus als mediierende Variable für den Zusammenhang von erlebtem sexuellem Missbrauch als unabhängige Variable, mit sexuellem Übergriff als abhängige Variable eingeführt. Im Anschluss wurde ein Strukturgleichungsmodell mit den fünf Skalen des CTQ als latente Variable e*xperienced abuse* geprüft und abschliessend erneut Neurotizismus als Mediator in das Strukturgleichungsmodell eingeführt. Auch der mediierende Einfluss der anderen vier NEO-PI-R Skalen wurde geprüft. Die statistischen Analysen wurden mit der Berechnungssoftware *R* durchgeführt und das Strukturgleichungsmodell mit dem Package *lavaan* analysiert (R Core Team, 2015).

2.3. Ergebnisse und Diskussion

Im Vergleich zur CTL-Gruppe wurde die Gruppe der CSA signifikant häufiger Opfer von emotionalem und physischem Missbrauch und die Gruppe der CSO signifikant häufiger Opfer von physischer Vernachlässigung. Hinsichtlich sexueller Missbrauchserfahrung in der Kindheit fanden sich hingegen keine signifikanten Gruppenunterschiede. Die Gruppe der

CSO zeigte sich als neurotischer und weniger gewissenhaft als die CTL-Gruppe, wobei sich die Werte aller drei Gruppen überwiegend im Normbereich befanden. Einen direkten Zusammenhang von eigener sexueller Missbrauchserfahrung in der Kindheit mit sexuellem Missbrauchsverhalten an Kindern im Erwachsenenalter konnte nicht gefunden werden. Hingegen wurde bei den CSA-Probanden mit mindestens geringer sexueller Missbrauchserfahrung ein signifikant höherer Neurotizismuswert im Vergleich zu den CSA-Probanden ohne sexuelle Missbrauchserfahrung festgestellt Die darauffolgende Prüfung von Neurotizismus als vermittelnde Variable des Zusammenhangs von erlebtem sexuellem Missbrauch und sexuellem Missbrauchsverhalten bestätigte diesen als Mediator. Jedoch stellte sich auch ein signifikanter Einfluss anderer Missbrauchs- und Vernachlässigungserfahrungen in der Kindheit auf Neurotizismus heraus, weshalb die fünf CTQ-Skalen zu einer latenten Variablen *experienced abuse* zusammengefasst wurden. Nun zeigte sich ein signifikanter direkter Zusammenhang von *experienced abuse* mit sexuellem Übergriff, welcher jedoch bei Einführen von Neurotizismus als mediierende Variable seine Signifikanz verlor. Dies bestätigte Neurotizismus als Mediator von *experienced abuse* und sexuellem Übergriff. Ein vermittelnder Einfluss anderer NEO-PI-R Persönlichkeitsfaktoren wurde geprüft, konnte aber nicht festgestellt werden.

In der Gesamtheit lässt sich also festhalten, dass bei den Probanden der CSA-Gruppe weniger eine sexuelle Missbrauchserfahrung im Spezifischen, sondern das Erleben von mindestens geringem Missbrauch in der Kindheit im Allgemeinen, vermittelt durch eine neurotische Persönlichkeitsausprägung, mit aktivem sexuellem Missbrauchsverhalten an Kindern assoziiert war.

Sexueller Missbrauch tritt selten isoliert auf, sondern zieht häufig zusätzliche Missbrauchserfahrungen mit sich (Häuser, Schmutzer, Brähler, & Glaesmer, 2011; Jespersen et al., 2009; Turner, Finkelhor, & Ormrod, 2010). In bisherigen Studien wurde jedoch eine Poly-Viktimisierung nur selten berücksichtigt (Finkelhor, Ormrod, & Turner, 2007; Rossman & Rosenberg, 1998; Turner et al., 2010). Die Beachtung einer Poly-Viktimisierung ist vor allem deshalb wichtig, weil aufgezeigt werden konnte, dass Opfer verschiedener Missbrauchsformen in der Kindheit im Vergleich zu Opfern einer (wiederholten) Missbrauchsart ein erhöhtes Risiko für ein Sexualdelikt im Erwachsenenalter aufwiesen (Leach et al., 2016). Die oftmals fehlende Erhebung eines vollständigen Missbrauchsprofils könnte eine Erklärung für die bis heute widersprüchlichen Resultate in Bezug auf den

Zusammenhang von sexueller Missbrauchserfahrung und aktivem sexuellem Missbrauchsverhalten sein.

Dass auch ein Zusammenhang von erfahrenem Missbrauch mit erhöhten Neurotizismuswerten gefunden wurde, überrascht aufgrund der Ähnlichkeit dieser Persönlichkeitsausprägung zu Symptomen einer Depression wenig, da der Zusammenhang von posttraumatischen Belastungsstörungen und Depression wiederholt aufgezeigt wurde (z.B., Brunello et al., 2001) (Allen & Lauterbach, 2007).

Das Aufbauen und Aufrechterhalten von adulten Beziehungen kann durch erhöhte Neurotizismusausprägungen erschwert sein. Einflussausübung und Respektgewinn stösst in Beziehungen mit Kindern meist auf weniger Widerstand, wodurch emotionale und sexuelle Bedürfnisse leichter befriedigt werden können (Dennison et al., 2001). Ward und Stewart (2003) argumentieren zudem, dass Kindsmissbrauchern die Fähigkeit fehlt, ihre primären Bedürfnisse nach emotionaler Stabilität, intimen Beziehungen oder Macht auf eine sozial akzeptierte Art und Weise zu befriedigen.

Die Kombination sowohl der Berücksichtigung aller erhobenen Missbrauchsformen sowie einer neurotischen Persönlichkeitsausprägung scheint bei der Gruppe der CSA relevant für die Erklärung des Zusammenhangs von erlebtem Missbrauch in der Kindheit und aktivem sexuellem Kindsmissbrauch im Erwachsenenalter zu sein.

3. NEUROTICISM IN CHILD SEX OFFENDERS IS ASSOCIATED WITH MORE PRONOUNCED SEXUAL DYSFUNCTIONS, COGNITIVE DISTORTIONS, AND PSYCHOLOGICAL COMPLAINTS (Artikel 2)

3.1. Theoretischer Hintergrund

Kindsmissbraucher werden mit grösseren Normabweichungen in der Persönlichkeit im Vergleich zu teleiophilen gesunden Kontrollprobanden assoziiert, wobei die Mehrheit der Kindsmissbraucher die Diagnose einer Persönlichkeitsstörung nicht erfüllt (Cohen, Grebchenko, Steinfeld, Frenda, & Galynker, 2008). In Studien mit pädosexuellen Sexualstraftätern werden ebenfalls mehr subklinische Persönlichkeitsmerkmale wie Schüchternheit, Introvertiertheit und emotionale Unreife beschrieben. Dies sind Eigenschaften, welche mit erhöhten Neurotizismuswerten vereinbar sind (Cohen et al., 2002; Hall & Hall, 2007; Murray, 2000).

Andererseits wird Neurotizismus mit der Schwere von delinquentem Verhalten assoziiert (Agnew, Brezina, Wright, & Cullen, 2002; Eysenck, 1996a zitiert in Cale, 2006; Eysenck, 1996b zitiert in Cale, 2006; Caspi, Moffitt, Silva, & Stouthamer-Loeber, 1994; Krueger et al., 1994; Listwan, Voorhis, & Ritchey, 2007). Auch Studien mit pädosexuellen Sexualstraftätern weisen auf höhere Neurotizismuswerte selbiger hin, im Vergleich zu einer teleiophilen Kontrollgruppe (Wilson & Cox, 1983) und zeigen eine positive Korrelation von erhöhten Neurotizismuswerten mit befürwortenden Gedanken für sexuelle Handlungen mit Kindern auf (Egan et al., 2005).

Neurotizismus wird aufgrund seiner facettenreichen Charakteristiken eine Auswirkung auf verschiedene weitere Bereiche von Verhalten und Kognition nachgesagt wie beispielsweise schlechte Verhaltensinhibitionen, unangepasste Copingstrategien, dominantes Verhalten (Clark, Watson, & Mineka, 1994; Côté & Moskowitz, 1998; Gunthert, Cohen, & Armeli, 1999) oder sexuelle Dysfunktionen (Eysenck, 1971; Fagan et al., 1991; Raymond, Coleman, Ohlerking, Christenson, & Miner, 1999). Des Weiteren wird Neurotizismus mit wahrgenommenen psychischen und physischen Symptomen assoziiert (Costa Jr. & McCrae, 1987; Feldman, Cohen, Doyle, Skoner, & Gwaltney Jr., 1999; Ormel & Wohlfarth, 1991; Watson & Pennebaker, 1989). Es besteht gar die Annahme, dass die Skalen der *Symptom Checkliste-90-R* (SCL-90-R; Franke & Derogatis, 2002), welche subjektiv wahrgenommene psychische und physische Symptome erfassen, eigentlich Facetten von Neurotizismus messen (Desmet et al., 2008; Vassend & Skrondal, 1999).

Zusammengefasst berichtet die Literatur von erhöhten Neurotizismuswerten bei Kindsmissbrauchern und pädosexuellen Sexualstraftätern. Darüber hinaus wird Neurotizismus mit der Schwere von delinquentem Verhalten, sexuellem Leiden sowie vermehrten psychologischen und somatische Beschwerden assoziiert. Aber auch kognitive Verzerrungen sind stets ein wichtiger Bestandteil in theoretischen Modellen für Kindsmissbrauch (Abel et al., 1989; Hall & Hirschman, 1991; Ward & Siegert, 2002).

Diese Befunde führten zu der Überlegung, dass pädosexuelle Kindsmissbraucher, im Vergleich zu einer gesunden teleiophilen Kontrollgruppe, erhöhte Neurotizismuswerte aufweisen und dass diejenigen Kindsmissbraucher mit erhöhten Neurotizismuswerten im Vergleich zu jenen mit tiefen Neurotizismuswerten über schwerwiegenderes Missbrauchsverhalten, mehr sexuelle Dysfunktionen sowie stärkere kognitive Verzerrungen und psychologische und somatische Beschwerden berichten.

3.2. Methoden

3.2.1. Studienteilnehmer

Aufgrund der Generierung gleichgrosser Subgruppen beziehen sich die hier berichteten Daten auf eine Stichprobe der MIPS-Studie von n = 20 CSA- und n = 20 CSEM-Probanden, sowie n = 21 CTL-Teilnehmer. Die Gruppe der CSO war hinsichtlich der Ausbildungsjahre sowie verbalen und nonverbalen Intelligenz vergleichbar zur CTL-Gruppe. Bezüglich des Alters war die Gruppe der CSO signifikant älter.

3.2.2. Messinstrumente

Das *NEO - Personality Inventory - Revised* (*NEO-PI-R;* Ostendorf & Angleitner, 2004) misst die fünf Persönlichkeitsdimensionen Neurotizismus, Extraversion, Offenheit für Erfahrungen Gewissenhaftigkeit und Verträglichkeit.

Das *Multiphasic Sex Inventory* (*MSI;* Deegener, 1996) erfasst Merkmale und Verhaltensauffälligkeiten bei Sexualstraftäter wie Paraphilien und sexuelle Dysfunktionen.

Die *Symptom Checkliste-90-R* (*SCL-90-R*; Franke & Derogatis, 2002) misst subjektiv wahrgenommene psychologische und physische Beschwerden.

3.2.3. Analyse

Als erstes wurden die beiden Gruppen CSO und CTL hinsichtlich der drei Fragebögen NEO-PI-R, MSI und SCL-90-R deskriptiv beschrieben und miteinander verglichen. Im Anschluss

wurde die Gruppe der CSO mittels eines Mediansplits in eine Gruppe mit hohem und eine Gruppe mit tiefem Neurotizismuswert geteilt. Um gleichgrosse Subgruppen zu erhalten wurden hierfür die Gruppe der CSA und CSEM separat in je eine Gruppe mit hohen und eine Gruppe mit tiefen Neurotizismuswerten aufgeteilt, wobei einer von zwei CSA-Teilnehmern mit dem exakten Medianwert zufällig ausgewählt und ausgeschlossen wurde. Im Anschluss wurden die Werte der MSI-Skalen *Child Molest, Sexual Dysfunctions* und *Validity*, aller SCL-90-R-Skalen und der vier übrigen NEO-PI-R-Skalen zwischen CSO-Probanden mit hohen und tiefen Neurotizismuswerten verglichen. Schliesslich wurde als Kontrollbedingung die Gruppe der CSO in eine Gruppe mit hohen und tiefen Werten in der MSI-Subskala *Child Molest: Total Score* aufgeteilt und die Werte in den MSI-Subskalen *Sexual Dysfunctions* und *Cognitive Distortions/Immaturity,* des SCL-90-R und des NEO-PI-R zwischen diesen beiden Subgruppen verglichen. Um gleichgrosse Subgruppenhälften zu erhalten, wurde hierfür abermals ein CSA-Teilnehmer mit dem Medianwert ausgeschlossen. Die statistischen Analysen wurden mit der Berechnungssoftware *R* durchgeführt (R Core Team, 2015).

3.3. Ergebnisse und Diskussion

Die Gruppe der CSO zeichnete sich im Vergleich zur CTL-Gruppe durch höhere Neurotizismus- und tiefere Gewissenhaftigkeitswerte aus, wobei sich die Werte der meisten Teilnehmer im Normbereich befanden. Die Gruppe der CSO zeigte im Vergleich zur CTL-Gruppe erwartungsgemäss signifikant höhere Werte in allen Subskalen des Kindsmissbrauchsverhaltens, mit Ausnahme einer Skala (*grooming*). Die CSO-Gruppe berichtete aber auch über signifikant mehr empfundene sexuelle Unzulänglichkeit und Impotenzbeschwerden sowie stärkere kognitive Verzerrungen und Unreife. Hinsichtlich der Erhebung der psychischen und somatischen Beschwerden zeigten sich bei der Gruppe der CSO signifikant höhere Werte auf fünf der neun Skalen (*interpersonal sensitivity, depression, anxiety, phobic anxiety* und *psychotisicm*).

Das Aufteilen der CSO-Gruppe in je eine Subgruppe mit hohen und tiefen Neurotizismuswerten ergab keinen signifikanten Unterschied im Kindsmissbrauchsverhalten mit Ausnahme einer Skala (*abuse of boys*). Jedoch zeichneten sich jene Teilnehmer der CSO-Gruppe mit höheren Neurotizismuswerten durch mehr sexuelle Dysfunktionen (*sexual inadequacies, premature ejaculation, impotence*), stärkere kognitive Verzerrungen und Unreife sowie durch signifikant mehr berichtete psychologische und somatische Beschwerden (*obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger-hostility, paranoid ideation, psychoticism* und *somatization*) aus.

Die Kontrollbedingung ergab keine signifikanten Gruppenunterschiede.

Die Befunde von erhöhten Neurotizismuswerten der CSO-Gruppe stimmen mit Studien mit pädosexuellen Probanden (Wilson & Cox, 1983) und mit Kindsmissbrauchern (Dennison, Stough, & Birgden, 2001; Becerra-García, García-León, Muela-Martínez, & Egan, 2013) überein. Die tieferen Gewissenhaftigkeitswerte hingegen scheinen eher mit Sexualstraftaten als mit Pädosexualität assoziiert zu sein (Dennison, et al., 2001; Wilson & Cox, 1983).

Die Resultate hinsichtlich des Kindsmissbrauchsverhaltens lassen vermuten, dass Neurotizismus nur wenig mit der Schwere von delinquentem sexuellem Verhalten bei CSO-Teilnehmern assoziiert ist. Bisherige Befunde berichten jedoch von erhöhten Neurotizismuswerten bei delinquentem Verhalten (Caspi et al., 1994; Krueger et al., 1994; Listwan et al., 2007). Miller und Lynam (2001) beschreiben in einer Metaanalyse positive aber auch negative Korrelationen von Neurotizismus und antisozialem Verhalten. Sie argumentieren, dass auf der einen Seite neurotische Individuen eher zu impulsiven Handlungen neigen, andererseits emotional stabile Personen keine Ängste empfinden, welche sie von antisozialem Verhalten abhalten könnten. Antisoziales Verhalten wurde zwar wiederholt mit pädosexuellem Verhalten assoziiert, ist allerdings weder eine notwendige noch eine hinreichende Bedingung für Kindsmissbrauch (Cohen et al., 2002; Cohen & Galynker, 2002; Raymond et al., 1999). Ergänzend berichten Egan, Kavanagh, und Blair (2005) eine positive Korrelation von Neurotizismus mit pädosexuellen Gedanken. Die fehlenden Befunde hinsichtlich einer Assoziation von CSO-Teilnehmern mit erhöhten Neurotizismuswerten und der Schwere von Kindsmissbrauchsverhalten könnten darauf zurückzuführen sein, dass die Gruppe der CSO aus Straftätern mit einem geringen unmittelbaren Rückfallrisiko bestand, welche nur leicht erhöhte Neurotizismuswerte aufwiesen. Zukünftige Studien sollten Hochrisiko-CSO-Teilnehmer und/oder hoch neurotische CSO-Probanden untersuchen, um die Beziehung von Neurotizismus und Kindsmissbrauch zu präzisieren.

Die Befunde von vermehrt berichteten sexuellen Dysfunktionen bei CSO-Probanden mit erhöhten Neurotizismuswerten stimmen mit Befunden bei gesunden Probanden überein (Eysenck, 1971; Rosenheim, & Neumann, 1981).

CSO-Probanden mit erhöhten Neurotizismuswerten imponierten im Vergleich zu jenen mit tieferen Neurotizismuswerten durch stärkere kognitive Verzerrungen und Unreife, durch welche Sexualstraftäter ihre Delikte zu rechtfertigen vermögen. Ob die kognitiven Verzerrungen ursächlich für den Kindsmissbrauch, oder ob sie postdeliktisch entstanden sind,

wird kontrovers diskutiert (Abel, Becker, & Cunningham-Rathner, 1984; Hall & Hirschman, 1991; Ward, Hudson, Johnston, & Marshall, 1997; Ward & Siegert, 2002). Einer möglichen Unreife bei pädosexuellen Personen wurde bisher weniger Beachtung geschenkt. Vermutet wurde, dass Betroffene sich auf einer kindlichen emotionalen Reifeebene befinden, weshalb sie eine sexuelle Beziehung mit Kindern als befriedigend empfinden (Araji & Finkelhor, 1985). Araji und Finkelhor (1985) konnten diese Annahme in empirischen Untersuchungen jedoch nicht bestätigen. Dennoch berichtet auch Wilson (1999) von einer signifikant höheren Unreife bei homosexuellen Pädophilen im Vergleich zu erwachsenen Sexualstraftätern und Straftätern ohne Sexualdelikt. Um die Dynamik um Kindsmissbrauchsverhalten besser verstehen zu können, sind weitere Untersuchungen von kognitiven Verzerrungen und Unreife bei Sexualstraftätern mit einer pädosexuellen Ausrichtung, unter Beachtung ihrer Persönlichkeitsprofile, indiziert.

CSO-Probanden mit erhöhten Neurotizismuswerten berichteten auch mehr psychologische Probleme und psychopathologische Symptome. Übereinstimmend schlagen Vassend und Skrondal (1999) vor, dass die *SCL-90-R*-Skalen Facetten von Neurotizismus abbilden. Es werden verschiedene ursächliche Mechanismen diskutiert, wie beispielsweise mehr Stresserleben durch eine erhöhte Sensibilität für kleine Fehler oder Frustrationen bei neurotischen Personen (Ormel &Wohlfarth, 1991) oder ein direkter kausaler Zusammenhang der Neurotizismusfacetten mit Gesundheitsproblemen (Anderson, Bradley, Young, McDaniel, & Wise, 1985; Diamond, 1982) sowie konträr dazu, dass Gesundheitsprobleme zu einer neurotischen Persönlichkeit beitragen (Watson & Pennebaker, 1989). Andere Modelle nehmen an, dass neurotische Personen einerseits körperlichen Empfindungen mehr Beachtung schenken und diese andererseits eher negativ interpretieren und rückerinnern (Cioffi, 1991; Feldman et al., 1999; Larsen, 1992; Watson & Pennebaker, 1989).

Zusammenfassend scheint eine neurotische Persönlichkeitseigenschaft nicht nur mit einer grossen Bandbreite an psychischen und somatischen Beschwerden bei Sexualstraftätern mit einer pädosexuellen Ausrichtung assoziiert zu sein, sondern auch mit sexuellen Dysfunktionen, kognitiven Verzerrungen und Unreife. Ein Zusammenhang von Neurotizismus mit der Schwere von Kindsmissbrauch konnte nicht nachgewiesen werden.

4. INDIRECT AND NEUROPSYCHOLOGICAL INDICATORS OF PEDOPHILIC SEXUAL INTEREST AND OFFENDING (Artikel 3)

4.1. Theoretischer Hintergrund

Die hohe Zahl an Verleugnung und Dezimierung einer pädosexuellen Präferenz und/oder eines sexuellen Kindsmissbrauchs seitens der (verurteilten) Betroffenen stellt ein erhebliches Problem nicht nur für die Diagnosestellung, sondern auch für die therapeutische Behandlung dar (Barbaree, 1991; Marshall, 1994). Die Mittel die den forensischen Psychiatern und Psychologen in solchen Fällen, neben der direkten Befragung oder klassischen Fragebögen, zur Verfügung stehen, sind begrenzt. Bis heute konnte sich keine Methode zur zuverlässigen objektiven Erfassung einer Diagnose der Pädophilie etablieren.

In Nordamerika wird häufig die Penile Plethysmografie zur Identifikation pädosexueller Personen verwendet. Dabei wird mittels eines Penisrings die sexuelle Erektion als direkte Reaktion auf erotische Stimuli gemessen. Obwohl diese Methode eine gute Sensitivität und Spezifität aufweist (Cantor & McPhail, 2015), wird sie wegen der fehlenden Standardisierung (Marshall & Fernandez, 2003; Purcell et al., 2015), der mangelnden Reliabilität (Marshall & Fernandez, 2003), der unzureichenden temporären Stabilität (Müller et al., 2014) sowie der möglichen willentlichen Unterdrückung einer erektilen Reaktion (McAnulty & Adams, 1991; Quinsey & Chaplin, 1988) kritisiert. Der grösste Vorbehalt ergibt sich jedoch aufgrund ethischer Bedenken, insbesondere aus der Intrusivität des Verfahrens, weshalb die Penile Plethysmografie in Europa nur vereinzelt Anwendung findet (Babchishin, Nunes, & Hermann, 2013; Harris, Rice, Chaplin, & Quinsey, 1999).

Ein anderer Ansatz misst per fMRI-Untersuchung den Blutsauerstoffgehalt (BOLD) des Gehirns bei zeitgleicher Präsentation sexueller Stimuli. Studien zeigen, dass sich pädosexuelle Personen in ihrer BOLD-Reaktionen auf Kinder- bzw. Erwachsenenbilder signifikant von Kontrollgruppen unterscheiden (Sartorius et al., 2008; Walter et al., 2007) und dass sie anhand der BOLD-Reaktion von nicht pädosexuellen Personen differenziert werden können (Ponseti et al, 2012; 2014; 2016). Auch ereigniskorrelierte Potenziale (EKP's) wurden zur Untersuchung der differenzierten Verarbeitung erotischer Stimuli bei pädosexuellen Personen herangezogen (Howard, Longmore, Mason, & Martin, 1994; Knott, Impey, Fisher, Delpero, & Fedoroff, 2016). Der wesentliche Kritikpunkt dieser Ansätze liegt darin, dass fast ausschliesslich geständige pädosexuelle Personen untersucht wurden und somit die Auswirkung von Verleugnung auf die Resultate noch ungeklärt ist.

Eine Möglichkeit, um Täuschungsabsichten zu umgehen, bieten implizite Tests, bei welchen das eigentliche Ziel für den naiven zu Untersuchenden nicht ersichtlich ist, indem indirektes Verhalten quantifiziert wird. Beispielsweise hat sich die Messung der Betrachtungszeit (Viewing Time, VT) von sexuell attraktiven visuellen Stimuli, während Probanden selbige Bilder auf einer Skala nach ihrer Attraktivität beurteilen, als ein erfolgsversprechender Ansatz gezeigt. Eine längere VT deutet auf ein stärkeres sexuelles Interesse hin (Rosenzweig, 1942). Mit Hilfe der VT ist es gelungen, Kindsmissbraucher von anderen (Sexual-) Straftäter und nicht straffälligen Personen zu differenzieren (Schmidt, Babchishin, & Lehmann, 2017). Ein weiterer vielversprechender impliziter Test ist der Implizite Assoziationstest (IAT) (Greenwald, McGhee, & Schwartz, 1998), welcher die Stärke automatischer Assoziationen zwischen Konzepten (z.B. Erwachsene vs. Kind) und Wertattributen (z.B. sexuell vs. nicht-sexuell) mittels Reaktionszeitmessung bei einer Zuordnungsaufgabe misst (Babchishin et al., 2013). Auch hier ist für den zu Untersuchenden die relevante Variable (Reaktionszeit) nicht erkennbar. Unter Verwendung des IAT's liessen sich gleichermassen bereits Kindsmissbraucher von nicht straffälligen Personen differenzieren (Babchishin et al., 2013).

Verschiedene Studien berichten von defizitären Kontrollfunktionen (Habermeyer et al., 2013; Schiffer & Vonlaufen, 2011; Suchy, Whittaker, Strassberg, & Eastvold, 2009), strukturellen Hirnveränderungen (Cantor et al., 2008; Schiffer et al., 2007), tieferem IQ und häufigerer Linkshändigkeit (Blanchard et al., 2007; Cantor et al., 2004), langsamerer kognitiver Verarbeitung (Suchy et al., 2009) sowie anderen Persönlichkeitsbeeinträchtigungen (Cohen et al., 2002; Wilson & Cox, 1983) bei pädosexuellen Personen. Das Vorhandensein dieser Merkmale alleine erlaubt jedoch keinen Nachweis einer pädosexuellen Präferenz.

Daneben führte die rasante Entwicklung des Internets zu vermehrtem Konsum von kinderpornographischem Material und Annäherungsverhalten über das Internet (Cybergrooming) (Quayle & Taylor, 2003). Bezugnehmend auf eine Metaanalyse, teilen Kinderpornographie-Konsumenten gewisse Eigenschaften mit Kindsmissbrauchern, wie beispielsweise eine erhöhte Rate an erlebtem Kindsmissbrauch im Vergleich zur Allgemeinbevölkerung (Babchishin et al., 2011). Sie unterscheiden sich jedoch auch durch vergleichsweise mehr Selbstkontrolle und eine grössere psychologische Hemmschwelle für einen Übergriff als Kindsmissbraucher (Babchishin et al., 2011). Bis dato haben leider erst wenige Studien Kindsmissbraucher mit Konsumenten von Kinderpornographie verglichen.

Ziel der hier berichteten Studie war die Ermittlung einer begrenzten Anzahl an Variablen zur Differenzierung der CSO- von der CTL-Gruppe einerseits, und der CSA- von der CSEM-Gruppe andererseits. Dies mit dem Bestreben, einfach zugängliche Indikatoren pädosexueller Sexualstraftäter zu erhalten, welche helfen könnten zu verstehen, hinsichtlich welcher Eigenschaften sich Kindsmissbraucher von Kinderpornographie-Konsumenten unterscheiden.

4.2. Methoden

4.2.1. Studienteilnehmer

Die berichteten Daten beziehen sich auf n = 22 CSA-, n = 21 CSEM- und n = 21 CTL-Teilnehmer der MIPS-Studie. Die drei Gruppen unterschieden sich nicht hinsichtlich des Alters, der Bildung, des Berufsstatus, der Nationalität oder der verbalen/nonverbalen Intelligenz. Die Gruppe der CSA zeichnete sich jedoch durch eine signifikant stärkere Tendenz zur Linkshändigkeit aus.

4.2.2. Messinstrumente

Daten aus folgenden Verfahren wurden zur Klassifikationsanalyse herangezogen:

Anhand einer *Neuropsychologischen Testbatterie* wurden Funktionen der Aufmerksamkeit, des Arbeitsgedächtnisses, des Episodischen Gedächtnisses, der Exekutivfunktionen, des Risikoverhaltens und der Motorik untersucht. Aus dieser Untersuchung resultierten 47 Variablen.

Das *Go/NoGo-Paradigma* (Rosvold, Mirsky, Sarason, Bransome Jr, & Beck, 1956) misst die individuelle Fähigkeit der Inhibition einer nicht adäquaten Reaktion. Folgende drei Variablen wurden extrahiert: Anzahl Fehlalarme (FA), Reaktionszeit bis zur korrekten Reaktion, Reaktionszeit bis zum FA.

Vier *Implizite Tests* zur Messung der sexuellen Präferenz wurden durchgeführt, wofür jeweils ein standardisiertes Bilderset von nackten und mit Badeanzug bekleideten Personen, beiderlei Geschlechts, eingeteilt nach fünf körperlichen Entwicklungsstufen, verwendet wurde (Tanner I = Kleinkind bis Tanner V = Erwachsen) (NRP; Pacific Behavioral Assessment Corporation, 2004):

Anhand des *IAT*'s wurde die Differenz (*d*) der individuellen Reaktionszeit bei zur eigenen sexuellen Präferenz kongruenter (z.B. «Kind» und «sexuell») zu inkongruenter (z.B. «Erwachsen» und «sexuell») Zuordnungsbedingung gemessen. Der resultierende Wert *d* gibt Auskunft über das Ausmass sowie Richtung der sexuellen Präferenz.

Beim *VT*-Paradigma sollten die Teilnehmer NRP-Bilder nach ihrer sexuellen und attraktiven Ästhetik beurteilen. Unsere primäre Aufmerksamkeit galt dabei jedoch der Betrachtungszeit. Fünf Variablen (geschlechtsunabhängiger maximaler Medianwert pro Tannerstufe I - V) resultierten aus dieser Untersuchung.

Die *Semantische Misattributionsprozedur (SMP)* behilft sich konzeptueller Primingeffekte (NRP-Bilder) auf semantische Evaluationen (sexuell vs. nicht sexuell) von, dem Teilnehmer unbekannten, chinesischen Schriftzeichen. Das ursprüngliche Paradigma (Imhoff, Schmidt, Bernhardt, Dierksmeier, & Banse, 2011) wurde modifiziert, indem durch Variation der temporären Maskierungsbedingung eine subliminale sowie eine supraliminale Bedingung geschaffen wurde (Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006; Del Cul, Baillet, & Dehaene, 2007). Darüber hinaus wurde die *VT* von der sexuellen Präferenz entsprechenden Bildern, mit Bildern welche der Präferenz nicht entsprechen verglichen (Mokros et al., 2013). Zwölf Variablen der *SMP*, bestehend aus sechs Reaktionsvariablen und sechs Reaktionszeiten wurden für die Klassifikationsanalyse extrahiert.

Die *Choice Reaction Time (CRT)*-Aufgabe misst das verzögerte Antwortverhalten bei sexuell attraktiven Bildern (Geer & Bellard, 1996; Gress & Laws, 2009; Mokros, Dombert, Osterheider, Zappalà, & Santtila, 2010). Analog zur *VT*-Aufgabe wurden fünf Variablen (geschlechtsunabhängiger maximaler Medianwert pro Tannerstufe I - V) extrahiert.

4.2.3. Analyse

In einem ersten Schritt wurden Indikatoren für eine pädosexuelle vs. teleiophile Präferenz identifiziert. Hierfür wurden die Daten der CSA- und CSEM-Gruppe gepoolt (CSO) und der CTL-Gruppe gegenübergestellt. In einem zweiten Schritt wurden Eigenschaften identifiziert, welche zwischen der Gruppe der CSA und CSEM diskriminieren. Beide Analysen hatten zum Ziel, ein kleines Set an Variablen für eine möglichst optimale Diskrimination zu extrahieren. Dies wurde mit Hilfe einer Random Forest Analyse realisiert (Breiman, Friedman, Stone, & Olshen, 1984; Pflueger, Franke, Graf, & Hachtel, 2015), anhand welcher Klassifikationsgenauigkeiten bei multivariaten Daten verbessert werden können. Für diese Analyse wurde zunächst die Variablenrelevanz optimiert und anschliessend der kreuzvalidierte Vorhersagefehler minimiert (Genuer, Poggi, & Tuleau-Malot, 2010).

Nachdem dadurch ein bestmögliches prädiktives Variablenset erreicht werden konnte, wurde eine *Area under the Receiver Operating Characteristic Curve (ROC; AUC)* aus den resultierenden Mittelwertswahrscheinlichkeiten der Klassenzuteilung berechnet. Anhand post-hoc Analysen wurde der Beitrag jeder identifizierten Variable an der *AUC* errechnet. Die statistischen Analysen wurden mit der Berechnungssoftware *R* durchgeführt (R Core Team, 2015).

4.3. Ergebnisse und Diskussion

Der Random-Forest Algorithmus identifizierte sechs Variablen, welche die Probanden hinsichtlich ihrer sexuellen Präferenz optimal klassifizierten (CSO vs. CTL). Dies waren drei implizite sowie drei neuropsychologische Testvariablen: Die Gruppe der CSO war gekennzeichnet durch einen tieferen IAT-Wert, eine längere VT, eine verzögerte Reaktionszeit bei supraliminal präsentierten Stimuli (SMP) sowie einer schlechteren Gedächtnisfunktion, mehr Fehlern bei der Go/NoGo-Aufgabe und einem impulsiveren Verhalten bei einem Glücksspiel als die CTL-Gruppe. Zur optimalen Diskrimination der CSA- zur CSEM-Gruppe identifizierte der Algorithmus drei neuropsychologische Variablen: Die Gruppe der CSA wies mehr Interferenzfehler, mehr Fehler in der Aufmerksamkeitsspanne und ein höheres Risikoverhalten bei selbigem Glücksspiel auf.

Die Gruppe der CSO konnte, basierend auf den impliziten Tests sowie der neuropsychologischen Untersuchung, mit einer über 86%igen Genauigkeit korrekt identifiziert werden. Die Differenzierung der CSA- und CSEM-Gruppe gelang, basierend auf den neuropsychologischen Verfahren, etwas weniger genau, aber dennoch gut, mit einer 74%igen Genauigkeit.

Bei den Berechnungen zur Differenzierung der Gruppe der CSO und der CTL erwiesen sich drei der impliziten Testvariablen als relevant, zwei andere hingegen als irrelevant. Die Befunde hinsichtlich des IAT- und des VT-Wertes stimmen mit bisherigen Studienergebnissen überein (Babchishin et al., 2013; Mokros et al., 2013; Schmidt et al., 2017), diejenigen der SMP (Imhoff et al., 2011) und CRT-Aufgabe (Dombert et al., 2015; Mokros et al., 2010) entsprechen allerdings nicht den erwarteten Resultaten. Ein Grund hierfür könnte in der zusätzlich eingefügten Bedingung einer subliminalen Reizpräsentation bei der SMP und einer Reihenfolgesensitivität der CRT-Aufgabe liegen (Rönspies et al., 2015; Santtila et al., 2009), da die verschiedenen Tests wurden bei der Durchführung nicht interindividuell ausbalanciert wurden.

Die Ergebnisse zeigen das Potenzial impliziter Verfahren zur Einschätzung einer sexuellen Präferenz auf, wobei die Anwendung verschiedener Testverfahren einem einzigen Testverfahren vorzuziehen ist (Banse, Schmidt, & Clarbour, 2010; Ó Ciardha & Gormley, 2013; van Leeuwen et al., 2013). Die Anwendung verschiedener Tests erhöht nicht nur die Reliabilität, sondern erschwert insbesondere auch die Verfälschbarkeit der Resultate.

Des Weiteren zeigte die CSO-Gruppe stärkere Beeinträchtigungen der Exekutivfunktionen im Vergleich zur CTL-Gruppe, ein Resultat, welches in jüngster Vergangenheit bereits wiederholt aufgezeigt wurde (Habermeyer et al., 2013; Schiffer & Vonlaufen, 2011; Suchy et al., 2009). Cantor et al. (2004) berichten zusätzlich von tieferen IQ-Werten bei pädosexuellen Personen, was wir anhand unserer Daten nicht bestätigen können. Grund hierfür könnte sein, dass unsere Stichprobe aus Probanden mit einem geringen unmittelbaren Rückfallrisiko bestand. Die berichteten neuropsychologischen Defizite könnten demnach die Beeinträchtigungen bei einer Gruppe von Hochrisiko-CSO unterrepräsentieren. Neuropsychologische Defizite könnten mit strukturellen Hirnanormalien in Zusammenhang stehen (Cantor et al., 2008; Schiffer et al., 2007). Hierfür würde auch die bereits berichtete (Cantor et al., 2004) gefundene stärkere Tendenz zu Linkshändigkeit sprechen (Tenbergen et al., 2015). Ebenfalls unklar ist, ob die beobachteten neuropsychologischen Defizite der sexuellen Präferenz oder aber der Tendenz für einen sexuellen Übergriff an Kindern zuzuordnen sind. Die erhöhte Impulsivität der CSO-Gruppe würde für letzteres sprechen.

Die neuropsychologischen Testverfahren erwiesen sich auch als relevant zur Differenzierung der CSA- und der CSEM-Gruppe. Implizite Messungen zur Einschätzung der sexuellen Präferenz scheinen hierfür hingegen nicht von relevanter Bedeutung zu sein. Dies bekräftigt die Annahme, dass der Konsum von Kinderpornographie als Indikator für eine pädosexuelle Präferenz gilt (Seto et al., 2006). Eine relevante pädophile Ansprechbarkeit war einzig Einschlusskriterium für die CSA-Gruppe. Dennoch legen die Resultate die Vermutung nahe, dass sich die beiden Gruppen hinsichtlich ihrer sexuellen Präferenz wenig unterscheiden.

Die Gruppe der CSA zeigte ausserdem weniger kognitive Beeinträchtigungen als die CSEM-Gruppe, was bisherigen Resultaten widerspricht (Merdian, Curtis, Thakker, Wilson, & Boer, 2014; Merdian, Wilson, & Boer, 2009). Zu beachten ist jedoch, dass die Gruppe der CSA mit einer etwas tieferen Genauigkeit von der CSEM-Gruppe differenziert werden konnte, im Vergleich zur Klassifizierung der Gruppe der CSO gegen die der CTL. Dies deutet darauf hin, dass sich die beiden Gruppen der CSA und CSEM nicht stark unterscheiden.

In der Gesamtheit lässt sich dennoch festhalten, dass es gelungen ist, zwischen der Gruppe der CSO und CTL anhand impliziter und neuropsychologischer Verfahren mit einer 86%igen Genauigkeit und zwischen der Gruppe der CSA und CSEM anhand neuropsychologischer Tests mit einer 74%igen Genauigkeit zu differenzieren.

5. ALLGEMEINE DISKUSSION

Kindsmissbraucher werden in unserer Gesellschaft mit vielen negativen Adjektiven konnotiert (Mason, 2014) und es wird wenig bis gar nicht zwischen Kindsmissbraucher mit und ohne pädosexuelle Präferenz differenziert. Die Tatsache, dass weniger als die Hälfte aller sexuellen Übergriffe auf Kinder von pädosexuellen Sexualstraftätern begangen wird (Schaefer et al., 2010), findet in der öffentlichen Diskussion wenig Berücksichtigung. Stattdessen bleibt der mediale und gesellschaftliche Blick auf der Verhaltensebene von Extremereignissen fixiert. Deshalb erstaunt es nicht, dass die Untersuchung pädosexueller Personen durch deren Verleugnen und Abstreiten der eigenen pädosexuellen Präferenz erschwert ist. Betroffene dementieren ihr sexuelles Interesse vermutlich nicht nur aus Angst vor negativen Konsequenzen, sondern auch aufgrund eines Interessenskonflikts mit den eigenen Werten. Dies könnte der Grund sein, weshalb die Verleumdungsrate auch innerhalb der Gruppen von verurteilten Kindsmissbrauchern hoch ist (Barbaree, 1991; Marshall, 1994). Das Bestreiten der eigenen pädophilen sexuellen Präferenz bei pädosexuellen Straftäter hat Auswirkungen auf die Diagnose- und Prognosestellung wie auch auf Therapieverlaufsevaluationen. Aktuell stehen Klinikern, Gutachtern und Forschern keine hinreichend verlässlichen Verfahren für eine objektive Erfassung pädosexueller Präferenzen zur Verfügung. Im Rahmen gutachterlicher Tätigkeiten oder therapeutischer Behandlungen sind treffende Einschätzungen jedoch von immenser Wichtigkeit.

Das Ziel dieser Dissertation ist es, zum Verständnis für die Entstehung und Manifestation einer pädosexuellen Präferenz wie auch von Missbrauchsverhalten beizutragen. Anhand der umfassenden Untersuchung pädosexueller Straftäter im Rahmen der MIPS-Studie sollen mögliche, von der Selbstauskunft unabhängige Indikatoren für eine pädosexuelle Präferenz und/oder Faktoren, welche einen Kindsmissbrauch begünstigen können, gefunden und aufgezeigt werden. Eine zuverlässigere Grundlage für die Diagnostik, Risikoeinschätzung und Behandlung pädosexueller Sexualstraftäter würde einerseits die Wahrscheinlicht verringern, dass eine irrtümlicherweise als pädophil und/oder rückfallgefährdet eingestufte Person länger im Straf- oder Massnahmevollzug verbleiben müsste (falsch positiv). Andererseits würde aber auch das Risiko von zu günstigen Legalprognosen reduziert und somit weitere Kinder vor sexuellem Missbrauch bewahrt (falsch negativ). Folglich würde nicht nur die Gesellschaft, sondern auch die betroffene Person von einer validen Beurteilung der Präferenz und deren Verhaltenskonsequenzen profitieren.

Aus der Analyse der Daten resultieren folgende Ergebnisse: Der **erste Artikel** zeigt erstmalig den durch Neurotizismus verstärkten Zusammenhang von allgemein erlebtem Missbrauch in der Kindheit und aktivem sexuellem Missbrauchsverhalten im Erwachsenenalter bei pädosexuellen Sexualstraftätern auf. Der **zweite Artikel** veranschaulicht die Beziehung von erhöhten Neurotizismuswerten bei pädosexuellen Sexualstraftätern mit vermehrten sexuellen Dysfunktionen, kognitiven Verzerrungen und psychischen sowie somatischen Beschwerden. Der **dritte Artikel** zeigt auf, dass es möglich ist, Kindsmissbraucher anhand einer kleinen Anzahl an Variablen zuverlässig von einer teleiophilen, nicht straffälligen Kontrollgruppe zu diskriminieren.

Unter Betrachtung der erhobenen Daten wird ersichtlich, dass es sich beim Kindsmissbrauch nicht um ein homogenes Phänomen, sondern um ein komplexes Gefüge verschiedener Charakteristiken unterschiedlicher Ausprägungsformen handelt. Dies fügt sich in den derzeitigen Erkenntnisstand einer multifaktoriell bedingten Genese ein, wobei postuliert wird, dass die einzelnen Faktoren wechselseitig interagieren (Duttge, Engel, & Zoll, 2016; Fegert, Hoffmann, König, Niehues, & Liebhardt, 2015). Multifaktorielle Theorien existieren bereits seit über drei Dekaden, derweil neue Forschungsergebnisse stetig in nachfolgende theoretische Modelle integriert wurden. Beispielsweise wird nach dem Vier-Faktoren-Modell von Finkelhor und Araji (1986) den vier Elementen des Erlebens von emotionaler Kongruenz mit Kindern, der sexuelle Erregung durch Kinder, der Blockierung zur Reifung einer adulten Sexualität und der Enthemmung eine entscheidende Rolle zur Entstehung pädosexueller Übergriffe zugeschrieben. Marshall und Barbaree (1990) führen zum einen distale Faktoren wie biologische Besonderheiten, aber auch bestimmte Kindheitserfahrungen oder soziokulturelle Faktoren wie den Konsum von Gewalt- und Kinderpornographie als risikoerhöhende Eigenschaften für sexuelle Übergriffe an. Zum anderen zählen sie proximale Einflüsse wie Intoxikationen als übergriffbegünstigende Faktoren auf. Der vierteiligen Theorie von Hall und Hirschman (1991) zufolge entsteht ein sexueller Übergriff als Folge des Zusammenwirkens von sexueller Erregbarkeit, kognitiver Verzerrungen, affektiver Kontrolldefizite und Auffälligkeiten in der Persönlichkeit. Das Pfadmodell von Ward und Siegert (2002) differenziert hingegen Intimitätsdefizite, deviante sexuelle Skripts und Beziehungsschemata, emotionale Dysregulation, kognitive Verzerrungen sowie die Kombination aller genannten.

Das bis heute elaborierteste Ätiologiemodell wurde von Ward und Beech (2006) vorgelegt. Anhand der integrierten Theorie sexuellen Missbrauchs (*Integrated Theory of*

Sexual Offending; ITSO) versuchen sie, die oben genannten vier wichtigsten multifaktoriellen Ätiologiemodelle in einer umfassenden Theorie zu vereinen (Abbildung 1). Im Bestreben nach einer ganzheitlichen Theorie sollen sowohl Manifestation, assoziierte Mechanismen und Entwicklung, als auch die Stabilität von sexuellem Missbrauchsverhalten erklärt werden. Ward und Beech gehen dabei von drei grundlegenden Dimensionen aus: biologische, umweltbedingte und neuropsychologische Faktoren.

Unter die biologischen Faktoren subsumieren sie die genetische sowie die evolutionäre neuronale Entwicklung. Bei den Umweltfaktoren differenzieren sie proximale Faktoren, welche die soziale und psychologische Entwicklung beeinflussen, und distale Faktoren, die als situative und kontextbedingte Umwelteinflüsse in unmittelbarem Zusammenhang mit Missbrauchsverhalten stehen können. Diese beiden Faktoren wirken sich als biologisches Funktionsniveau und soziale Lernerfahrungen auf die Ausbildung der drei interagierenden neuropsychologischen Faktoren der Motivation und Emotion, der Handlungsselektion und -kontrolle sowie der Wahrnehmung und des Gedächtnisses aus. Zusammen tragen diese drei neuropsychologischen Faktoren durch eine kontinuierliche Interaktion zur Ausprägung klinischer Symptome, sog. State-Faktoren bei. Diese klinischen Symptome werden aufgeteilt in Defizite der Emotionsregulation, sozio-affektive Beeinträchtigungen, missbrauchsbegünstigende Einstellungen und sexuelle Devianz. Die Ausprägungen der klinischen Symptome gelten als psychologische Risikofaktoren, welche wiederum direkt sexuelles Missbrauchsverhalten begünstigen können. Ward und Beech argumentieren, dass die Folgen des Missbrauchsverhaltens dazu führen können, die Vulnerabilitäten des Täters durch die negativen Umwelteinflüsse aufrechtzuerhalten und somit die Wahrscheinlichkeit zukünftigen Missbrauchsverhaltens zu erhöhen. Infolgedessen beginne der Kreislauf von neuem. Die Autoren erklären die verschiedenen Arten sexuellen Missbrauchs durch individuell unterschiedliche Gewichtung und Interaktion der einzelnen Faktoren, wodurch jeder sexuelle Missbrauch unter einem anderen Bedingungsgefüge stattfinde.

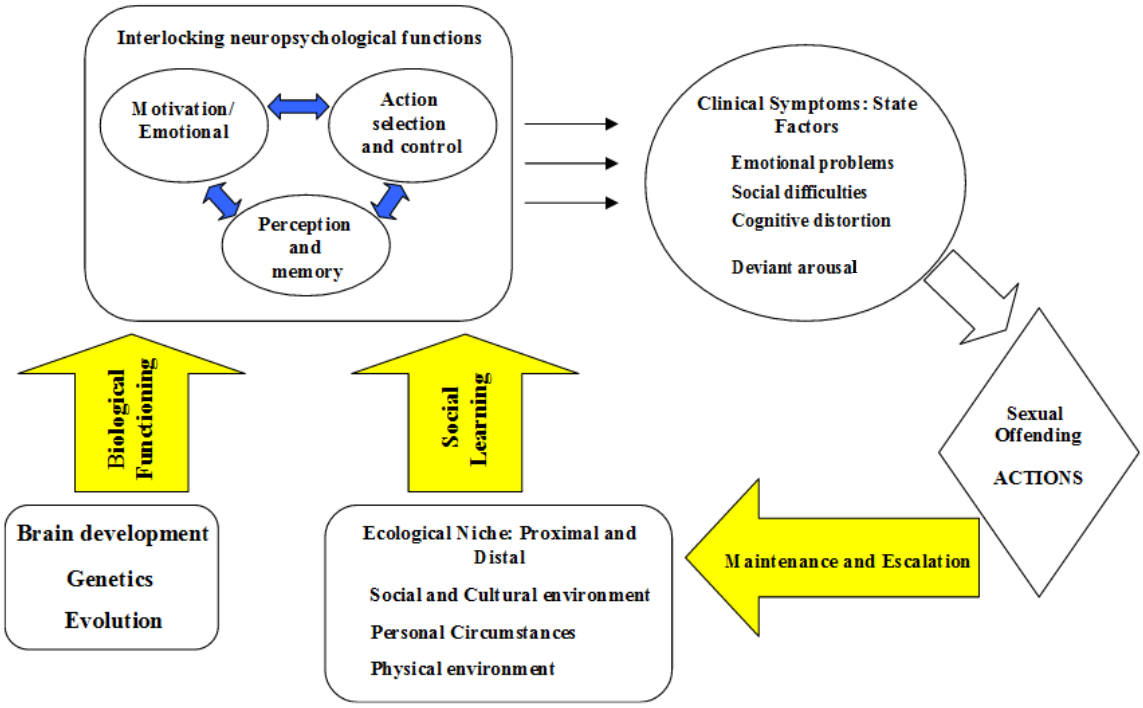


Abbildung 1. Integrated Theory of Sexual Offending (Ward & Beech, 2006).

Im Rahmen unserer Untersuchungen erwies sich Neurotizismus als eine relevante Persönlichkeitseigenschaft bei pädosexuellen Sexualstraftätern. Einerseits war Neurotizismus die mediierende Variable des Zusammenhangs von Missbrauchserfahrung in der Kindheit und sexuellem Übergriff auf Kinder im Erwachsenenalter (**Artikel 1**), andererseits stand Neurotizismus in direkter Beziehung mit sexuellen Dysfunktionen, kognitiven Verzerrungen und psychischen sowie somatischen Beschwerden (**Artikel 2**). Gemäss dem Ätiologiemodell von Ward und Beech (2006) werden die, den klinischen Symptomen subsumierten, *sozioaffektiven Defizite* charakterisiert durch Einsamkeit, tiefes Selbstwertgefühl oder hohes Misstrauen. Neurotizismus könnte demnach dem ITSO-Modell zufolge mit seinen Eigenschaften der emotionalen Labilität wie Ängstlichkeit, Unsicherheit und geringem Selbstwert den sozioaffektiven Defiziten zugeordnet werden. Als Hauptursache für das Auftreten sozioaffektiver Defizite werden von den Autoren erlebte aversive Erfahrungen in der Kindheit genannt. Beispielhaft werden hierfür erlebte Missbrauchserfahrungen aufgeführt. Erlebter Missbrauch in der Kindheit könne laut Autoren die psychologische Entwicklung des Individuums beeinflussen und wäre somit den *distalen Umweltfaktoren* anzugliedern. Die pädosexuelle Präferenz könnte unter dem klinischen Symptom der *devianten sexuellen Erregung* subsumiert werden. Den Ausprägungen der klinischen Symptome werden wiederum missbrauchsbegünstigende Eigenschaften zugeschrieben. Unsere Befunde eines

mediierenden Einflusses von Neurotizismus auf den Zusammenhang von erlebtem Missbrauch und Missbrauchsverhalten sind somit gut in das Modell der ITSO integrierbar.

Der Faktor *Motivation und Emotion* innerhalb des neuropsychologischen Systems wird gemäss dem ITSO-Modell durch persönliche Ziele und Bedürfnisse beeinflusst. Sexuelle Dysfunktionen und Gefühle sexueller Unzulänglichkeiten könnten zu Schwierigkeiten beim Ziel eines adult partnerschaftlichen Beziehungsaufbaus führen, womit Bedürfnisse unbefriedigt blieben. Folglich könnten unsere Befunde von empfundenen sexuellen Dysfunktionen bei Sexualstraftätern der Dimension Motivation und Emotion zugeordnet werden.

Die Wahrnehmung und das Gedächtnis fungieren laut Autoren als präattentiver Filter, welcher bei Beeinträchtigungen zu defizitären Verarbeitungen sensorischer Informationen und innerer Repräsentationen führen könne. Daraus resultierende unangepasste Annahmen sowie dysfunktionale Interpretationen und Einstellungen könnten laut Autoren Einfluss auf die Deutung sozialer Begegnungen haben. Kognitive Verzerrungen werden dem Modell zufolge aber auch direkt den klinischen Symptomen zugeordnet, indem dysfunktionale Einstellungen den sexuellen Missbrauch entschuldigen oder rechtfertigen, beispielsweise durch fehlerhafte Zuschreibungen der Konsequenzen oder Verleugnung der Verantwortlichkeit. Der Befund von stärkeren kognitiven Verzerrungen bei Sexualstraftätern liesse sich demnach sowohl dem neuropsychologischen System der *Wahrnehmung und Gedächtnis* wie auch dem klinischen Faktor *Missbrauchsbegünstigende Einstellung* zuordnen.

Auch die Befunde von erhöhten psychischen und somatischen Beschwerden wie Depressivität, Ängstlichkeit, interpersonelle Sensibilität und Feindseligkeit bei Sexualstraftätern mit erhöhten Neurotizismuswerten könnten den klinischen Symptomen zugeschrieben werden, indem sie als Anzeichen für *Probleme der Emotionsregulation* und/oder *sozioaffektive Defizite* beschrieben werden (Fegert et al., 2015).

Bei der Diskriminierung von Kindsmissbrauchern von einer teleiophilen nicht straffälligen Kontrollgruppe wiesen die Sexualstraftäter ein impulsiveres Verhalten sowie eine schlechtere Gedächtnisleistung auf (**Artikel 3**). Impulsives Verhalten geht einher mit verminderter Verhaltenskontrolle und könnte somit dem neuropsychologischen System der *Handlungsauswahl und -kontrolle* zugeordnet werden. Die Dimension der *Wahrnehmung und des Gedächtnisses* habe laut Ward und Beech seine biologischen Korrelate u.a. in hippocampalen Strukturen, weshalb unsere Befunde der defizitären Gedächtnisleistungen bei Sexualstraftätern dieser Dimension anzugliedern wären. Dem ITSO-Modell zufolge könnten aber auch Besonderheiten in der neuronalen Entwicklung zu impulsivem Verhalten oder

Gedächtnisdefiziten führen, wonach die Befunde der beeinträchtigten Verhaltenskontrolle und Gedächtnisfunktionen bei Sexualstraftätern im Modell auch bereits vor den neuropsychologischen Funktionen, dem biologischen Faktor der *genetischen und neuronalen Hirnentwicklung* angegliedert werden könnte.

Unsere untersuchte Stichprobe weist demnach Symptome aller vier klinischen Faktoren auf, welche gemäss dem ITSO-Modell in einem direkten Zusammenhang mit einem Sexualdelikt stehen. Dies ist von Bedeutung, weil ein sexueller Übergriff laut Ward und Beech Veränderungen in der Person oder dem Umfeld mit sich bringen kann, durch welches das Missbrauchsverhalten aufrechterhalten wird.

Wenn wir nun die Gesamtheit aller Resultate der vorliegenden Dissertationsschrift dem ITSO-Modell zugrunde legen, könnte gemäss Ward und Beech (2006) zusammengefasst folgendes Wirkkonstrukt pädosexuelles Missbrauchsverhalten begünstigen und aufrechterhalten: Die negative soziale Lernerfahrung durch das Erleben von Missbrauch in der Kindheit könnte, unterstützt durch die bestehende verminderte Gedächtnisleistung, zur Ausbildung unpassender und limitierter kognitiver Schemata führen, wodurch die Bildung inadäquater Einstellungen und dysfunktionaler Interpretationen begünstigt wird. In Wechselwirkung mit subjektiv empfundenen sexuellen Unzulänglichkeiten und der Schwierigkeit, inneren Impulsen Aufschub zu gewähren, bildet sich eine erhöhte Unsicherheit im sozialen Kontakt, eine generelle Ängstlichkeit, ein geringer Selbstwert aber auch eine emotionale Labilität und Reizbarkeit. Zusammen mit missbrauchsbegünstigenden Einstellungen und einer bestehenden pädosexuellen Präferenz besteht nun ein erhöhtes Risiko für einen sexuellen Kindsmissbrauch. Indem durch einen sexuellen Übergriff auf ein Kind eine Bedürfnisbefriedigung gelingt und sich die betroffene Person zeitgleich weiter sozial isoliert, verringert sich die Chance auf die Etablierung einer rechtskonformen Beziehung. Wenn nun die Umgebung nicht sozial, strafrechtlich oder therapeutisch intervenierend einwirkt, beginnt der Kreislauf von neuem und das sexuelle Missbrauchsverhalten wird fortgesetzt bzw. aufrechterhalten.

Diese beispielhafte Veranschaulichung eines möglichen Wirkmechanismus der berichteten Resultate der MIPS-Studie anhand des ITSO-Modells hat nicht den Anspruch, die Komplexität von pädosexuellem Verhalten vollständig abzubilden, sondern erleuchtet lediglich einen Ausschnitt möglicher wirkender Faktoren. Unberücksichtigt bleiben neben der individuell unterschiedlichen Gewichtung der jeweiligen Faktoren jene Aspekte, welche nicht

Inhalt der Untersuchungen im Rahmen der MIPS-Studie waren, oder aber als Daten vorliegen, jedoch für die vorliegende Dissertation nicht verwendet wurden (beispielsweise die familiäre Herkunft oder neurophysiologische Parameter). Darüber hinaus muss die Frage der Kausalität ungeklärt bleiben. Durch den sich wiederholenden Kreislauf des Modells ist nicht ersichtlich, ob die berichteten beeinträchtigten Faktoren Ursache oder Folge des pädosexuellen Missbrauchsverhaltens sind. Führt beispielsweise eine neurotische Persönlichkeitseigenschaft zu einem erhöhten Risiko für einen sexuellen Übergriff an einem Kind? Oder führt die, durch den Kindsmissbrauch hervorgerufene Angst vor Konsequenzen oder Interessenskonflikt zu einer neurotischen Persönlichkeit? Dieselbe Frage bleibt nicht nur hinsichtlich der pädosexuellen Präferenz, sondern auch in Bezug auf die anderen Variablen der sexuellen Dysfunktion, kognitiven Verzerrung und Unreife sowie psychischen und somatischen Beschwerden unbeantwortet. Auch protektive Faktoren, entweder in Abwesenheit zusätzlicher Risikofaktoren oder im Vorhandensein sozialer und personaler Ressourcen, wurden in der MIPS-Studie nicht erhoben und finden im ITSO-Modell keine Berücksichtigung. Denn ob die hier berichteten Indikatoren, wie erhöhte Neurotizismuswerte, Missbrauchserfahrungen oder inhibitorische und kognitive Defizite, direkt mit einer pädosexuellen Präferenz und/oder Kindsmissbrauch assoziiert sind, ist nicht zuletzt auch abhängig von der Resilienz der betroffenen Person. Eine verminderte Resilienz kann Ausdruck einer Persönlichkeitseigenschaft oder aber auch Folge dieser Indikatoren sein (Collishaw et al., 2007; DuMont et al., 2007). Übereinstimmend berichtet Collishaw et al. (2007), dass Personen, welche Missbrauch erfahren haben und erhöhte Neurotizismuswerte aufweisen, signifikant weniger resilient gegenüber psychischen Störungen im Erwachsenenalter sind. Durch eine verminderte Resilienz sind physische und soziale Ressourcen reduziert, was wiederum die Entwicklung einer adäquaten Resilienz erschwert (Agaibi & Wilson, 2005; Bowen, El Komy, & Steer, 2008; Edwards, Sakasa, & Van Wyk, 2005).

Ätiologische Annahmen und die Konzeptualisierung von Wirkmechanismen wie durch die ITSO sind wichtig, um entsprechende diagnostische Beurteilungen vornehmen und Interventionen umsetzen zu können. Theorien können die Ziele der Interventionen aufzeigen, indem sie eine Grundstruktur abbilden, die darlegt, wo die problematischen Bereiche liegen, wie diese miteinander interagieren und durch welche psychologischen, soziokulturellen oder biologischen Faktoren sie verursacht werden könnten (Ward & Beech, 2006). Ward und Beech versuchen mit ihrem Modell aufzuzeigen, warum sich eine bestimmte Person innerhalb

eines spezifischen Umfelds sexuell an Kindern vergehen könnte. Anhand ätiologischer Modelle wie der ITSO könnten Behandlungsprogramme individuell zugeschnitten und eine one-size-fits-all-Behandlung vermieden werden (Ward & Beech, 2006).

Voraussetzung für eine erfolgreiche therapeutische Intervention ist jedoch, dass entsprechende missbrauchsbegünstigende Eigenschaften veränderbar sind. Anhand von Metaanalysen konnten Risikofaktoren extrahiert werden, welche die Wahrscheinlichkeit eines generellen oder einschlägigen sexuellen Rückfalls erhöhen (Hanson & Morton-Bourgon, 2005; Mann, Hanson, & Thornton, 2010). Das Vorliegen einer pädosexuellen Präferenz gilt (zusammen mit einer antisozialen Grundhaltung) als wichtigste Risikodimensionen für das erneute Begehen eines Sexualdeliktes. Im Besonderen weisen die genannten Autoren auf potenziell dynamische Risikofaktoren hin, welche Ziel therapeutischer Interventionen sein könnten. Diese Faktoren sind von grosser Bedeutsamkeit, weil in den Definitionskriterien des DSM-5 die pädophile sexuelle Orientierung aufgrund eines fehlenden Remissionskriteriums als unveränderlich konstruiert wurde (American Psychiatric Association, 2013; Briken, 2015; Briken, Fedoroff, & Bradford, 2014). Das DSM-5 betont jedoch, dass die Störung der Pädophilie weitere Elemente umfasse, welche über die Zeit veränderbar seien, wie beispielsweise sexuelle Frustration oder Einsamkeit (American Psychiatric Association, 2013). Die durch die Arbeitsgruppen um Karl Hanson extrahierten dynamischen Risikofaktoren waren u.a. erhöhte Impulsivität, instabile Lebensführung, missbrauchsbegünstigende Einstellungen, emotionale Identifikation mit Kindern und unbefriedigende oder mangelnde sexuelle Kontakte (Hanson & Morton-Bourgon, 2005; Mann et al., 2010). Diese Variablen gehen mit unseren Befunden von Defiziten in der Verhaltenskontrolle, erhöhten Neurotizismuswerten, vermehrten kognitiven Verzerrungen und Unreife sowie mehr sexuellen Dysfunktionen einher. Generelle psychologische Probleme wie Ängstlichkeit sowie erfahrener Missbrauch in der Kindheit stünden hingegen nicht in direktem Zusammenhang mit einschlägigem Rückfall, sondern würden als Risikofaktoren für ein erstmaliges Sexualdelikt prädestinieren. Die Autoren betonen jedoch, dass Faktoren, welche ein Sexualdelikt initiieren, nicht mit Faktoren übereinstimmen müssen, welche das Missbrauchsverhalten aufrechterhalten (Hanson & Morton-Bourgon, 2005). Diese risikoerhöhenden und rückfallbegünstigenden Faktoren unterstreichen die Relevanz unserer Befunde, indem sie verdeutlichen, dass die gefundenen objektiv messbareren Indikatoren nicht nur diagnostisch und primärpräventiv relevant sind, sondern auch legalprognostisch und therapeutisch eingesetzt werden könnten.

5.1. Implikation für Praxis und Forschung

Aktuell gibt es kein allgemeingültiges Behandlungsprogramm für Sexualstraftäter (Nedopil, 2010), was in Anbetracht der interindividuell heterogenen Persönlichkeitseigenschaften wahrscheinlich auch kaum zweckdienlich wäre. Generell scheint jedoch ein kognitiv-behavioraler Ansatz anderen Behandlungsmodellen überlegen zu sein (Hanson, Bourgon, Helmus, & Hodgson, 2009; Lösel & Schmucker, 2005). Die bis heute am häufigsten angewandten und diskutierten Therapieprogramme sind das *Relapse-Prevention (RP)*-Modell (Pithers, Marques, Gibat, & Marlatt, 1983), das *Risk-Need-Responsivity (RNR)*-Modell (Andrews, Bonta, & Hoge, 1990; Bonta & Andrews, 2007) sowie das *Good Lives Model (GLM)* (Ward & Stewart, 2003).

Das RP-Modell (Pithers et al., 1983) soll den Sexualstraftätern Fähigkeiten vermitteln, welche sie Risikosituationen möglichst frühzeitig erkennen und adäquat darauf reagieren lassen. Mögliche Copingstrategien werden durch in sensu Expositionen identifiziert, hinsichtlich ihrer Anwendbarkeit überprüft und trainiert. Kritisiert wird jedoch insbesondere die therapeutisch ausschliessliche Verfolgung von Vermeidungszielen, womit der Schwerpunkt zu stark auf dem devianten Verhalten liege (Ward, Mann, & Gannon, 2007). Das RNR-Modell (Andrews, Bonta, & Hoge, 1990; Bonta & Andrews, 2007) passt die therapeutischen Ressourcen an das Ausmass des individuellen Rückfallrisikos an (*Risk*), berücksichtigt individuell dynamische Rückfallfaktoren (*Need*) und stimmt die Behandlung auf die individuellen Fähigkeiten ab (*Responsivity*). Als wesentliche Kritikpunkte werden hier die Tatsachen genannt, dass die Behandlungsmotivation und die individuellen Bedürfnisse der Straftäter zu wenig Berücksichtigung finden (Ward et al., 2007). Vor diesem Hintergrund wurde das GLM als Ergänzung zum RNR-Modell entwickelt (Ward & Stewart, 2003). Im Fokus steht die Befriedigung primärer Bedürfnisse, welche die Lebenszufriedenheit und somit die Therapiemotivation erhöhe. Durch den Aufbau prosozialer Ressourcen sollen die Täter dazu befähigt werden, ihre Grundbedürfnisse auf eine adäquate und rechtskonforme Weise zu befriedigen. Diese drei genannten Modelle werden häufig in Kombination angewandt oder mit weiteren Herangehensweisen ergänzt (Fegert et al., 2015).

Die Befunde der vorliegenden Dissertationsschrift können wichtige potenziell veränderungssensitive Hinweise für eine individuell angepasste Therapieplanung liefern. Beispielsweise könnten hinsichtlich des **ersten Artikels** Kenntnisse über die Neurotizismusausprägungen der Patienten nützlich sein, um Behandlungsmethoden zu entwickeln und zu optimieren (Costa, 1991; Dennison et al., 2001; McCrae, 1991). Bei Patienten mit hohen Neurotizismuswerten sollten die Therapieziele in Übereinstimmung mit

dem *Responsivity*-Prinzip (Bonta & Andrews, 2007) möglichst klar und realistisch definiert werden sowie der Schwerpunkt der Therapie auf der Ängstlichkeit und der Stimmungsunausgeglichenheit liegen (Miller, 1991). Dies würde auch dem Ansatz des GLM entsprechen, weil primäre Bedürfnisse durch Stabilisierung der Stimmungslage und vermehrtem sozialem Einbezug leichter befriedigt werden können (Ward et al., 2007; Ward & Stewart, 2003). Darüber hinaus zeigten Van Voorhis et al. (2002), dass der Therapieerfolg partiell von den Neurotizismuswerten der Sexualstraftäter abhängen kann. Das Wissen um Defizite in der Persönlichkeit ist hinsichtlich der Resultate des ersten Artikels insbesondere auch deshalb wichtig, weil bereits sexuelle Missbrauchserfahrung allein bei Hochrisiko-Sexualstraftätern sowie bei Sexualstraftätern mit Opfern jünger als 15 Jahre, die Rückfallwahrscheinlichkeit für eine Sexualstraftat erhöht (Nunes, Hermann, Renee Malcom, & Lavoie, 2013). Angesichts der relativen Stabilität von Persönlichkeitsmerkmalen (Caspi, Moffitt, Silva, & Stouthamer-Loeber, 1994; Caspi & Roberts, 1990; Miller & Lynam, 2001), sollte das primäre Ziel jedoch nicht nur in der Senkung der erhöhten Neurotizismuswerte liegen, sondern entsprechend der Befunde des **zweiten Artikels** sollte die Aufmerksamkeit auch auf die verzerrte Wahrnehmung (Beech & Mann, 2003; Ward et al., 1997), den beklagten sexuellen Dysfunktionen (Rosenheim & Neumann, 1981) sowie den psychischen und physischen Beschwerden (Barsky & Klerman, 1983) der Sexualstraftäter mit erhöhten Neurotizismuswerten gelegt werden. Auch dies stünde wieder im Einklang mit den RNR-Prinzipien sowie dem GLM, indem die Behandlung auf individuelle Faktoren und Fähigkeiten abgestimmt würde (Bonta & Andrews, 2007) und die Verbesserung sexueller Defizite der primären Bedürfnisbefriedigung dienlich ist (Ward et al., 2007; Ward & Stewart, 2003). Dies könnte einen umfassenderen und erfolgversprechenderen therapeutischen Ansatz bei neurotischen pädosexuellen Sexualstraftätern erlauben. Die Resultate des **dritten Artikels** geben Hinweise für inhibitorische wie auch kognitive Defizite bei Sexualstraftäter. Ein psychotherapeutisches Ziel sollte demnach auch darin liegen, pädosexuelle Patienten, bei Vorhandensein solcher Beeinträchtigungen, über diese Defizite aufzuklären, den Behandlungsplan entsprechend den Fähigkeiten anzupassen und sie darin zu unterstützen, Kompensationsstrategien zu entwickeln. Eine Vorgehensweise, die wieder gut mit den RP- und RNR-Modellen vereinbar ist und durch Strategien zur Befriedigung primärer Bedürfnisse ergänzt werden könnte.

Die hier berichteten Resultate und therapeutischen Implikationen sind insbesondere deshalb bedeutungsvoll, weil eine adäquate Behandlung von Sexualstraftätern erwiesenermassen das Risiko für einen Rückfall senken kann (Hall, 1995; Hanson et al.,

2002; Hanson & Morton-Bourgon, 2005). Gleichwohl ist die Replikation unserer Befunde an einer unabhängigen, homogeneren und grösseren Stichprobe sowie an Hochrisiko-Sexualstraftäter unerlässlich. Trotzdem könnten die hier berichteten Befunde im Rahmen einer Therapie jedoch bereits jetzt für einen Einstieg in die oft unklare sexuelle Präferenz genutzt werden.

5.2. Limitationen

Die Teilnehmer der beiden Indexgruppen waren aufgrund ihres Deliktes strafrechtlich aufgefallen oder verurteilt. Durch diese Vorselektion der Stichprobe bleibt das Dunkelfeld von Straftätern, die ihre Taten unentdeckt verüben, unberücksichtigt, infolge lassen unsere Resultate keine Generalisierung auf die Gesamtheit der Sexualstraftäter zu. Darüber hinaus kann nicht ausgeschlossen werden, dass ein verübter Kindsmissbrauch strafrechtlich unentdeckt war und wir einen Probanden fälschlicherweise der CSEM-Gruppe zugeordnet haben. Dies hätte eine Vermischung der beiden Indexgruppen zur Folge, wodurch eine methodische Differenzierung sinnwidrig würde. Diesbezüglich waren wir auf die Ehrlichkeit der Probanden angewiesen. Die untersuchte Stichprobe bestand ferner aus Sexualstraftätern mit einem geringen unmittelbaren Rückfallrisiko, weshalb die Generalisierung unserer Resultate auf Hochrisiko-Sexualstraftäter noch zu untersuchen wäre. Zudem sind Studienresultate zur Validität von Eigenauskünften bei Straftätern nicht eindeutig (Haapasalo, 1990; Mills, Loza, & Kroner, 2003), folglich besteht trotz Anonymisierung der Daten, das Risiko von sozial erwünschtem Antwortverhalten der Probanden, wodurch die Resultate der klinischen Exploration und der expliziten Messungen zu hinterfragen wären. Die CTL-Gruppe war darüber hinaus im Altersmedian zehn Jahre jünger als die beiden Indexgruppen. Obwohl das Alter nur wenig Einfluss auf die Neurotizismuswerte hat (Donnellan & Lucas, 2008), kann dies zu einer Über- oder Unterschätzung der Gruppenunterschiede in den NEO-PI-R-Skalen geführt haben. Ausserdem führt die kleine Stichprobe zu einer verminderten statistischen Power unserer Resultate und multiple Testungen können die Wahrscheinlichkeit von Zufallsbefunden erhöhen.

Ein weiterer kritisch zu reflektierender Punkt besteht in der Selbstauskunft bei retrospektivem Erfassen von Missbrauchserfahrung in der Kindheit, welche verzerrt oder überschätzt sein kann (Hardt & Rutter, 2004; Leach et al., 2016) (**Artikel 1**). Die Resultate der Validitätsitems des CTQ-Fragebogens weisen aber bei allen drei Studiengruppen auf eine ehrliche Beantwortung der Fragen hin. Auch repräsentieren unsere Resultate nur eine Momentaufnahme der aktuellen Situation und bilden nicht die Dynamik der Zusammenhänge

von Neurotizismus und pädosexuellem Verhalten, sexuellen Dysfunktionen, kognitiven Verzerrungen und Unreife sowie psychischen und physischen Beschwerden ab (**Artikel 2**). Aufgrund der kleinen Stichprobe konnte der Einfluss möglicher konfundierender Faktoren wie Substanzkonsum, Komorbiditäten oder das Erleben kritischer Lebensereignisse nicht kontrolliert werden und Schwierigkeiten bei der Rekrutierung geeigneter Probanden verhinderten die Bildung homogenerer Subgruppen (**Artikel 3**).

Anzumerken ist, dass die erfolgreiche Studienführung beinahe an den Rekrutierungsschwierigkeiten gescheitert wäre. Die benötigte Stichprobengrösse konnte nur durch eine Verlängerung der Studiendurchführung und erhöhte Rekrutierungsbemühungen erreicht werden. Dies lag zum einen daran, dass viele pädosexuelle Personen die Einschlusskriterien nicht erfüllten oder aber kein Interesse an der Studienteilnahme hatten. Insbesondere aber wurden während des Rekrutierungszeitraums, mangels genügend entsprechend ausgebildeter Therapeuten, viel weniger Einzel- und Gruppentherapien mit pädosexuellen Personen durchgeführt als erwartet und auch als teilweise im Vorfeld angekündigt. Unsere Rekrutierungsschwierigkeiten spiegeln demnach auch ein aktuell bestehendes unbefriedigendes Angebot an Therapiemöglichkeiten für pädosexuelle Personen in der Schweiz wider.

5.3. Konklusion und Ausblick

Unsere Resultate veranschaulichen die Relevanz von Neurotizismus bei pädosexuellen Sexualstraftätern. Einerseits zeigte sich Neurotizismus als mediierende Variable des Zusammenhangs von erlebtem sexuellem Missbrauch und genereller Missbrauchserfahrung in der Kindheit mit eigenem sexuellem Missbrauchsverhalten an Kindern (**Artikel 1**). Andererseits standen erhöhte, jedoch im Normbereich liegende Neurotizismuswerte in signifikantem Zusammenhang mit kognitiven Verzerrungen, sexuellen Dysfunktionen sowie psychischen und physischen Beschwerden (**Artikel 2**). Ein multidimensionaler Ansatz, welcher neben Persönlichkeitsmerkmalen auch erlebten Missbrauch in der Kindheit, kognitive Verzerrungen, sexuelle Dysfunktionen und psychische sowie somatische Beschwerden miteinbezieht, verspricht somit wertvolle Anhaltspunkte für eine Behandlungsoptimierung zu liefern, um therapeutische Erfolge zu verbessern und Rezidivraten zu senken. Ob eine neurotische Persönlichkeitsausprägung für das Erfahren von (sexuellem) Missbrauch in der Kindheit prädisponiert oder ob (sexuelle) Missbrauchserfahrung die Wahrscheinlichkeit der

Entwicklung neurotischer Persönlichkeitsmerkmale erhöht, wäre eine interessante Fragstellung für zukünftige Folgestudien (Jespersen et al., 2009).

Eine standardisierte und objektive Testung, welche nicht auf der Selbstauskunft der betroffenen Person beruht, kann forensische Psychiater und Psychologen in der Einschätzung einer pädosexuellen Präferenz wesentlich unterstützen. Neurotizismus, Missbrauchserfahrung, kognitive Verzerrungen, sexuelle Dysfunktionen aber auch somatische und psychologische Beschwerden sind objektiv valide erfassbare Konstrukte, welche zu einem besseren Verständnis gegenüber einer pädosexuellen Straftat beitragen können. Bezüglich der objektiven Erfassbarkeit sind jedoch auch die Befunde zur Relevanz impliziter wie auch neuropsychologischer Testverfahren hervorzuheben (**Artikel 3**). Um jedoch standardisierte Richtlinien zu definieren, ist a priori die weitere Erhebung normativer Daten unerlässlich.

Wünschenswert wäre die Prüfung eines multimodalen Ansatzes, wie auch der differenzierenden Indikatoren an einer grösseren Stichprobe von pädosexuellen Sexualstraftätern mit einem hohen Rückfallrisiko. Hiermit würde ein wichtiger Beitrag für eine validere Diagnostik, Legalprognostik und Verlaufskontrolle pädophiler Straftäter geleistet. Durch diesen könnten ungerechtfertigte negative Legalprognosen verringert, aber auch die Opferzahl sexuellen Kindsmissbrauchs, wenn auch nicht gänzlich beseitigt, zumindest reduziert werden.

6. REFERENZEN

Abel, G. G., Becker, J. V., & Cunningham-Rathner, J. (1984). Complications, consent, and cognitions in sex between children and adults. *International Journal of Law and Psychiatry*, *7*(1), 89–103. https://doi.org/10.1016/0160-2527(84)90008-6

Abel, G. G., Gore, D. K., Holland, C. L., Camps, N., Becker, J. V., & Rathner, J. (1989). The measurment of the cognitive distortions of child molesters. *Annals of Sex Research*, *2*(2), 135–152.

Agaibi, C. E., & Wilson, J. P. (2005). Trauma, PTSD, and resilience a review of the literature. *Trauma, Violence, & Abuse*, *6*(3), 195–216.

Agnew, R., Brezina, T., Wright, J. P., & Cullen, F. T. (2002). Strain, Personality Traits, and Delinquency: Extending General Strain Theory. *Criminology*, *40*, 43–72.

Allen, B., & Lauterbach, D. (2007). Personality characteristics of adult survivors of childhood trauma. *Journal of Traumatic Stress*, *20*(4), 587–595. https://doi.org/10.1002/jts.20195

American Psychiatric Association. (2000). *Diagnostic criteria from DSM-IV-TR*. American Psychiatric Pub.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5).

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., … Giles, W. H. (2005). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174–186. https://doi.org/10.1007/s00406-005-0624-4

Anderson, K. O., Bradley, L. A., Young, L. D., McDaniel, L. K., & Wise, C. M. (1985). Rheumatoid arthritis: review of psychological factors related to etiology, effects, and treatment. *Psychological Bulletin*, *98*(2), 358.

Andrews, D. A., Bonta, J., & Hoge, R. D. (1990). Classification for effective rehabilitation: Rediscovering psychology. *Criminal Justice and Behavior*, *17*(1), 19–52.

Araji, S., & Finkelhor, D. (1985). Explanations of pedophilia: Review of empirical research. *Journal of the American Academy of Psychiatry and the Law Online*, *13*(1), 17–37.

Babchishin, K. M., Hanson, R. K., & Hermann, C. A. (2011). The Characteristics of Online Sex Offenders: A Meta-Analysis. *Sexual Abuse: A Journal of Research and Treatment*, *23*(1), 92–123. https://doi.org/10.1177/1079063210370708

Babchishin, K. M., Nunes, K. L., & Hermann, C. A. (2013). The validity of Implicit Association Test (IAT) measures of sexual attraction to children: A meta-analysis. *Archives of Sexual Behavior*, *42*(3), 487–499.

Banse, R., Schmidt, A. F., & Clarbour, J. (2010). Indirect measures of sexual interest in child sex offenders: A multimethod approach. *Criminal Justice and Behavior*, *37*(3), 319–335.

Barbaree, H. E. (1991). Denial and minimization among sex offenders: Assessment and treatment outcome. In *Forum on corrections Research* (Vol. 3, pp. 30–33).

Barsky, A. J., & Klerman, G. L. (1983). Overview: hypochondriasis, bodily complaints, and somatic styles. *Am J Psychiatry*, *140*, 273.

Becerra-García, J. A., García-León, A., Muela-Martínez, J. A., & Egan, V. (2013). A controlled study of the Big Five personality dimensions in sex offenders, non-sex offenders and non-offenders: relationship with offending behaviour and childhood abuse. *The Journal of Forensic Psychiatry & Psychology*, *24*(2), 233–246. https://doi.org/10.1080/14789949.2013.764463

Beech, A. R., & Mann, R. (2003). Recent developments in the assessment and treatment of sexual offenders. In *Offender Rehabilitation and Treatment: Effective Programmes and Policies to Reduce Re-offending* (pp. 259–288). John Wiley & Sons.

Beier, K. M., Bosinski, H. A. G., & Loewit, K. (2005). *Sexualmedizin–Grundlagen und Praxis, 2. überarb. Aufl*. Urban & Fischer, München.

Beier, K. M., Schaefer, G. A., Goecker, D., Neutze J., & Ahlers C. J. (2007). Das Präventionsprojekt Dunkelfeld (PPD). *Berliner Ärzte*, *7*, 32–35.

Bernstein, D. P., & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-report: Manual*. Psychological Corporation.

BFS - Polizeiliche Kriminalstatistik (PKS) 2016. (2017, March 27). Retrieved April 24, 2017, from https://www.bfs.admin.ch/bfs/de/home/statistiken/kriminalitaet-strafrecht/erhebungen/pks.html

Blanchard, R., Kolla, N. J., Cantor, J. M., Klassen, P. E., Dickey, R., Kuban, M. E., & Blak, T. (2007). IQ, Handedness, and Pedophilia in Adult Male Patients Stratified by Referral Source. *Sexual Abuse: A Journal of Research and Treatment*, *19*(3), 285–309. https://doi.org/10.1007/s11194-007-9049-0

Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation*, *6*, 1–22.

Bowen, E., El Komy, M., & Steer, C. (2008). *Characteristics associated with resilience in children at high risk of involvement in anti-social and other problem behaviour*.

Braun G., Hasebrink M., & Huxoll M. (2003). *Pädosexualität ist Gewalt: (Wie) Kann die Jugendhilfe schützen?* (1.). Beltz Verlag.

Breiman, L., Friedman, J., Stone, C. J., & Olshen, R. A. (1984). *Classification and regression trees*. CRC press.

Briken, P. (2015). Paraphilie und paraphile Störung im DSM-5. *Forensische Psychiatrie, Psychologie, Kriminologie*, *9*(3), 140–146.

Briken, P., Fedoroff, J. P., & Bradford, J. W. (2014). Why Can't Pedophilic Disorder Remit? *Archives of Sexual Behavior*, *43*(7), 1237–1239. https://doi.org/10.1007/s10508-014-0323-1

Browne, A., & Finkelhor, D. (1987). Impact of child sexual abuse: A review of the research. *Annual Progress in Child Psychiatry and Child Development*, *1987*, 555–584.

Brunello, N., Davidson, J. R. T., Deahl, M., Kessler, R. C., Mendlewicz, J., Racagni, G., … Zohar, J. (2001). Posttraumatic Stress Disorder: Diagnosis and Epidemiology, Comorbidity and Social Consequences, Biology and Treatment. *Neuropsychobiology*, *43*(3), 150–162. https://doi.org/10.1159/000054884

Bundschuh, C. (2001). *Pädosexualität: Entstehungsbedingungen und Erscheinungsformen*. Opladen: Leske + Budrich.

Cale, E. M. (2006). A quantitative review of the relations between the "Big 3" higher order personality dimensions and antisocial behavior. *Journal of Research in Personality*, *40*(3), 250–284.

Cantor, J. M., Blanchard, R., Christensen, B. K., Dickey, R., Klassen, P. E., Lee, A., … Kuban, M. E. (2004). Intelligence, Memory, and Handedness in Pedophilia. *Neuropsychology*, *18*(1), 3–14. https://doi.org/10.1037/0894-4105.18.1.3

Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., … Blanchard, R. (2008). Cerebral white matter deficiencies in pedophilic men. *Journal of Psychiatric Research*, *42*(3), 167–183. https://doi.org/10.1016/j.jpsychires.2007.10.013

Cantor, J. M., & McPhail, I. V. (2015). Sensitivity and specificity of the phallometric test for hebephilia. *The Journal of Sexual Medicine*, *12*(9), 1940–1950.

Caspi, A., Moffitt, T. E., Silva, P. A., & Stouthamer-Loeber, M. (1994). Are Some People Crime-Prone - Replications of the Personality-Crime Relationship across Countries, Genders, Races, and Methods. *Criminology*, *32*, 163–196.

Caspi, A., & Roberts, B. W. (1990). Personality continuity and change across the life course. *Handbook of Personality: Theory and Research, 2*, 300–326.

Cioffi, D. (1991). Beyond attentional strategies: A cognitive-perceptual model of somatic interpretation. *Psychological Bulletin*, *109*(1), 25.

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology, 103*(1), 103.

Cohen, L. J., & Galynker, I. I. (2002). Clinical features of pedophilia and implications for treatment. *Journal of Psychiatric Practice®*, *8*(5), 276–289.

Cohen, L. J., Grebchenko, Y. F., Steinfeld, M., Frenda, S. J., & Galynker, I. I. (2008). Comparison of Personality Traits in Pedophiles, Abstinent Opiate Addicts, and Healthy Controls: Considering Pedophilia as an Addictive Behavior. *The Journal of Nervous and Mental Disease*, *196*(11), 829–837. https://doi.org/10.1097/NMD.0b013e31818b4e3d

Cohen, L., McGeoch, P., Watras-Gans, S., Acker, S., Poznansky, M. S. W., Cullen, K., & Itskovich, Y. (2002). Personality impairment in male pedophiles. *The Journal of Clinical Psychiatry*, *63*(10), 912–919.

Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse & Neglect*, *31*(3), 211–229.

Costa Jr., P. T., & McCrae, R. R. (1987). Neuroticism, Somatic Complaints, and Disease: Is the Bark Worse than the Bite? *Journal of Personality*, *55*(2), 299–316. https://doi.org/10.1111/1467-6494.ep8970749

Costa, P. T. J. (1991). Clinical use of the five-factor model: An introduction. *Journal of Personality Assessment*, *57*(3), 393–398.

Côté, S., & Moskowitz, D. S. (1998). On the dynamic covariation between interpersonal behavior and affect: prediction from neuroticism, extraversion, and agreeableness. *Journal of Personality and Social Psychology, 75*(4), 1032.

Deegener, G. (1996). *Multiphasic sex inventory (MSI): Fragebogen zur Erfassung psychosexueller Merkmale bei Sexualtätern: Handbuch*. Hogrefe, Verlag für Psychologie.

Dehaene, S., Changeux, J.-P., Naccache, L., Sackur, J., & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: a testable taxonomy. *Trends in Cognitive Sciences*, *10*(5), 204–211.

Del Cul, A., Baillet, S., & Dehaene, S. (2007). Brain Dynamics Underlying the Nonlinear Threshold for Access to Consciousness. *PLoS Biol*, *5*(10), e260. https://doi.org/10.1371/journal.pbio.0050260

Dennison, S. M., Stough, C., & Birgden, A. (2001). The big 5 dimensional personality approach to understanding sex offenders. *Psychology, Crime & Law*, *7*(1–4), 243–261. https://doi.org/10.1080/10683160108401796

Desmet, M., Van Hoorde, H., Verhaeghe, P., Meganck, R., Vanheule, S., & Van den Abeele, T. (2008). Interpersonal profiles and neurotic symptoms: Are they associated with each other? *Psychoanalytic Psychology*, *25*(2), 342.

Diamond, E. (1982). The Role of anger and hostility in essential hypertension and coronary heart disease. *Psychological Bulletin*, *92*(2), 410–433.

Dombert, B., Antfolk, J., Kallvik, L., Zappalà, A., Osterheider, M., Mokros, A., & Santtila, P. (2015). Identifying pedophilic interest in sex offenders against children with the indirect choice reaction time task. *European Journal of Psychological Assessment*.

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: evidence from two national samples. *Psychology and Aging*, *23*(3), 558.

DuMont, K. A., Widom, C. S., & Czaja, S. J. (2007). Predictors of resilience in abused and neglected children grown-up: The role of individual and neighborhood characteristics. *Child Abuse & Neglect*, *31*(3), 255–274. https://doi.org/10.1016/j.chiabu.2005.11.015

Duttge, G., Engel, W., & Zoll, B. (2016). *Sexuelle Identität und gesellschaftliche Norm*. Universitätsverlag Göttingen.

Edwards, D., Sakasa, P., & Van Wyk, G. (2005). Trauma, resilience and vulnerability to PTSD: A review and clinical case analysis. *Journal of Psychology in Africa*, *15*(2), 143–153.

Egan, V., Kavanagh, B., & Blair, M. (2005). Sexual Offenders Against Children: The Influence of Personality and Obsessionality on Cognitive Distortions. *Sexual Abuse: A Journal of Research and Treatment*, *17*(3), 223–240. https://doi.org/10.1177/107906320501700301

Eysenck, H. J. (1950). *Dimensions of Personality*. Transaction Publishers.

Eysenck, H. J. (1971). Personality and sexual adjustment. *The British Journal of Psychiatry*, *118*(547), 593–608.

Eysenck, H. J. (1996a). Personality and crime: Where do we stand. *Psychology, Crime & Law, 2,* 143-152.

Eysenck, H. J. (1996b). Personality theory and the problem of criminality. In J. Muncie, & J. McLaughlin (Eds.), *Criminological perspectives: A reader* (pp. 81-98). London: sage.

Fagan, P. J., Wise, T. N., Schmidt Jr., C. W., Ponticas, Y., Marshall, R. D., & Costa Jr., P. T. (1991). A Comparison of Five-Factor Personality Dimensions in Males With Sexual Dysfunction and Males With Paraphilia. *Journal of Personality Assessment*, *57*(3), 434.

Fegert, J. M., Hoffmann, U., König, E., Niehues, J., & Liebhardt, H. (2015). *Sexueller Missbrauch von Kindern und Jugendlichen - Ein Handbuch zur Prävention und Intervention für Fachkräfte im medizinischen, psychotherapeutischen und pädagogischen Bereich*. Springer.

Feldman, P. J., Cohen, S., Doyle, W. J., Skoner, D. P., & Gwaltney Jr, J. M. (1999). The impact of personality on the reporting of unfounded symptoms and illness. *Journal of Personality and Social Psychology*, *77*(2), 370.

Finkelhor, D., & Araji, S. (1986). Explanations of pedophilia: A four factor model. *Journal of Sex Research*, *22*(2), 145–161.

Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Poly-victimization: A neglected component in child victimization. *Child Abuse & Neglect*, *31*(1), 7–26.

Franke, G. H., & Derogatis, L. R. (2002). *SCL-90-R: Symptom-Checkliste von LR Derogatis: deutsche Version: Manual*. Beltz Test.

Gamble, S. A., Talbot, N. L., Duberstein, P. R., Conner, K. R., Franus, N., Beckman, A. M., & Conwell, Y. (2006). Childhood Sexual Abuse and Depressive Symptom Severity: The Role of Neuroticism. *The Journal of Nervous and Mental Disease*, *194*(5), 382–385. https://doi.org/10.1097/01.nmd.0000218058.96252.ac

Geer, J. H., & Bellard, H. S. (1996). Sexual content induced delays in unprimed lexical decisions: Gender and context effects. *Archives of Sexual Behavior*, *25*(4), 379–395. https://doi.org/10.1007/BF02437581

Genuer, R., Poggi, J.-M., & Tuleau-Malot, C. (2010). Variable selection using random forests. *Pattern Recognition Letters*, *31*(14), 2225–2236.

Glaser, D. (2000). Child Abuse and Neglect and the Brain - A Review. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *41*(01), 97–116. https://doi.org/null

Glasser, M., Kolvin, I., Campbell, D., Glasser, A., Leitch, I., & Farrelly, S. (2001). Cycle of child sexual abuse: links between being a victim and becoming a perpetrator. *The British Journal of Psychiatry*, *179*(6), 482–494. https://doi.org/10.1192/bjp.179.6.482

Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the Implicit Association Test. *Journal of Personality and Social Psychology*, *74*(6), 1464–1480.

Gress, C. L. Z., & Laws, D. R. (2009). Cognitive Modelling of Sexual Arousal and Interest: Choice Reaction Time Measures. In D. Thornton & D. R. Laws (Eds.), *Cognitive Approaches to the Assessment of Sexual Interest in Sexual Offenders* (pp. 85–99). Oxford, UK: Wiley-Blackwell.

Gunthert, K. C., Cohen, L. H., & Armeli, S. (1999). The role of neuroticism in daily stress and coping. *Journal of Personality and Social Psychology*, *77*(5), 1087.

Haapasalo, J. (1990). Sensation seeking and Eysenck's personality dimensions in an offender sample. *Personality and Individual Differences*, *11*(1), 81–84. https://doi.org/10.1016/0191-8869(90)90171-M

Habermeyer, B., Esposito, F., Händel, N., Lemoine, P., Kuhl, H. C., Klarhöfer, M., … others. (2013). Response inhibition in pedophilia: An fMRI pilot study. *Neuropsychobiology*, *68*(4), 228–237.

Hall, G. C. N. (1995). Sexual offender recidivism revisited: a meta-analysis of recent treatment studies. *Journal of Consulting and Clinical Psychology*, *63*(5), 802.

Hall, G. C. N., & Hirschman, R. (1991). Toward a theory of sexual aggression: a quadripartite model. *Journal of Consulting and Clinical Psychology*, *59*(5), 662.

Hall, R. C. W., & Hall, R. C. W. (2007). A Profile of Pedophilia: Definition, Characteristics of Offenders, Recidivism, Treatment Outcomes, and Forensic Issues. *Mayo Clinic Proceedings*, *82*(4), 457–471. https://doi.org/10.4065/82.4.457

Hanson, R. K., Bourgon, G., Helmus, L., & Hodgson, S. (2009). The principles of effective correctional treatment also apply to sexual offenders: A meta-analysis. *Criminal Justice and Behavior*, *36*(9), 865–891.

Hanson, R. K., & Bussiere, M. T. (1998). Predicting Relapse: A Meta-Analysis of Sexual Offender Recidivism Studies. *Journal of Consulting*, *66*(2), 348–362. https://doi.org/10.1037/0022-006X.66.2.348

Hanson, R. K., Gordon, A., Harris, A. J., Marques, J. K., Murphy, W., Quinsey, V. L., & Seto, M. C. (2002). First report of the collaborative outcome data project on the effectiveness of psychological treatment for sex offenders. *Sexual Abuse: A Journal of Research and Treatment*, *14*(2), 169–194.

Hanson, R. K., & Morton-Bourgon, K. E. (2005). The Characteristics of Persistent Sexual Offenders: A Meta-Analysis of Recidivism Studies. *Journal of Consulting*, *73*(6), 1154–1163.

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of Child Psychology and Psychiatry*, *45*(2), 260–273. https://doi.org/10.1111/j.1469-7610.2004.00218.x

Harris, G. T., Rice, M. E., Chaplin, T. C., & Quinsey, V. L. (1999). Dissimulation in phallometric testing of rapists' sexual preferences. *Archives of Sexual Behavior*, *28*(3), 223–232.

Häuser, W., Schmutzer, G., Brähler, E., & Glaesmer, H. (2011). Misshandlungen in Kindheit und Jugend. *Dtsch Arztebl*, *108*, 17.

Howard, R. C., Longmore, F. J., Mason, P. A., & Martin, J. L. (1994). Contingent negative variation (CNV) and erotic preference in self-declared homosexuals and in child sex offenders. *Biological Psychology*, *38*(2), 169–181.

Imhoff, R., Schmidt, A. F., Bernhardt, J., Dierksmeier, A., & Banse, R. (2011). An inkblot for sexual preference: A semantic variant of the Affect Misattribution Procedure. *Cognition & Emotion*, *25*(4), 676–690. https://doi.org/10.1080/02699931.2010.508260

Jespersen, A. F., Lalumière, M. L., & Seto, M. C. (2009). Sexual abuse history among adult sex offenders and non-sex offenders: A meta-analysis. *Child Abuse & Neglect*, *33*(3), 179–192. https://doi.org/10.1016/j.chiabu.2008.07.004

Kendler, K. S., Gardner, C. O., & Prescott, C. A. (2006). Toward a Comprehensive Developmental Model for Major Depression in Men. *American Journal of Psychiatry*, *163*(1), 115–124. https://doi.org/10.1176/appi.ajp.163.1.115

Knott, V., Impey, D., Fisher, D., Delpero, E., & Fedoroff, P. (2016). Pedophilic brain potential responses to adult erotic stimuli. *Brain Research*, *1632*, 127–140.

Krueger, R. F., Schmutte, P. S., Caspi, A., Moffitt, T. E., Campbell, K., & Silva, P. A. (1994). Personality traits are linked to crime among men and women: evidence from a birth cohort. *Journal of Abnormal Psychology*, *103*(2), 328.

Larsen, R. J. (1992). Neuroticism and selective encoding and recall of symptoms: evidence from a combined concurrent-retrospective study. *Journal of Personality and Social Psychology*, *62*(3), 480.

Leach, C., Stewart, A., & Smallbone, S. (2016). Testing the sexually abused-sexual abuser hypothesis: A prospective longitudinal birth cohort study. *Child Abuse & Neglect*, *51*, 144–153. https://doi.org/10.1016/j.chiabu.2015.10.024

Listwan, S. J., Voorhis, P. V., & Ritchey, P. N. (2007). Personality, Criminal Behavior, and Risk Assessment Implications for Theory and Practice. *ResearchGate*, *34*(1), 60–75. https://doi.org/10.1177/0093854806289195

Lösel, F., & Schmucker, M. (2005). The effectiveness of treatment for sexual offenders: A comprehensive meta-analysis. *Journal of Experimental Criminology*, *1*(1), 117–146. https://doi.org/10.1007/s11292-004-6466-7

Mann, R. E., Hanson, R. K., & Thornton, D. (2010). Assessing risk for sexual recidivism: Some proposals on the nature of psychologically meaningful risk factors. *Sexual Abuse: A Journal of Research and Treatment*,*22*(2), 191-217.

Marshall, W. L. (1994). Treatment effects on denial and minimization in incarcerated sex offenders. *Behaviour Research and Therapy*, *32*(5), 559–564.

Marshall, W. L., & Barbaree, H. E. (1990). An integrated theory of the etiology of sexual offending. *Handbook of Sexual Assault: Issues, Theories, and Treatment of the Offender*, 257–275.

Marshall, W. L., & Fernandez, Y. M. (2003). Sexual preferences: Are they useful in the assessment and treatment of sexual offenders? *Aggression and Violent Behavior*, *8*(2), 131–143. https://doi.org/10.1016/S1359-1789(01)00056-8

Mason, G. (2014). Victim Attributes in Hate Crime Law Difference and the Politics of Justice. *British Journal of Criminology*, *54*(2), 161-179.

McAnulty, R. D., & Adams, H. (1991). Voluntary control of penile tumescence among homosexual and heterosexual subjects. *Archives of Sexual Behavior*, *21*(1), 17–31.

McCrae, R. R. (1991). The five-factor model and its assessment in clinical settings. *Journal of Personality Assessment*, *57*(3), 399–414.

Merdian, H. L., Curtis, C., Thakker, J., Wilson, N., & Boer, D. P. (2014). The endorsement of cognitive distortions: Comparing child pornography offenders and contact sex offenders. *Psychology, Crime & Law*, *20*(10), 971–993.

Merdian, H. L., Wilson, N., & Boer, D. P. (2009). Characteristics of internet sexual offenders: a review. *Sexual Abuse in Australia and New Zealand*, *2*(1), 34–47.

Miller, J. D., & Lynam, D. (2001). Structural Models of Personality and their Relation to Antisocial Behavior: A Meta-Analytic Review. *Criminology*, *39*, 765–798.

Miller, T. R. (1991). The psychotherapeutic utility of the five-factor model of personality: A clinician's experience. *Journal of Personality Assessment*, *57*(3), 415–433.

Mills, J. F., Loza, W., & Kroner, D. G. (2003). Predictive validity despite social desirability: evidence for the robustness of self-report among offenders. *Criminal Behaviour and Mental Health*, *13*(2), 140–150. https://doi.org/10.1002/cbm.536

Mokros, A. (2013). Die latente Struktur sexueller Präferenzstörungen am Beispiel des Sadismus und der Pädophilie. *Zeitschrift Für Sexualforschung*, *26*(02), 188–198.

Mokros, A., Dombert, B., Osterheider, M., Zappalà, A., & Santtila, P. (2010). Assessment of Pedophilic Sexual Interest with an Attentional Choice Reaction Time Task. *Archives of Sexual Behavior*, *39*(5), 1081–1090. https://doi.org/10.1007/s10508-009-9530-6

Mokros, A., Gebhard, M., Heinz, V., Marschall, R. W., Nitschke, J., Glasgow, D. V., … Laws, D. R. (2013). Computerized Assessment of Pedophilic Sexual Interest Through Self-Report and Viewing Time Reliability, Validity, and Classification Accuracy of the Affinity Program. *Sexual Abuse: A Journal of Research and Treatment*, *25*(3), 230–258. https://doi.org/10.1177/1079063212454550

Mokros, Osterheider, M., & Nitschke, J. (2012). Pädophilie. *Der Nervenarzt*, *83*(3), 355–358.

Mullen, P. E., Martin, J. L., Anderson, J. C., Romans, S. E., & Herbison, G. P. (1996). The long-term impact of the physical, emotional, and sexual abuse of children: A community study. *Child Abuse & Neglect*, *20*(1), 7–21. https://doi.org/10.1016/0145-2134(95)00112-3

Müller, K., Curry, S., Ranger, R., Briken, P., Bradford, J., & Fedoroff, J. P. (2014). Changes in Sexual Arousal as Measured by Penile Plethysmography in Men with Pedophilic Sexual Interest. *The Journal of Sexual Medicine*, *11*(5), 1221–1229. https://doi.org/10.1111/jsm.12488

Murray, J. B. (2000). Psychological Profile of Pedophiles and Child Molesters. *The Journal of Psychology*, *134*(2), 211–224. https://doi.org/10.1080/00223980009600863

Nedopil, N. (2010). *Forensische Psychiatrie: Klinik, Begutachtung und Behandlung zwischen Psychiatrie und Recht*. Georg Thieme Verlag.

Nunes, K. L., Hermann, C. A., Renee Malcom, J., & Lavoie, K. (2013). Childhood sexual victimization, pedophilic interest, and sexual recidivism. *Child Abuse & Neglect*, *37*(9), 703–711. https://doi.org/10.1016/j.chiabu.2013.01.008

Ó Ciardha, C., & Gormley, M. (2013). Measuring sexual interest using a pictorial modified Stroop task, a pictorial Implicit Association Test and a Choice Reaction Time task. *Journal of Sexual Aggression*, *19*(2), 158–170.

Ormel, J., & Wohlfarth, T. (1991). How neuroticism, long-term difficulties, and life situation change influence psychological distress: a longitudinal model. *Journal of Personality and Social Psychology*, *60*(5), 744.

Ostendorf, F., & Angleitner, A. (2004). *NEO-Persönlichkeitsinventar nach Costa und McCrae, Revidierte Fassung (NEO-PI-R)*. Hogrefe Göttingen.

Pacific Behavioral Assessment Corporation. (2004). The NRP (Not Real People) Visual Stimulus Set.

Pereda, N., Guilera, G., Forns, M., & Gómez-Benito, J. (2009). The prevalence of child sexual abuse in community and student samples: A meta-analysis. *Clinical Psychology Review*, *29*(4), 328–338.

Pflueger, M. O., Franke, I., Graf, M., & Hachtel, H. (2015). Predicting general criminal recidivism in mentally disordered offenders using a random forest approach. *BMC Psychiatry*, *15*(1), 62.

Pithers, W. D., Marques, J. K., Gibat, C. C., & Marlatt, G. A. (1983). Relapse prevention with sexual aggressives: A self-control model of treatment and maintenance of change. *The Sexual Aggressor: Current Perspectives on Treatment*, 214–239.

Ponseti J, Granert O, Jansen O, & et al. (2012). Assessment of pedophilia using hemodynamic brain response to sexual stimuli. *Archives of General Psychiatry*, *69*(2), 187–194. https://doi.org/10.1001/archgenpsychiatry.2011.130

Ponseti, J., Granert, O., Van Eimeren, T., Jansen, O., Wolff, S., Beier, K., … others. (2016). Assessing paedophilia based on the haemodynamic brain response to face images. *The World Journal of Biological Psychiatry*, *17*(1), 39–46.

Ponseti, J., Granert, O., Van Eimeren, T., Jansen, O., Wolff, S., Beier, K., … Siebner, H. (2014). Human face processing is tuned to sexual age preferences. *Biology Letters*, *10*(5), 20140200.

Pumberger, T., & Eher, R. (2013). *Meinungen von Expertinnen und Experten zur Entstehung und Relevanz pädosexueller Neigungen und Verhaltensweisen bei Männern und zu entsprechenden Ansatzpunkten für eine primäre und sekundäre Prävention [Opinions from experts on development and relevance of pedosexual preferences and behavior in men and on corresponding approaches for primary and secondary prevention]*. Institut für Gewaltforschung und Prävention.

Purcell, M. S., Chandler, J. A., & Fedoroff, J. P. (2015). The Use of Phallometric Evidence in Canadian Criminal Law. *The Journal of the American Academy of Psychiatry and the Law*, *43*(2), 141–153.

Quayle, E., & Taylor, M. (2003). Model of problematic Internet use in people with a sexual interest in children. *CyberPsychology & Behavior*, *6*(1), 93–106.

Quinsey, V. L., & Chaplin, T. C. (1988). Preventing faking in phallometric assessments of sexual preference. *Annals of the New York Academy of Sciences*, *528*(1), 49–58.

R Core Team. (2015). R: A language and environment for statistcal computing. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from http://www.R-project.org/.

Raymond, N. C., Coleman, E., Ohlerking, F., Christenson, G. A., & Miner, M. (1999). Psychiatric comorbidity in pedophilic sex offenders. *American Journal of Psychiatry, 156*(5), 786-788.

Rogosch, F. A., & Cicchetti, D. (2004). Child maltreatment and emergent personality organization: Perspectives from the five-factor model. *Journal of Abnormal Child Psychology*, *32*(2), 123–145.

Rönspies, J., Schmidt, A. F., Melnikova, A., Krumova, R., Zolfagari, A., & Banse, R. (2015). Indirect measurement of sexual orientation: Comparison of the Implicit Relational Assessment Procedure, viewing time, and choice reaction time tasks. *Archives of Sexual Behavior*, *44*(5), 1483–1492.

Rosenheim, E., & Neumann, M. (1981). Personality characteristics of sexually dysfunctioning males and their wives. *Journal of Sex Research*, *17*(2), 124–138.

Rosenzweig, S. (1942). The Photoscope as an Objective Device for Evaluating Sexual Interest. *Psychosomatic Medicine*, *4*(2), 150–158.

Rossman, B. B. R., & Rosenberg, M. S. (1998). The Multiple Victimization of Children. *Journal of Aggression, Maltreatment & Trauma*, *2*(1), 1–5. https://doi.org/10.1300/J146v02n01_01

Rosvold, H. E., Mirsky, A. F., Sarason, I., Bransome Jr, E. D., & Beck, L. H. (1956). A Continuous Performance Test of Brain Damage1'5. *Journal of Consulting Psychology, 20*(5), 343-350.

Roy, A. (2002). Childhood trauma and neuroticism as an adult: possible implication for the development of the common psychiatric disorders and suicidal behaviour. *Psychological Medicine*, *32*(08), 1471–1474. https://doi.org/10.1017/S0033291702006566

Santtila, P., Mokros, A., Viljanen, K., Koivisto, M., Sandnabba, N. K., Zappala, A., & Osterheider, M. (2009). Assessment of sexual interest using a choice reaction time task and priming: A feasibility study. *Legal and Criminological Psychology*, *14*(1), 65–82.

Sartorius, A., Ruf, M., Kief, C., Demirakca, T., Bailer, J., Ende, G., … Dressing, H. (2008). Abnormal amygdala activation profile in pedophilia. *European Archives of Psychiatry and Clinical Neuroscience*, *258*(5), 271–277.

Schaefer, G. A., Mundt, I. A., Feelgood, S., Hupp, E., Neutze, J., Ahlers, C. J., … Beier, K. M. (2010). Potential and Dunkelfeld offenders: Two neglected target groups for prevention of child sexual abuse. *International Journal of Law and Psychiatry*, *33*(3), 154–163. https://doi.org/10.1016/j.ijlp.2010.03.005

Schiffer, B., Peschel, T., Paul, T., Gizewski, E., Forsting, M., Leygraf, N., … Krueger, T. H. (2007). Structural brain abnormalities in the frontostriatal system and cerebellum in pedophilia. *Journal of Psychiatric Research*, *41*(9), 753–762.

Schiffer, B., & Vonlaufen, C. (2011). Executive Dysfunctions in Pedophilic and Nonpedophilic Child Molesters. *The Journal of Sexual Medicine*, *8*(7), 1975–1984. https://doi.org/10.1111/j.1743-6109.2010.02140.x

Schmidt, A. F., Babchishin, K. M., & Lehmann, R. J. (2017). A meta-analysis of viewing time measures of sexual interest in children. *Archives of Sexual Behavior*, *46*, 287–300.

Seto, M. C. (2008). *Pedophilia and sexual offending against children: Theory, assessment, and intervention.* American Psychological Association.

Seto, M. C. (2012). Is Pedophilia a Sexual Orientation? *Archives of Sexual Behavior*, *41*(1), 231–236. https://doi.org/10.1007/s10508-011-9882-6

Seto, M. C., Cantor, J. M., & Blanchard, R. (2006). Child pornography offenses are a valid diagnostic indicator of pedophilia. *Journal of Abnormal Psychology*, *115*(3), 610.

Seto, M. C., & Lalumière, M. L. (2010). What is so special about male adolescent sexual offending? A review and test of explanations through meta-analysis. *Psychological Bulletin*, *136*(4), 526–575. https://doi.org/10.1037/a0019700

Suchy, Y., Whittaker, J. W., Strassberg, D. S., & Eastvold, A. (2009). Neurocognitive differences between pedophilic and nonpedophilic child molesters. *Journal of the International Neuropsychological Society*, *15*(02), 248–257. https://doi.org/10.1017/S1355617709090353

Tenbergen, G., Wittfoth, M., Frieling, H., Ponseti, J., Walter, M., Walter, H., … Kruger, T. H. (2015). The neurobiology and psychology of pedophilia: recent advances and challenges. *Frontiers in Human Neuroscience*, *9*.

Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). Poly-Victimization in a National Sample of Children and Youth. *American Journal of Preventive Medicine*, *38*(3), 323–330. https://doi.org/10.1016/j.amepre.2009.11.012

van Leeuwen, M. L., van Baaren, R. B., Chakhssi, F., Loonen, M. G., Lippman, M., & Dijksterhuis, A. (2013). Assessment of implicit sexual associations in non-incarcerated pedophiles. *Archives of Sexual Behavior*, *42*(8), 1501–1507.

Van Voorhis, P., Spruance, L., Ritchie, P. N., Johnson-Listwan, S., Seabrook, R., Pealer, J., & others. (2002). The Georgia cognitive skills experiment outcome evaluation: Phase II. Cincinnati, OH: University of Cincinnati. *Center for Criminal Justice Research.*

Vassend, O., & Skrondal, A. (1999). The problem of structural indeterminacy in multidimensional symptom report instruments. The case of SCL-90-R. *Behaviour Research and Therapy*, *37*(7), 685–701. https://doi.org/10.1016/S0005-7967(98)00182-X

Walter, M., Witzel, J., Wiebking, C., Gubka, U., Rotte, M., Schiltz, K., … Northoff, G. (2007). Pedophilia is Linked to Reduced Activation in Hypothalamus and Lateral Prefrontal Cortex During Visual Erotic Stimulation. *Biological Psychiatry*, *62*(6), 698–701. https://doi.org/10.1016/j.biopsych.2006.10.018

Ward, T., & Beech, A. (2006). An integrated theory of sexual offending. *Aggression and Violent Behavior*, *11*(1), 44–63. https://doi.org/10.1016/j.avb.2005.05.002

Ward, T., Hudson, S. M., Johnston, L., & Marshall, W. L. (1997). Cognitive distortions in sex offenders: An integrative review. *Clinical Psychology Review*, *17*(5), 479–507. https://doi.org/10.1016/S0272-7358(97)81034-3

Ward, T., Mann, R. E., & Gannon, T. A. (2007). The good lives model of offender rehabilitation: Clinical implications. *Aggression and Violent Behavior*, *12*(1), 87–107. https://doi.org/10.1016/j.avb.2006.03.004

Ward, T., & Siegert, R. J. (2002). Toward a comprehensive theory of child sexual abuse: A theory knitting perspective. *Psychology, Crime and Law*, *8*(4), 319–351.

Ward, T., & Stewart, C. A. (2003). The treatment of sex offenders: Risk management and good lives. *Professional Psychology: Research and Practice*, *34*(4), 353.

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: exploring the central role of negative affectivity. *Psychological Review*, *96*(2), 234.

Whitaker, D. J., Le, B., Karl Hanson, R., Baker, C. K., McMahon, P. M., Ryan, G., … Rice, D. D. (2008). Risk factors for the perpetration of child sexual abuse: A review and meta-analysis. *Child Abuse & Neglect*, *32*(5), 529–548. https://doi.org/10.1016/j.chiabu.2007.08.005

Wilson, G. D., & Cox, D. N. (1983). Personality of paedophile club members. *Personality and Individual Differences*, *4*(3), 323–329.

Wilson, R. J. (1999). Emotional congruence in sexual offenders against children. *Sexual Abuse: A Journal of Research and Treatment*, *11*(1), 33–47.

World Health Organisation: Child and Adolescent Health. Europe. (2016).

World Health Organization. (1992). ICD-10: International statistical classification of diseases and health-related problems. *Geneva: WHO*.

ANHANG

ANHANG A-1

Publikation 1:

Boillat, C., Schwab, N., Stutz, M., Pflueger, M. O., Graf, M., & Rosburg, T. (2017). Neuroticism as a risk factor for child abuse in victims of childhood sexual abuse. *Child Abuse & Neglect, 68,* 44-54.

Neuroticism as a risk factor for child abuse in victims of childhood sexual abuse

Coralie Boillat[1], Nathalie Schwab[1], Matthias Stutz[1], Marlon O. Pflueger[1], Marc Graf[1], Timm Rosburg[1, CA]

[1] University Basel, University Psychiatric Clinics, Department of Forensic Psychiatry, Wilhelm Klein-Strasse 27, 4002 Basel, Switzerland

[CA] PD Dr. phil. Timm Rosburg, University Basel, University Psychiatric Clinics, Department of Forensic Psychiatry, Wilhelm Klein-Strasse 27, 4002 Basel, Switzerland

E-Mail: timm.rosburg@upkbs.ch; Phone number: 0041 61 325 58 24

Abstract

Findings on the relationship of experienced sexual abuse and abuse behavior in adulthood are ambiguous. However, associations between experienced abuse and neuroticism as well as between neuroticism and active child abuse have been reported repeatedly. In our study, we compared pedosexual child abusers with consumers of internet child pornography and control subjects with adult-sexual preference with regard to traumatic childhood experience (Childhood Trauma Questionnaire, CTQ), personality traits (NEO - Personality Inventory - Revised, NEO-PI-R), and sexual abnormalities (Multiphasic Sex Inventory, MSI). In an initial analysis, sexual abuse experienced in childhood was not directly linked to sexual abuse behavior in adulthood. However, this relationship was mediated by neuroticism. In a second step, the CTQ scales were conflated and, using a structural equation model, direct link between the overall level of abuse experienced in childhood (generally high CTQ levels) and sexual abuse behavior in adulthood revealed again the mediation by neurotic personality. We conclude that the overall level of abuse experienced in childhood in general, and less sexual abuse experience in particular, modulates the tendency for child sexual abuse behavior in adulthood. Data suggest that, depending on the resilience of an individual, abuse experience during childhood increases the likelihood of developing neurotic personality traits in later life, which are in turn considered to increase the risk of child sexual abuse in child sex offenders.

Keywords: child sexual assault; neuroticism; pedosexual preference; sexual abuse experiences; traumatic childhood experiences

Traumatic life experiences in childhood, as for example physical and emotional abuse, are widespread and have often negative social and health consequences (‘World Health Organization: Child and Adolescent Health. Europe.’, 2016). Anda et al. (2005) reported a prevalence of 64% of at least one traumatic childhood experience in an epidemiological US study. With regard to sexual abuse experienced prior to the age of 18 years, a meta-analysis of 65 epidemiological studies across 22 countries showed a prevalence rate of 7.9% in men and 19.7% in women, also pointing out a considerable variance of these rates across studies (Pereda, Guilera, Forns, & Gómez-Benito, 2009). In addition to acute physical injuries, such traumatic experiences, in particular by sexual abuse, have been associated with grave long-term effects such as memory loss, affective symptoms, or behavioral abnormalities, like aggression towards sexual partners (Anda et al., 2005; Browne & Finkelhor, 1987; Glaser, 2000; Mullen, Martin, Anderson, Romans, & Herbison, 1996).

In Switzerland, in 2015, 1.4% (6,756) of all convictions were based on sexually-related offences. 18.2% of these involved sexual acts against children (Art. 187 StGB) (‘BFS - Polizeiliche Kriminalstatistik (PKS) 2015’, 2016). In the public view, child abuse is often synonymous with pedophilia (Beier, Bosinski, & Loewit, 2005; Braun G., Hasebrink M., & Huxoll M., 2003; Bundschuh, 2001; Seto, 2008). However, only 12–20% of sexual crimes against children are actually committed by pedosexual perpetrators (American Psychiatric Association, 1999). Nevertheless, pedophilic preference needs to be considered as an important risk factor for repeated child abuse (Hanson & Bussiere, 1998; Hanson & Morton-Bourgon, 2005). The recurrence rate for sex crimes committed by pedosexual perpetrators is high: in homosexual pedophilia, the rate is over 50%; in heterosexual pedophilia, the rate is between 25% and 50% (Nedopil, 2010).

A prominent theory on child abuse is the presumption that especially men who were victims of sexual abuse in childhood show a higher risk of sexually abusing children themselves (Glasser et al., 2001; Seto, 2008). Several studies found evidence that experiencing sexual abuse in childhood is a risk factor for active child abuse in later life, both in adolescent and adult child abusers (Babchishin, Hanson, & Hermann, 2011; Jespersen, Lalumière, & Seto, 2009; Seto & Lalumière, 2010; Whitaker et al., 2008). This is contrasted by a prospective epidemiological study, which could not identify sexual abuse experience as a predictor for later child abuse (Leach, Stewart, & Smallbone, 2016). Also, with regard to pedophilic child abusers, previous results do not allow a reliable conclusion about how

experienced sexual abuse in childhood relates to active pedosexual abuse behavior in later life (Jespersen et al., 2009). Thus, previous findings on the relationship between experienced sexual abuse in childhood and child sexual abuse behavior in adulthood are ambiguous. Nevertheless, it has repeatedly been shown that the experience of child abuse has long-term and far-reaching effects on victims (Anda et al., 2005; Browne & Finkelhor, 1987; Glaser, 2000; Mullen et al., 1996).

For instance, previous studies have provided some evidence for an impact of sexual abuse experienced in childhood on the development of the victim's personality (Allen & Lauterbach, 2007; Becerra-García, García-León, Muela-Martínez, & Egan, 2013; Rogosch & Cicchetti, 2004). In particular, the experience of sexual abuse in childhood is associated with higher levels of neuroticism (Gamble et al., 2006; Kendler, Gardner, & Prescott, 2006; Roy, 2002). In his personality model, Hans Jürgen Eysenck conceptualized neuroticism as the lack of emotional stability, characterized by anxiety, low self-esteem, and sensitivity, as well as nervousness and restlessness (Eysenck, 1950). The experience of sexual abuse in childhood might be more devastating if, due to insufficient resilience, physical and social resources are limited, which in turn can impair the development of adequate resilience (Agaibi & Wilson, 2005; Bowen, El Komy, & Steer, 2008; Edwards, Sakasa, & Van Wyk, 2005).

Of importance, neuroticism has in turn been associated with active child abuse: Dennison, Stough, and Birgden (2001) and Becerra-García et al. (2013) reported higher neuroticism levels in convicted child abusers compared to a control group of non-offenders. Egan, Kavanagh, and Blair (2005) showed a positive correlation of increased neuroticism levels with the presence of thoughts approving sexual acts involving children in child abusers. In addition, the average neuroticism levels for child abusers determined in this study were higher compared to normative values according to the personality test applied. Previous studies, however, often did not clearly differentiate between child abusers with and without pedophilic sexual orientation. Only Wilson and Cox (1983) specified the sample and examined 77 pedophilic men, which had not yet necessarily become criminal offenders. The pedophilic men showed higher neuroticism levels compared to the male adult sexual control group.

These findings led us to the consideration that the diverging results in the literature of how experienced sexual abuse during childhood relates to own active sexual child abuse behavior might possibly be explained by a mediating influence of a person's neurotic trait. The aim of this study was to examine the influence of neuroticism on the link of sexual abuse

experience and sexual abuse behavior in pedosexual child abusers. To our knowledge this triadic interplay has not been investigated in previous studies.

Our hypothesis was that the relation between experienced sexual abuse and sexual child abuse in male pedosexual sex offenders is more likely to become apparent if the experience of abuse contributes to a neurotic personality development. To test this assumed relation, the data of adult male pedosexual sex offenders were compared to an adult heterosexual non-offending control group, as well as to a group of convicted child pornography consumers without sexual acts committed against children. The postulated relations between the three factors (experienced child abuse, neuroticism, active child abuse) were tested on the basis of a mediation analysis.

The data reported here originate from the Basel MIPS study (Measurable Indicators of Pedosexual Offenders), which intended to psychologically, neuropsychologically, and electrophysiologically differentiate child abusers with pedophilic responsiveness (Child Sexual Assaulters, CSA) and child pornography consumers without child contact (Child Sexual Exploitation Material, CSEM, users) from a non-offending heterosexual control group (Controls, CTL).

Method

Study participants

The sample consisted of n = 22 CSA, n = 21 CSEM and n = 23 CTL. Due to subsequent exclusions from the study, in case of detected organic brain deficits as well as missing information in the individual tests, the descriptive results reported here refer to a sample of n = 22 CSA, n = 20 CSEM and n = 21 CTL, and for the mediation and structural equation models to a sample of n = 21 CSA, n = 20 CSEM and n = 21 CTL. Within the framework of the Basel MIPS study, the subjects were recruited during the period of 01.06.13 to 31.12.15 in the Department of Forensic Psychiatry of the University Psychiatric Clinics Basel (Switzerland) and among outpatients. Inclusion criteria for the CSA group contained an attested or likely pedophilic disorder. The presence of a pedophile disorder was attested by the attending psychiatrist/therapist and verified by a senior forensic psychiatrist of our

research group in 19 of 21 CSA. In the remaining 2 CSA, a pedophilic disorder was considered as likely, but could not be fully confirmed: in one CSA the persistence of the pedophile symptoms over six months could not be verified, due to the fact that he was for a shorter period than six months in therapy; in a second CSA, persistent pedophile symptoms were present, but the critical age difference to the victim was minimally less than five years. All CSA had been convicted of child abuse or revealed concrete indications of child abuse (Art. 187 Swiss Penal Code, Switzerland). For an allocation into the CSEM group, a criminal conviction or concrete indications for the consumption of child pornography was required (Art. 197 Swiss Penal Code, Switzerland). A relevant pedophilic responsiveness was not an inclusion criterion for the CSEM group. In addition to the consumption of child pornography, two participants of the CSEM group were also guilty of abusing adolescent victims (all victims were in the age-range of 14 to 15 years old). For these two participants, evidence for a pedophilic disorder was scarce. The CTL group consisted of subjects from the general population with adult heterosexual orientation, recruited by means of a newspaper advertisement. All participants were male and between the age of 18 and 55 years. They showed no neurological or psychiatric deficits and were not taking any medication that could have affected the cognitive performance. With regard to number of years of training or education received as well as with regard to verbal and non-verbal intelligence, the three groups were similar and did not differ significantly. The median value of age of the control group was ten years below the median value of the two index groups ($p = .039$) (Table 1).

- insert Table 1 here -

Measuring instruments

During a two-day individual examination, data were collected from 35 different tests and questionnaires. The findings reported here are limited to the following three measuring instruments:

The *Childhood Trauma Questionnaire* (*CTQ;* Bernstein & Fink, 1998) is a self-assessment questionnaire which, based on 28 questions, retrospectively captures the experience of *sexual/physical/emotional abuse* as well as *physical and emotional neglect* during childhood. The answers are indicated on a 5-step Likert scale (*never true* to *very often*

true). Higher values describe a higher extent of abuse/neglect experience. In addition, the tendency for socially desirable response behavior is measured by means of three items.

The *NEO – Personality Inventory – Revised* (*NEO-PI-R;* Ostendorf & Angleitner, 2004) is a self-assessment questionnaire, which uses 241 questions to capture the levels of the five personality factors: *neuroticism, conscientiousness, agreeableness, extraversion* and *openness to experience*. The answers are indicated on a 5-step Likert scale (*strongly agree* to *strongly disagree*). T-norms of an overall norm sample of n = 11,724 are available.

The *Multiphasic Sex Inventory* (*MSI;* Deegener, 1996) is a self-assessment questionnaire for capturing psycho-sexual characteristics and behavioral abnormalities in sex offenders. Based on 300 questions, the scales *Paraphilias (Sexual Deviance), Paraphilias (Atypical Sexual Behavior) and Sexual Dysfunctions*, as well as *Validity* scales were recorded by means of *true*/*false* responses. Validity scales capture specific response tendencies such as socially desirable response behavior or tendencies to lying and justification. The *Paraphilias* scale *(Sexual Deviance)* is further subdivided into *Child Molest, Rape* and *Exhibitionism.* Standard tables of students, sex abusers as well as rapists are available for the interpretation of the obtained scores.

Analysis

In a first step, the three examined groups CSA, CSEM and CTL were described and compared with each other in terms of CTQ, NEO-PI-R as well as the MSI scales *child molest*. In a second step, the relation of the scale of experienced *Sexual Abuse* (CTQ) and the sub-scale *Sexual Assault/Attack* (MSI) was examined. Based on the raw values in the *Sexual Abuse* scale, the subjects were assigned to the category “without experience of abuse” or to the category “with experience of at least minor abuse”. Then, the values of the *Neuroticism* (NEO-PI-R) scale for subjects with experience of sexual abuse were compared to the neuroticism values of subjects without such experience. Afterwards, *neuroticism* was introduced as a mediating variable for the relation of experienced s*exual abuse* as independent variable with *sexual assault/attack* as dependent variable. Thereafter, a structural equation model was checked with the five scales of the CTQ and latent variable e*xperienced abuse*. Finally, *neuroticism* was again introduced as a mediator into the structural equation model. The mediating influence of the other four NEO-PI-R scales was examined in the total sample.

The statistical analyses were performed using the calculation software *R* and the structural equation model was analyzed with the *lavaan* package (R Core Team, 2015). For group comparisons, we used the Kruskal-Wallis test; *p*-values were corrected for multiple paired comparisons according to Benjamini and Hochberg (Benjamini & Hochberg, 1995).

Results

CTQ group comparison

The three examined groups did not differ significantly in the raw values of the individual scales *Sexual/Emotional/Physical Abuse* as well as *Emotional/Physical Neglect* (data not shown). All three groups had a value of zero in the *Lie* scale, which indicates honest responses to the questions. Significant group differences with regard to *Emotional* and *Physical Abuse* and *Physical Neglect* were, however, observed when the sample was dichotomized into participants with at least minor abuse/neglect and those without any such abuse/neglect experience. A higher percentage of participants in the CSA as well as in the CSEM group reported at least minor experience of e*motional abuse* (CSA: $p = .032$, CSEM: $p = .022$), and a higher percentage of the CSA group reported at least minor experience of *physical abuse* (CSA: $p = .014$) than the control group (Table 2). When combining the two index groups to one group and compared to the control group, in addition to significant differences in the scales of *Emotional* ($p = .010$) and *Physical Abuse* ($p = .011$), also a difference in the *Physical Neglect* scale ($p = .040$) was shown. However, the percentage of *sexual abuse* as well as *emotional neglect* in the three groups did not differ significantly. The high percentage of *emotional neglect* across all three groups is notable. The two sex offender groups did not differ in any CTQ scale.

- insert Table 2 here -

NEO-PI-R group comparison

The age-corrected personality profiles showed significant group differences in the scales *Conscientiousness* and *Neuroticism* (Figure 1). Compared to the control group, both the CSA and CSEM group showed significantly lower values on the *Conscientiousness* scale (CSA: T

= 48, CSEM: T = 46, CTL: T = 57, χ^2 = 11.8, 2, p = .003) and significantly higher values on the *Neuroticism* scale (CSA: T = 52, CSEM: T = 54, CTL: T = 43, χ^2 = 11.8, 2, p = .003). No other differences between the index groups and control subjects were revealed. In addition, the two index groups did not show significant differences in one of the five personality factors. However, it is important to note that most group median values were within +/- one standard deviation of the average of the norm sample (T > 60 or T < 40). Five subjects of the CSA group and five subjects of the CSEM group had *t*-values < 40 on the *Conscientiousness* scale, and six subjects of the CSA as well as four subjects of the CSEM group had *t*-values > 60 on the *Neuroticism* scale.

- insert Figure 1 here -

MSI group comparison

The MSI divides the sexual deviance scale *Child Molest* into four progression levels: *Fantasy*, *Grooming*, *Sexual Assault/Attack, as well as Aggravated Sexual Assault* and *Incest*. The control group stated, as expected, no sexual fantasies involving children, whereas the both index groups did (Table 3). The three groups did not significantly differ in the next progression level, *grooming*, which covers the areas of sneaking around, stalking and persuasion tactics, but also includes items such as “children generally liked me and wanted to be with me”. With regard to the sub-scales *Sexual Assault/Attack* as well as *Aggravated Sexual Assault* and *Incest*, only the CSA group showed median values greater than zero (p = .001) and varied from the two other groups (CSEM users and controls). The slightly increased values of the CSEM group on the *Sexual Assault/Attack* and *Aggravated Sexual Assault* scales can be referred to the two CSEM subjects who, in addition to the consumption of child pornography, were also guilty of abusing adolescent victims. A pedophilic disorder in these subjects was excluded in both cases by the treating psychiatrist. Two control subjects answered with “no” to the item from the *Sexual Assault/Attack* scale: “I have never exposed myself to a child”, which explains values > 0 of control subjects in this scale. The high value on the *Incest* scale in the CSEM group can be explained with the associated item in the scale: “I have never thought of sexually touching a child (children) in my family”, which was answered with “no” by several participants in this group. Compared to the control group, both index groups showed a stronger preference for girls (p < .001) and a less strong, but still significantly higher interest in boys (p = .002). The control group indicated no sexual interest

in children, regardless of gender. The values > 0 in the CSEM group and control group in the same scales are due to the fact that the scales also contain questions about fooling around, tickling or feelings of sexual attraction, in addition to questions on sexual harassment.

- insert Table 3 here -

Relation of experienced sexual abuse with personality traits

To identify neuroticism as a possible mediator of the relation between experienced *sexual abuse* and *sexual assault/attack,* the group average values of *neuroticism* were first compared between subjects with at least minor experience of *sexual abuse* and *subjects without sexual abuse experience.* The subjects of the CSA group with *sexual abuse experience* had significantly higher neuroticism scores compared to CSA subjects without sexual abuse experience (p = .025). The same pattern, although less pronounced, was found after combining the two index groups to one group (p = .047). No association of *sexual abuse* with the other NEO-PI-R scales was revealed.

Mediation model

In our analysis, we found no evidence for a direct link between experienced *sexual abuse* and *sexual assault/attack* in the study sample (t = -1.53, 24.6, p = .139). However, the structural equation models for experienced *sexual abuse* and *neuroticism* (z = 2.69, p = .007) as well as for *neuroticism* and *sexual assault/attack* (z = 2.72, p = .007) were significant (Figure 2, top left). According to this model, *neuroticism* provides a link between experienced sexual abuse in childhood and active child sexual abuse.

We further examined the mediating influence of *neuroticism* on the relation between other kinds of abuse/neglect experience and *sexual assault/attack* and revealed similar mediating effect of neuroticism, as described for the relation of experienced *sexual abuse* and *sexual assault/attack.* We found *neuroticism* as a significant mediator for the link between experienced *emotional abuse* and *sexual assault/attack (emotional abuse* with *neuroticism:* z = 2.72, p = .007; *neuroticism* with *sexual assault/attack:* z = 2.68, p = .007), for the relationship between experienced *physical neglect* and *sexual assault/attack (physical neglect* with *neuroticism:* z = 2.83, p = .005; *neuroticism* with *sexual assault/attack*: z = 2.76, p = .006), and for the link between experienced *emotional neglect* and sexual assault/attack

(emotional neglect with *neuroticism*: z = 2.07, *p* = .039; *neuroticism* with *sexual assault/attack:* z = 2.94, *p* = .003) (Figure 2). The other personality factors showed, in contrast, no mediating influence on the relationships between the different CTQ scales and *sexual assault/attack*.

- insert Figure 2 here -

Structural equation model

Subsequently, the five scales of the CTQ were modeled as indicators of a single, latent variable. The structural model created the relationship of the latent variable *abuse experienced* with the dependent variable *sexual assault/attack.* The results are shown in a path diagram with the standardized coefficients in Figure 3. In the first model (Figure3, top), which examines the direct relation between the latent and dependent variable, the common global chi-square value (χ^2), quotient of the χ^2 value with the degrees of freedom (df), comparative fit index (CFI), Goodness-of-Fit Index (GFI), as well as the root mean square error of approximation (RMSEA), showed an acceptable level of goodness of fit of the model structure. *Emotional abuse* was fixed with the latent variable *experienced abuse.* The factor loads of *physical abuse* (z = 4.45, *p* < .001), *sexual abuse (*z = 4.32, *p* < .001), *emotional neglect* (z= 3.18, *p* = .001) and *physical neglect* (z = 4.20, *p* < .001) were not fixed but freely variable. *Experienced abuse* predicted without mediating variable, *sexual assault/attack* (z = 2.47, *p* = .013). In a second model (Figure 3, bottom), the personality factor *neuroticism* was added as a mediator to the existing structural equation model. *Emotional abuse* was again fixed to the latent variable of *experienced abuse* and the factor loads of *physical neglect* (z = 4.42, *p* < .001), *sexual abuse* (z = 4.41, *p* < .001), *emotional neglect* (z = 3.26, *p* = .001) and *physical neglect* (z = 4.34, *p* < .001) were freely variable. The direct association of *experienced abuse* and *sexual assault/attack* was no longer significant (z = 1.50, *p* = .133). In contrast, *experienced abuse* significantly predicted *neuroticism* (z = 3.20, *p* = .001), and *neuroticism* significantly predicted *sexual assault/attack* (z = 2.06, *p* = .040). The goodness of fit criteria of the model to which the mediator *neuroticism* had been added, improved and could now be classified as good.

- insert Figure 3 here -

The mediating influence of alternative personality factors of the NEO-PI-R was examined and excluded.

Discussion

In summary, during childhood, participants of CSA group had significantly more often been victims of emotional and physical abuse, as compared to controls. Moreover, the combined index groups had more often become victims of physical neglect. However, with regard to sexual trauma in childhood, no significant group differences were detected. On the personality level, both index groups were shown to be more neurotic and less conscientious than the control group, whereby the values of most subjects, no matter from which group, were in the normal range.

A direct link between sexual abuse experienced in childhood and sexual abuse behavior against children in adulthood, which has been repeatedly reported in literature (e.g., Burton, 2003) could not be confirmed in our sample. When subdividing the CSA subjects into a group with at least minor sexual abuse experience and into a group without sexual abuse experience, a significantly higher neuroticism average value could be detected in the first group, which suggests that the experience of sexual abuse is possibly linked to this personality trait. The examination of the personality factor *neuroticism* as a mediating variable of the relation between experienced *sexual abuse* and *sexual assault/attack* confirmed neuroticism as a mediator in our study sample. However, as other experiences of abuse and neglect in childhood were also associated with increased *neuroticism,* the five CTQ scales were combined in our mathematical model to one latent variable (*experienced abuse*). By means of a structural equation model, a significant direct correlation between the latent variable of *experienced abuse* and *sexual assault/attack* could be demonstrated. However, this correlation lost its significance after the personality factor *neuroticism* was introduced as a mediating variable. A mediating influence of other NEO-PI-R personality factors could not be detected.

In summary, it has to be stated that to a lesser extent specifically sexual abuse experience, but rather the experience of abuse and neglect during childhood in general, mediated by a neurotic personality trait, was associated with active child sexual abuse behavior.

The experience of sexual abuse in childhood appears to have some impact on child sexual abuse in later life, however, the sexual abuse experience is neither a necessary, nor a sufficient precondition for child sexual abuse (Jespersen et al., 2009). The importance of a holistic consideration of experienced abuse in childhood is supported by studies which emphasize that sexual abuse rarely occurs as an isolated event, but often comes with additional negative experiences, such as the experience of other kinds of abuse (Jespersen et al., 2009). Moreover, previous studies mostly focused on one exclusive type of abuse experience, without considering poly-victimization (Finkelhor, Ormrod, & Turner, 2007; Rossman & Rosenberg, 1998; Turner, Finkelhor, & Ormrod, 2010). Interviews with 4,053 2- to 17-year-old children/adolescents (or their parents) showed that 80% of the surveyed children/adolescents experienced at least one type of abuse, whereby 66% became victims of more than one, 30% of more than five and 10% of more than eleven different types of abuse (Turner et al., 2010). Häuser, Schmutzer, Brähler, and Glaesmer (2011) reported, within the framework of a study of a German sample (n = 2,504), a significant correlation in the frequency of all measured types of abuse and neglect ($p < .001$), which shows that different abuse experiences are in relation to each other. The relevance of multiple experiences of abuse is also emphasized by study results which draw attention to an increased risk of later sexual abuse by victims of various types of abuse compared to victims of one (repeated) type of abuse (Leach et al., 2016). In a sample of 615 sexually abused men, 3.9% of the men, who were additionally victims of other types of abuse (53.5%), committed a sexual offence in adulthood, compared to 0.7% of men who had exclusively experienced sexual abuse (46.5%). Not the gravity of the individual abuse experiences, but the experience of multiple types of abuse, increased the risk for sexual assaults in later life, according to this study (Leach et al., 2016). The often missing creation of a complete abuse profile could offer an explanation for the to-date conflicting results of the relationship between experienced sexual abuse and active sexual abuse behavior.

The results reported here, however, also point to an association between the experience of abuse with increased neuroticism levels. Allen and Lauterbach (2007) were little surprised that people who experienced abuse showed higher levels of neuroticism, as this personality trait has similarities to the symptoms of depression and the relation of post-traumatic stress disorders and depression have repeatedly been demonstrated (e.g., Brunello et al., 2001). A person with increased neuroticism characteristics can find it difficult, based on their emotional instability and their propensity to insecurity/anxiety, to build and maintain relationships with adults. Exerting influence and gaining respect is usually met with less

resistance in children, whereby emotional and sexual needs might more easily be satisfied (Dennison et al., 2001). In addition, lack of skills and opportunities to fulfill and secure their primary goods of emotional stability (good of inner peace), intimate relationships (good of friendship) or mastery (good of excellence in play and work) in a socially acceptable manner are supposed to be characteristics of child molesters (Ward & Stewart, 2003).

Abuse in childhood, especially sexual abuse, increases, depending on the resilience of the affected person (DuMont et al., 2007), the probability of various psychological disorders (Collishaw et al., 2007), such as for example personality disorders in adulthood (Johnson, Cohen, Brown, Smailes, & Bernstein, 1999). A lack of resilience itself can be considered as a personality expression or might also be due to the experience of abuse in childhood, and thus contribute to the development of negative long-term consequences (Collishaw et al., 2007; DuMont et al., 2007). In agreement with this, Collishaw et al. (2007) report that individuals who experienced abuse and show increased neuroticism levels, are significantly less resilient against psychological disorders in adulthood.

Both, the combination and the consideration of all surveyed types of abuse, as well as a neurotic personality trait, emerged to be relevant for the explanation between the relation of experienced abuse in childhood and active sexual child abuse in adulthood in our investigated sample of pedosexual child abusers.

Costa (1991), McCrae (1991) and also Dennison et al. (2001) emphasized that the knowledge of the NEO personality factor characteristics of patients and offenders can be of use in developing and optimizing treatment methods. Miller (1991) suggests concrete treatment adjustments for each of the five personality factors. For patients with high neuroticism levels, the objectives should be defined as clearly and realistically as possible and the focus of the treatment should be on anxiety or mood swings. This is in line with the Good Life Model (Ward, 2002) which points out that treatment should enable an offender to secure important primary goods in acceptable ways, e.g. by targeting an improvement of their instable mood, their intimacy deficits, or their social isolation (Ward, Mann, & Gannon, 2007; Ward & Stewart, 2003). The Good Life Model suggests that the objective of achieving primary goods, speaks directly to the offenders' self-interest, which can motivate child sex offenders to adopt adequate new skills. Knowledge about such deficits in personality and social interaction is particularly important because the probability of relapse is increased in high risk sex offenders with sexual abuse experience, as well as in sex offenders with victims under the age of 15 (Nunes, Hermann, Renee Malcom, & Lavoie, 2013), and the adequate

treatment of sex offenders reduces the risk of relapse (Hall, 1995; Hanson et al., 2002; Hanson & Morton-Bourgon, 2005).

A point which needs to be critically reflected on in the current study, as well as in the aforementioned studies, is the fact that offenders tend to lie or represent themselves in a better light when portraying themselves (Mills, Loza, & Kroner, 2003). Study findings on this are, however, not necessarily clear. On the one hand, a greater tendency to socially desired response behavior in offenders was shown (e.g., Haapasalo, 1990), on the other hand, the validity of self-information of offenders was emphasized (e.g., Mills et al., 2003). Also in the study reported here, there is a potential risk of socially desirable response behavior of the convicted subjects, for example motivated by the belief that, despite anonymization of the data, dissimulating would have a positive effect on their prison sentence. Furthermore, the retrospective collection of experienced abuse in childhood is susceptible to false statements, due to cognitive distortions or even deliberate concealment (e.g. because of shame) (Hardt & Rutter, 2004). Leach et al. (2016) pointed out that studies with sex offenders which collect the sexual abuse experience by means of retrospective self-information, might overestimate the association of sexual abuse experience and active sexual child abuse. The tendency to trivialize and deny is measured with three items in the CTQ. The results of these items in our three study groups indicated, however, honest responses to our questions.

In addition to the mentioned methodological limitation, the definitions of the examined groups have to be critically considered. The participants of both index groups were known to the authorities or had been convicted for their offences, which resulted in a pre-selection of the sample. Moreover, two of the CSEM participants admitted sexual abuse of adolescent victims. However, other CSEM participants might as well have sexually abused children, without having been identified as sexual child abuser by the authorities and without admitting it to the researchers. In this respect, we were dependent on the subjects' honesty. The median age of the control group was ten years below the median age of the two index groups, which might have led to some overestimation or underestimation of group differences in the NEO-PI-R scales. However, age has apparently little influence on neuroticism scores (Donnellan & Lucas, 2008). Moreover, even though CSA reported twice the level of sexual victimization than the other two groups, the difference did not reach significance, which could be due to our small sample size and limited statistical power. The lack of statistical power could also be considered as a reason for the absence of a direct influence of experienced

sexual abuse on child sexual abuse behavior in later life in our mediation model. Contrariwise, there is the possibility of some random results, due to multiple testing. Given this, we consider a replication of the current findings in a larger, independent sample would be highly desirable.

Conclusion and outlook

Jespersen et al. (2009) suspected that individual differences played an important role for the missing direct link between sexual abuse experienced in childhood and sexual abuse behavior in adulthood. The results reported here suggest a mediating influence of a neurotic personality in the relation of sexual abuse experienced in childhood and active sexual child abuse in adulthood in pedosexual sex offenders. Moreover, the experienced abuse profile as a whole, and rather than sexual abuse on its own, appears to increase the likelihood of active child abuse in adulthood. The relation of experienced abuse in childhood and sexual abuse behavior in adulthood was again found to be mediated by neurotic personality. The interaction of different traumatic childhood experiences as well as the influence of a neurotic personality might be a reason for previously reported, conflicting results on the association between experienced sexual abuse and sexual abuse behavior against children.

Whether a neurotic personality is predisposed for experiencing sexual abuse or whether sexual abuse experience increases the probability of developing a neurotic personality, would be an interesting issue for future long-term studies (Jespersen et al., 2009). In addition, knowledge about the complete abuse profile, as well as about neurotic personality would provide valuable starting points for the optimization of treatment, in order to improve therapeutic success and to reduce recurrence rates.

References

Agaibi, C. E., & Wilson, J. P. (2005). Trauma, PTSD, and resilience a review of the literature. *Trauma, Violence, & Abuse*, *6*(3), 195–216.

Allen, B., & Lauterbach, D. (2007). Personality characteristics of adult survivors of childhood trauma. *Journal of Traumatic Stress*, *20*(4), 587–595. https://doi.org/10.1002/jts.20195

American Psychiatric Association. (1999). *Dangerous Sex Offenders: A Task Force Report of the American Psychiatric Association* (First). American Psychiatric Pub.

Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., … Giles, W. H. (2005). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, *256*(3), 174–186. https://doi.org/10.1007/s00406-005-0624-4

Babchishin, K. M., Hanson, K. R., & Hermann, C. A. (2011). The Characteristics of Online Sex Offenders: A Meta-Analysis. *Sexual Abuse: A Journal of Research and Treatment*, *23*(1), 92–123. https://doi.org/10.1177/1079063210370708

Becerra-García, J. A., García-León, A., Muela-Martínez, J. A., & Egan, V. (2013). A controlled study of the Big Five personality dimensions in sex offenders, non-sex offenders and non-offenders: relationship with offending behaviour and childhood abuse. *The Journal of Forensic Psychiatry & Psychology*, *24*(2), 233–246. https://doi.org/10.1080/14789949.2013.764463

Beier, K. M., Bosinski, H. A. G., & Loewit, K. (2005). *Sexualmedizin–Grundlagen und Praxis, 2. überarb. Aufl*. Urban & Fischer, München.

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society. Series B (Methodological)*, 289–300.

Bernstein, D. P., & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-report: Manual*. Psychological Corporation.

BFS - Polizeiliche Kriminalstatistik (PKS) 2015. (2016, March 21). Retrieved 6 June 2016, from http://www.bfs.admin.ch/bfs/portal/de/index/themen/19/03/02/key/02.html

Bowen, E., El Komy, M., & Steer, C. (2008). *Characteristics associated with resilience in children at high risk of involvement in anti-social and other problem behaviour*.

Braun G., Hasebrink M., & Huxoll M. (2003). *Pädosexualität ist Gewalt: (Wie) Kann die Jugendhilfe schützen?* (1.). Beltz Verlag.

Browne, A., & Finkelhor, D. (1987). Impact of child sexual abuse: A review of the research. *Annual Progress in Child Psychiatry and Child Development, 1987*, 555–584.

Brunello, N., Davidson, J. R. T., Deahl, M., Kessler, R. C., Mendlewicz, J., Racagni, G., … Zohar, J. (2001). Posttraumatic Stress Disorder: Diagnosis and Epidemiology, Comorbidity and Social Consequences, Biology and Treatment. *Neuropsychobiology*, *43*(3), 150–162. https://doi.org/10.1159/000054884

Bundschuh, C. (2001). *Pädosexualität: Entstehungsbedingungen und Erscheinungsformen*. Opladen: Leske + Budrich.

Burton, D. L. (2003). Male Adolescents: Sexual Victimization and Subsequent Sexual Abuse. *Child and Adolescent Social Work Journal*, *20*(4), 277–296. https://doi.org/10.1023/A:1024556909087

Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse & Neglect*, *31*(3), 211–229.

Costa, P. T. J. (1991). Clinical use of the five-factor model: An introduction. *Journal of Personality Assessment*, *57*(3), 393–398.

Deegener, G. (1996). *Multiphasic sex inventory (MSI): Fragebogen zur Erfassung psychosexueller Merkmale bei Sexualtätern: Handbuch*. Hogrefe, Verlag für Psychologie.

Dennison, S. M., Stough, C., & Birgden, A. (2001). The big 5 dimensional personality approach to understanding sex offenders. *Psychology, Crime & Law*, *7*(1–4), 243–261. https://doi.org/10.1080/10683160108401796

Donnellan, M. B., & Lucas, R. E. (2008). Age differences in the Big Five across the life span: evidence from two national samples. *Psychology and Aging*, *23*(3), 558.

DuMont, K. A., Widom, C. S., & Czaja, S. J. (2007). Predictors of resilience in abused and neglected children grown-up: The role of individual and neighborhood characteristics. *Child Abuse & Neglect*, *31*(3), 255–274. https://doi.org/10.1016/j.chiabu.2005.11.015

Edwards, D., Sakasa, P., & Van Wyk, G. (2005). Trauma, resilience and vulnerability to PTSD: A review and clinical case analysis. *Journal of Psychology in Africa*, *15*(2), 143–153.

Egan, V., Kavanagh, B., & Blair, M. (2005). Sexual Offenders Against Children: The Influence of Personality and Obsessionality on Cognitive Distortions. *Sexual Abuse: A Journal of Research and Treatment*, *17*(3), 223–240. https://doi.org/10.1177/107906320501700301

Eysenck, H. J. (1950). *Dimensions of Personality*. Transaction Publishers.

Finkelhor, D., Ormrod, R. K., & Turner, H. A. (2007). Poly-victimization: A neglected component in child victimization. *Child Abuse & Neglect*, *31*(1), 7–26.

Gamble, S. A., Talbot, N. L., Duberstein, P. R., Conner, K. R., Franus, N., Beckman, A. M., & Conwell, Y. (2006). Childhood Sexual Abuse and Depressive Symptom Severity: The Role of Neuroticism. *The Journal of Nervous and Mental Disease*, *194*(5), 382–385. https://doi.org/10.1097/01.nmd.0000218058.96252.ac

Glaser, D. (2000). Child Abuse and Neglect and the Brain—A Review. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *41*(01), 97–116. https://doi.org/null

Glasser, M., Kolvin, I., Campbell, D., Glasser, A., Leitch, I., & Farrelly, S. (2001). Cycle of child sexual abuse: links between being a victim and becoming a perpetrator. *The British Journal of Psychiatry*, *179*(6), 482–494. https://doi.org/10.1192/bjp.179.6.482

Haapasalo, J. (1990). Sensation seeking and Eysenck's personality dimensions in an offender sample. *Personality and Individual Differences*, *11*(1), 81–84. https://doi.org/10.1016/0191-8869(90)90171-M

Hall, G. C. N. (1995). Sexual offender recidivism revisited: a meta-analysis of recent treatment studies. *Journal of Consulting and Clinical Psychology*, *63*(5), 802.

Hanson, R. K., & Bussiere, M. T. (1998). Predicting Relapse: A Meta-Analysis of Sexual Offender Recidivism Studies. *Journal of Consulting*, *66*(2), 348–362. https://doi.org/10.1037/0022-006X.66.2.348

Hanson, R. K., Gordon, A., Harris, A. J., Marques, J. K., Murphy, W., Quinsey, V. L., & Seto, M. C. (2002). First report of the collaborative outcome data project on the effectiveness of psychological treatment for sex offenders. *Sexual Abuse: A Journal of Research and Treatment*, *14*(2), 169–194.

Hanson, R. K., & Morton-Bourgon, K. E. (2005). The characteristics of persistent sexual offenders: a meta-analysis of recidivism studies. *Journal of Consulting and Clinical Psychology*, *73*(6), 1154.

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of Child Psychology and Psychiatry*, *45*(2), 260–273. https://doi.org/10.1111/j.1469-7610.2004.00218.x

Häuser, W., Schmutzer, G., Brähler, E., & Glaesmer, H. (2011). Misshandlungen in Kindheit und Jugend. *Dtsch Arztebl*, *108*, 17.

Jespersen, A. F., Lalumière, M. L., & Seto, M. C. (2009). Sexual abuse history among adult sex offenders and non-sex offenders: A meta-analysis. *Child Abuse & Neglect*, *33*(3), 179–192. https://doi.org/10.1016/j.chiabu.2008.07.004

Johnson, J. G., Cohen, P., Brown, J., Smailes, E. M., & Bernstein, D. P. (1999). Childhood maltreatment increases risk for personality disorders during early adulthood. *Archives of General Psychiatry*, *56*(7), 600–606. https://doi.org/10.1001/archpsyc.56.7.600

Kendler, K. S., Gardner, C. O., & Prescott, C. A. (2006). Toward a Comprehensive Developmental Model for Major Depression in Men. *American Journal of Psychiatry*, *163*(1), 115–124. https://doi.org/10.1176/appi.ajp.163.1.115

Leach, C., Stewart, A., & Smallbone, S. (2016). Testing the sexually abused-sexual abuser hypothesis: A prospective longitudinal birth cohort study. *Child Abuse & Neglect*, *51*, 144–153. https://doi.org/10.1016/j.chiabu.2015.10.024

McCrae, R. R. (1991). The five-factor model and its assessment in clinical settings. *Journal of Personality Assessment*, *57*(3), 399–414.

Miller, T. R. (1991). The psychotherapeutic utility of the five-factor model of personality: A clinician's experience. *Journal of Personality Assessment*, *57*(3), 415–433.

Mills, J. F., Loza, W., & Kroner, D. G. (2003). Predictive validity despite social desirability: evidence for the robustness of self-report among offenders. *Criminal Behaviour and Mental Health*, *13*(2), 140–150. https://doi.org/10.1002/cbm.536

Mullen, P. E., Martin, J. L., Anderson, J. C., Romans, S. E., & Herbison, G. P. (1996). The long-term impact of the physical, emotional, and sexual abuse of children: A community study. *Child Abuse & Neglect*, *20*(1), 7–21. https://doi.org/10.1016/0145-2134(95)00112-3

Nedopil, N. (2010). *Forensische Psychiatrie: Klinik, Begutachtung und Behandlung zwischen Psychiatrie und Recht*. Georg Thieme Verlag.

Nunes, K. L., Hermann, C. A., Renee Malcom, J., & Lavoie, K. (2013). Childhood sexual victimization, pedophilic interest, and sexual recidivism. *Child Abuse & Neglect*, *37*(9), 703–711. https://doi.org/10.1016/j.chiabu.2013.01.008

Ostendorf, F., & Angleitner, A. (2004). *NEO-Persönlichkeitsinventar nach Costa und McCrae, Revidierte Fassung (NEO-PI-R)*. Hogrefe Göttingen.

Pereda, N., Guilera, G., Forns, M., & Gómez-Benito, J. (2009). The prevalence of child sexual abuse in community and student samples: A meta-analysis. *Clinical Psychology Review*, *29*(4), 328–338.

R Core Team. (2015). R: A language and environment for statistcal computing. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from http://www.R-project.org/.

Rogosch, F. A., & Cicchetti, D. (2004). Child maltreatment and emergent personality organization: Perspectives from the five-factor model. *Journal of Abnormal Child Psychology*, *32*(2), 123–145.

Rossman, B. B. R., & Rosenberg, M. S. (1998). The Multiple Victimization of Children. *Journal of Aggression, Maltreatment & Trauma*, *2*(1), 1–5. https://doi.org/10.1300/J146v02n01_01

Roy, A. (2002). Childhood trauma and neuroticism as an adult: possible implication for the development of the common psychiatric disorders and suicidal behaviour. *Psychological Medicine*, *32*(08), 1471–1474. https://doi.org/10.1017/S0033291702006566

Seto, M. C. (2008). *Pedophilia and sexual offending against children: Theory, assessment, and intervention.* American Psychological Association.

Seto, M. C., & Lalumière, M. L. (2010). What is so special about male adolescent sexual offending? A review and test of explanations through meta-analysis. *Psychological Bulletin*, *136*(4), 526–575. https://doi.org/10.1037/a0019700

Turner, H. A., Finkelhor, D., & Ormrod, R. (2010). Poly-Victimization in a National Sample of Children and Youth. *American Journal of Preventive Medicine*, *38*(3), 323–330. https://doi.org/10.1016/j.amepre.2009.11.012

Ward, T. (2002). Good lives and the rehabilitation of offenders: Promises and problems. *Aggression and Violent Behavior*, *7*(5), 513–528. https://doi.org/10.1016/S1359-1789(01)00076-3

Ward, T., Mann, R. E., & Gannon, T. A. (2007). The good lives model of offender rehabilitation: Clinical implications. *Aggression and Violent Behavior*, *12*(1), 87–107. https://doi.org/10.1016/j.avb.2006.03.004

Ward, T., & Stewart, C. A. (2003). The treatment of sex offenders: Risk management and good lives. *Professional Psychology: Research and Practice*, *34*(4), 353.

Whitaker, D. J., Le, B., Karl Hanson, R., Baker, C. K., McMahon, P. M., Ryan, G., … Rice, D. D. (2008). Risk factors for the perpetration of child sexual abuse: A review and meta-analysis. *Child Abuse & Neglect*, *32*(5), 529–548. https://doi.org/10.1016/j.chiabu.2007.08.005

Wilson, G. D., & Cox, D. N. (1983). Personality of paedophile club members. *Personality and Individual Differences*, *4*(3), 323–329.

World Health Organisation: Child and Adolescent Health. Europe. (2016).

Table 1

Demographic data: Median values with the relevant minimum and maximum values per group and differences between the groups

Demographics	CSA (N = 22)		CSEM (N = 21)		CTL (N = 21)		group comparison demographics [a]		
							CSA vs. CTL	CSEM vs. CTL	CSA vs. CSEM
	Md	(range)	Md	(range)	Md	(range)			
Age	36.5	(18-55)	36.0	(21-53)	26.0	(18-49)	1.89	4.86	0.20
Years of training	12.0	(10-17)	13.0	(10-23)	13.0	(10-21)	1.36	0.04	0.60
Verbal IQ	102.0	(91-130)	112.0	(64-136)	104.0	(89-130)	0.13	1.51	1.80
Non-verbal IQ	116.0	(94-135)	116.0	(66-138)	114.0	(102-131)	0.39	0.03	0.17

[a] Kruskal-Wallis Test: χ^2 –values, df = 1

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2

Childhood Trauma Questionnaire (CTQ): Percentage of study participants who had experienced at least minor abuse/neglect

CTQ	CSA (N = 22)	CSEM (N = 20)	CTL (N = 21)	group comparison CTQ [a]		
				CSA vs. CTL	CSEM vs. CTL	CSA vs. CSEM
Emotional abuse	36.4%	42.1%	4.8%	4.71*	5.98*	0.00
Physical abuse	54.5%	35.0%	9.5%	7.97*	2.54	0.92
Sexual abuse	40.9%	30.0%	19.0%	1.51	2.20	0.17
Emotional neglect	68.2%	65.0%	57.1%	0.19	0.04	0.00
Physical neglect	59.1%	60.0%	28.6%	2.91	2.93	0.00

[a] Chi-Quadrat Test: χ^2 –value, df = 1

* $p < .05$, ** $p < .01$, *** $p < .001$ (p-value corrected for multiple pair comparisons according to Benjamini and Hochberg)

Table 3

Multiphasic Sex Inventory (MSI): Median values with the relevant minimum and maximum values per group and differences between the three groups. Comment: Scores are converted to percentages (% of the maximum item score)

MSI	CSA (N = 22)		CSEM (N = 20)		CTL (N = 21)		group comparison MSI [a]		
							CSA vs. CTL	CSEM vs. CTL	CSA vs. CSEM
	Md	(range)	Md	(range)	Md	(range)			
Validity Scales									
Social Sexual Desirability	74.0	(49-97)	83.0	(43-100)	83.0	(49-100)	1.73	0.21	1.51
Lie: Child Molest	38.5	(8-100)	65.5	(15-100)	100.0	(85-100)	25.66***	22.95***	1.57
Cognitive Distortion / Immaturity	27.5	(0-65)	25.0	(5-70)	10.0	(0-35)	9.21**	11.26**	0.14
Child Molest									
Fantasy	60.0	(0-90)	60.0	(10-100)	0.0	(0-10)	16.60***	33.79***	0.60
Grooming	30.0	(0-80)	15.0	(0-60)	20.0	(0-40)	5.70	0.05	3.46
Sexual Assault/Attack	61.5	(11-89)	0.0	(0-67)	0.0	(0-11)	34.05***	4.30*	20.23***
Aggravated Sexual Assault	33.0	(0-83)	0.0	(0-68)	0.0	(0-0)	26.38***	4.53*	13.86***
Incest	25.0	(0-100)	0.0	(0-25)	0.0	(0-0)	15.09***	2.15	9.70**
Total Score	44.0	(3-72)	19.5	(5-62)	5.0	(0-10)	26.93***	27.15***	3.68
Abuse of Girls	50.0	(0-100)	33.0	(0-67)	0.0	(0-33)	11.34**	12.57**	1.28
Abuse of Boys	33.0	(0-100)	0.0	(0-100)	0.0	(0-33)	12.41**	4.79*	1.54

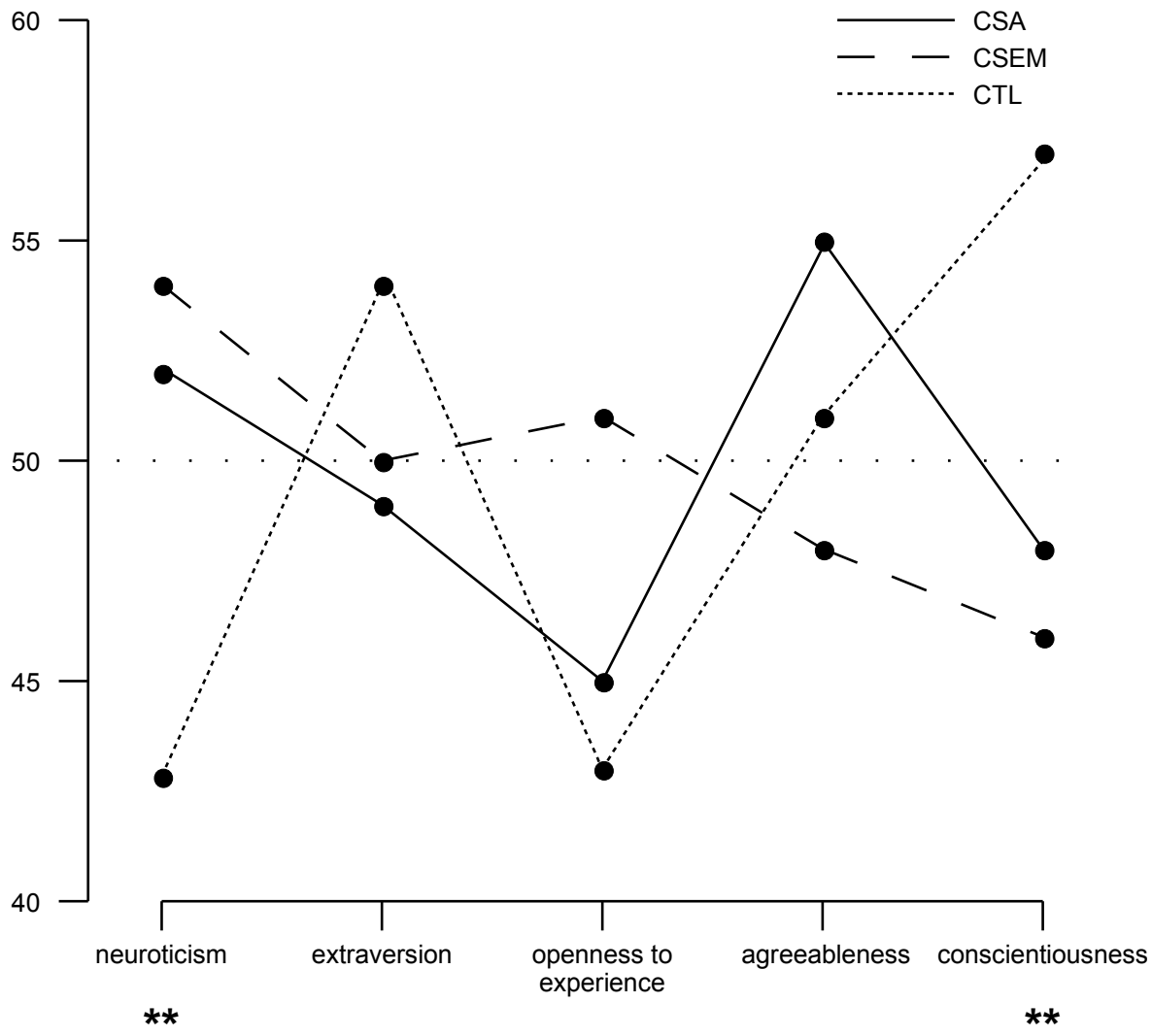
[a] Kruskal-Wallis Test: χ^2 –value, df = 1

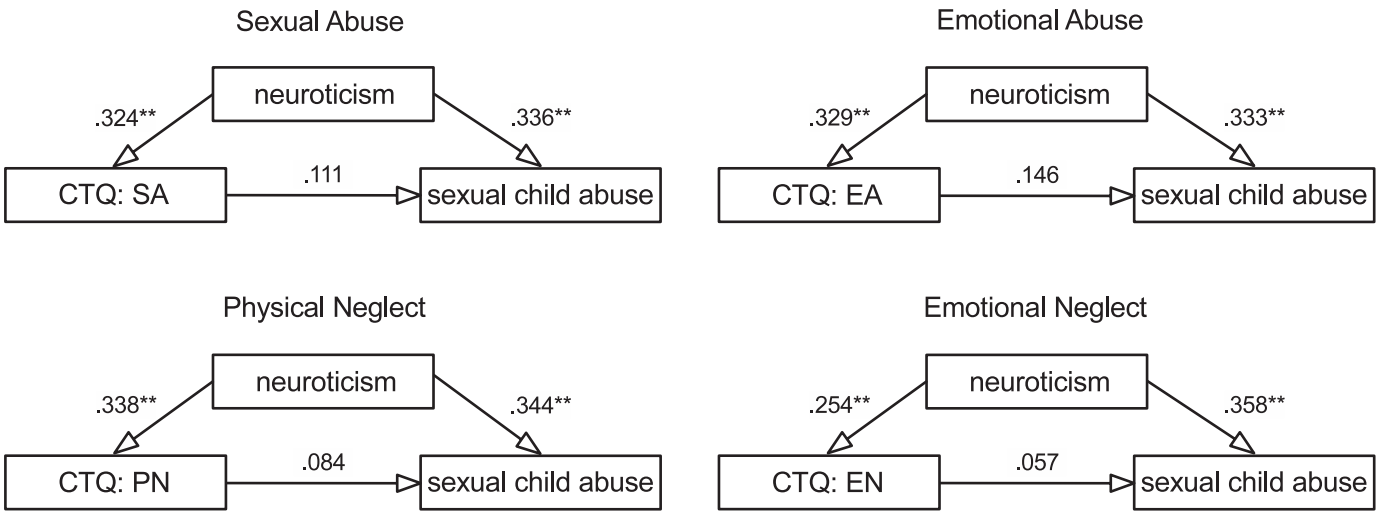
* $p < .05$, ** $p < .01$, *** $p < .001$ (p-value corrected for multiple pair comparisons according to Benjamini and Hochberg)

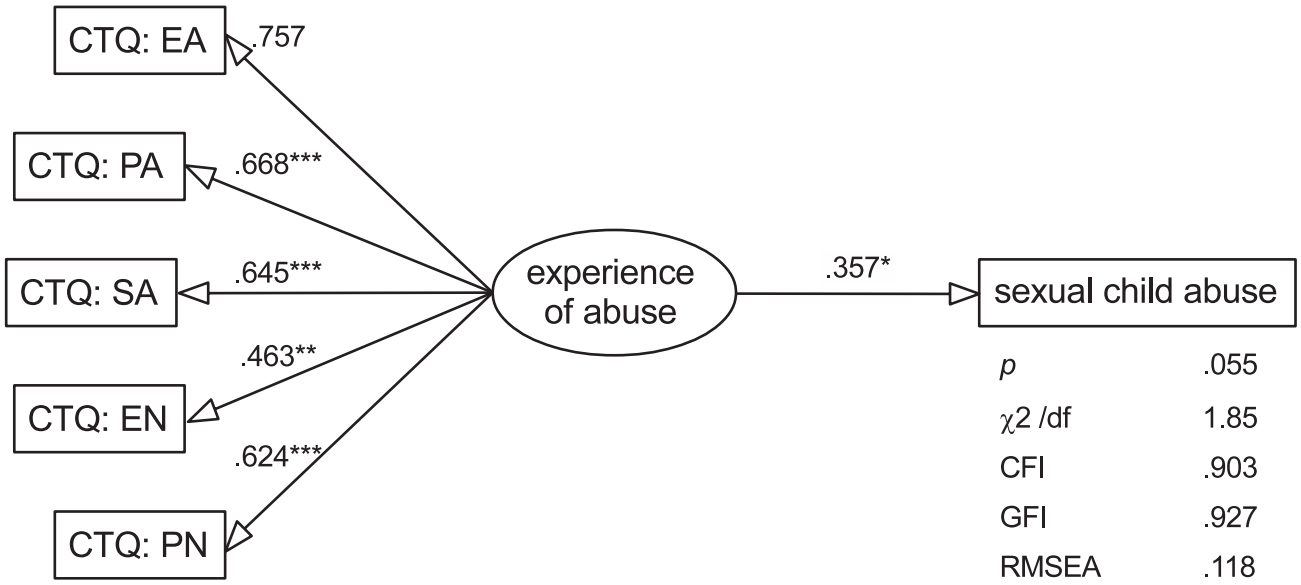
Figure 1. NEO Personality Inventory Revised (NEO-PI-R). Age-corrected profiles of the three groups in the five personality factors. The T-transformed group median values are stated.

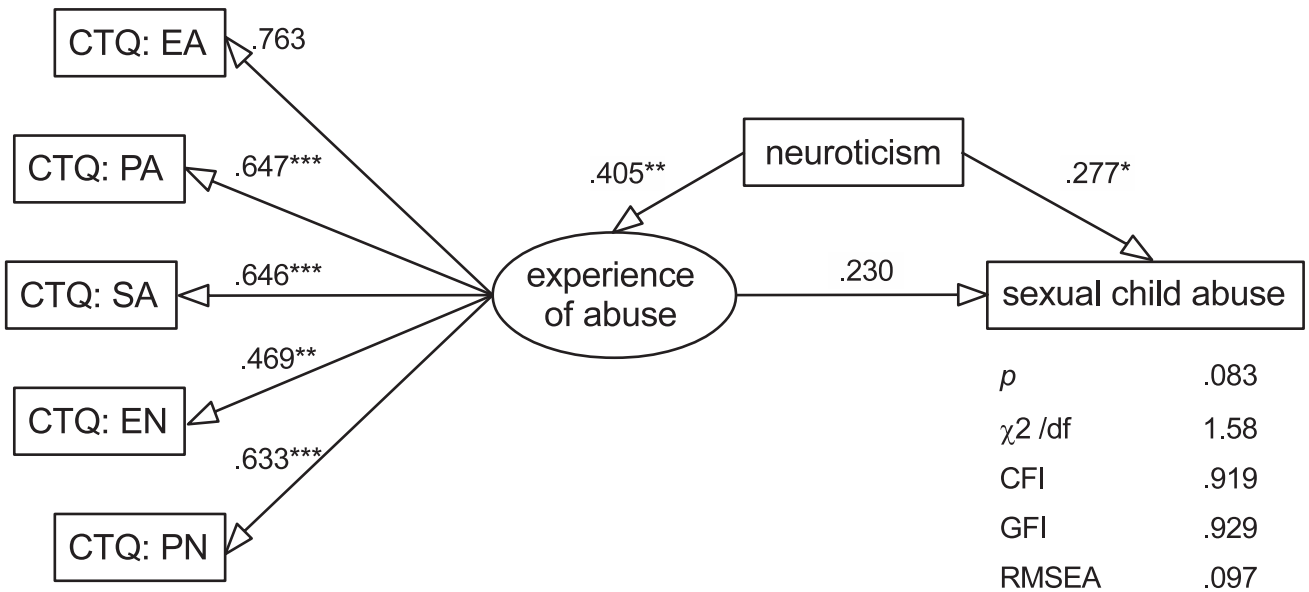
Figure 2. Mediation models. *Neuroticism* (NEO-PI-R) as a mediating factor for the correlation of experienced abuse/neglect (CTQ) and *sexual assault/attack* (MSI).

Figure 3. Structural equation models. Latent variable *abuse experienced*, composed of the five CTQ scales: Direct link of *abuse experienced* and *sexual assault/attack* (top). Link of *abuse experienced* and *sexual assault/attack* mediated by *neuroticism* (bottom). Relevant good to fit criteria.
EM: emotional abuse; PA: physical abuse; SA: sexual abuse; EN: emotional neglect; PN: physical neglect


60
55
50
45
40
CSA
CSEM
CTL
neuroticism
extraversion
openness to experience
agreeableness
conscientiousness
**
**


Sexual Abuse
neuroticism
.324**
.336**
CTQ: SA
.111
sexual child abuse
Emotional Abuse
neuroticism
.329**
.333**
CTQ: EA
.146
sexual child abuse
Physical Neglect
neuroticism
.338**
.344**
CTQ: PN
.084
sexual child abuse
Emotional Neglect
neuroticism
.254**
.358**
CTQ: EN
.057
sexual child abuse


CTQ: EA
.757
CTQ: PA
.668***
CTQ: SA
.645***
CTQ: EN
.463**
CTQ: PN
.624***
experience of abuse
.357*
sexual child abuse
p .055
χ2 /df 1.85
CFI .903
GFI .927
RMSEA .118


CTQ: EA
.763
CTQ: PA
.647***
CTQ: SA
.646***
CTQ: EN
.469**
CTQ: PN
.633***
neuroticism
.405**
.277*
experience of abuse
.230
sexual child abuse
p .083
χ2 /df 1.58
CFI .919
GFI .929
RMSEA .097

Acknowledgements

The authors would like to thank the Federal Office of Justice (Switzerland) for the funding of the MIPS study. We would also like to thank the employees at the Forensic Psychiatric Clinic Basel (Switzerland) who assisted in the data collection: Barbara Buser, Gunnar Deuring, Jacqueline Dijkstra, Dr. Patrick Lemoine, Sophie Müller-Siemens, Franziska Prinz, Nina Rüegg, Maria Schmidlin, Dr. Thorsten Spielmann and Michael Weber. We also would like to thank the institutes and practicing psychiatrists and psychologists who assisted in the recruitment of the subjects.

The authors Coralie Boillat and Nathalie Schwab share the first authorship of this study.

Funding

This work was supported by the Federal Office of Justice, Switzerland.

ANHANG A-2

Publikation 2:

Boillat, C., Deuring, G., Pflueger, M. O., Graf, M., & Rosburg, T. (*in press*). Neuroticism in child sex offenders is associated with more pronounced sexual dysfunctions, cognitive distortions, and psychological complaints. *International Journal of Law and Psychiatry.*

Neuroticism in child sex offenders and its association with sexual dysfunctions, cognitive distortions, and psychological complaints

Coralie Boillat[a], Gunnar Deuring[a], Marlon O. Pflueger[a], Marc Graf[a], Timm Rosburg[a, CA]

[a] University of Basel, University Psychiatric Clinics, Department of Forensic Psychiatry, Wilhelm Klein-Strasse 27, 4002 Basel, Switzerland

[CA] PD Dr. phil. Timm Rosburg, University of Basel, University Psychiatric Clinics, Department of Forensic Psychiatry, Wilhelm Klein-Strasse 27, 4002 Basel, Switzerland

E-Mail: timm.rosburg@upkbs.ch; Phone number: 0041 61 325 58 24

E-mail: Coralie.Boillat@upkbs.ch

Gunnar.Deuring@upkbs.ch

Marlon.Pflueger@upkbs.ch

Marc.Graf@upkbs.ch

Abstract

Studies in child sex offenders (CSO) often report deviant personality characteristics. In our study, we investigated neuroticism in CSO and tested the hypothesis that CSO with high neuroticism show more serious abuse behavior and are more likely to exhibit sexual dysfunction and cognitive distortions, as compared to CSO with low neuroticism. A sample of 40 CSO (both child sexual abusers and child sexual material users) was split into two subsamples based on their neuroticism scores, obtained by the NEO-Personality Inventory-Revised (NEO-PI-R) questionnaire. Subsequently, we compared their scores in the Multiphasic Sex Inventory (MSI) questionnaire and Symptom Checklist-90-Revised (SCL-90-R). Our results show that CSO exhibited higher levels of neuroticism than controls, but were still in the normal range. In CSO, neuroticism was associated with sexual dysfunction and cognitive distortions, rather than with more severe abuse behavior. Moreover, neuroticism in this group was linked to a broad range of psychological problems and psychopathological symptoms, such as somatization or anxiety. Our findings suggest that neuroticism even below the level of personality disorder is associated with a broader range of psychological problems in CSO, which should be addressed in therapy.

Keywords: child sexual assault; neuroticism; pedosexual preference; sexual dysfunctions; cognitive distortions; psychological complaints

1. Introduction

Sex offenses against children are crimes with severe, traumatic consequences for the victims ("World Health Organisation: Child and Adolescent Health. Europe." 2016). In Switzerland, in 2015, 18.2% of all convictions based on sexually related offenses, involved sexual acts against children ("BFS - Polizeiliche Kriminalstatistik (PKS) 2015," 2016). Although only 25-50% of sexual crimes against children are committed by pedosexual perpetrators (Schaefer et al., 2010), a pedophilic preference is considered as an important risk factor for repeated child abuse (Hanson & Bussiere, 1998; Hanson & Morton-Bourgon, 2005).

Literature suggests that personality abnormalities represent an important comorbidity in persons who sexually offend against children (child sex offenders, CSO). Using the Structured Clinical Interview for DSM-IV Axis II Disorders (SCID-II), Cohen, Grebchenko, Steinfeld, Frenda, and Galynker (2008) showed that adult sex offenders with a conviction for sexual offenses against prepubescent children had higher scores for paranoid, schizoid, and dependent personality disorder than controls. The majority of child molesters did, however, not meet the criteria for a diagnosis of personality disorder. In line with this finding, CSO were reported to be less likely diagnosed with a personality disorder, as compared to adult sex offenders (Långström, Sjöstedt, & Grann, 2004). For pedophile CSO, there is one study that reported an extremely high prevalence of personality disorders in pedophiles (60 %) (Raymond, Coleman, Ohlerking, Christenson, & Miner, 1999). Other studies on pedophiles, reported more subclinical personality characteristics, such as high levels of shyness, introversion, and emotional immaturity, similarly to the studies on CSO (Cohen et al., 2002; Murray, 2000). In their review, Hall and Hall (2007) proposed that pedophilic sex offenders would be more socially alienated and less emotionally stable than most other people.

Emotional stability is one dimension of the personality model developed by Eysenck, in which he described personality as a combination of traits in the three dimensions neuroticism, extraversion, and psychoticism (Eysenck, 1950). In this model, neuroticism is characterized by social anxiety, low self-esteem, and hypersensitivity, as well as nervousness and restlessness. Eysenck (1996) associated an elevation of neuroticism with crime, arguing that the respective individuals have emotional drive properties most likely to increase current action tendencies. Moreover, he stated that high levels of neuroticism would predict criminal offending (Eysenck, 1996 cited in Cale, 2006). More recent studies supported this notion and revealed associations between high levels of neuroticism (or of negative emotionality which is used interchangeably with neuroticism) and delinquency (Agnew, Brezina, Wright, & Cullen,

2002; Caspi, Moffitt, Silva, & Stouthamer-Loeber, 1994; Krueger et al., 1994; Listwan, Voorhis, & Ritchey, 2007). Dennison, Stough, and Birgden (2001) found that CSO marked significantly higher on neuroticism than a non-offending control sample. Studies in pedophiles showed higher neuroticism levels, as compared to a control group with adult sexual preference (Wilson & Cox, 1983), and demonstrated a positive correlation of increased neuroticism with the presence of thoughts approving sexual acts involving children in child abusers (Egan, Kavanagh, & Blair, 2005).

Neuroticism as a multifaceted personality trait is assumed to affect various areas of behavior and cognition. Research has found evidence that individuals with high neuroticism values exhibit, for example, poor behavioral inhibition, maladaptive coping strategies, or little agreeable, dominant behavior (Clark, Watson, & Mineka, 1994; Côté & Moskowitz, 1998; Gunthert, Cohen, & Armeli, 1999). Other studies reported an impact of neuroticism on thinking, for instance a negative correlation of neuroticism with divergent thinking (Chamorro-Premuzic & Reichenbacher, 2008).

Moreover, neuroticism might affect various aspects of well-being: High neuroticism scores have been related to sexual dysfunction, such as impotence or premature ejaculation (Eysenck, 1971; Fagan et al., 1991; Raymond et al., 1999). Neuroticism has also been associated with a range of subjectively reported psychological and physical symptoms, such as anxiety or chest pain (Costa Jr. & McCrae, 1987; Feldman, Cohen, Doyle, Skoner, & Gwaltney Jr., 1999; Ormel & Wohlfarth, 1991; Watson & Pennebaker, 1989). Ormel and Wohlfarth (1991) reported that neuroticism has a strong direct effect on psychological distress. It has been proposed that the scales of the Symptom Checklist-90-R (SCL-90-R, Franke & Derogatis (2002)), which assesses subjectively perceived psychological problems and psychopathological symptoms, might even record facets of neuroticism (Vassend & Skrondal, 1999), see also Desmet et al. (2008).

In summary, previous research suggests elevated neuroticism scores in sex offenders against children and pedophiles. Moreover, it has been shown that high neuroticism might be associated with more severe delinquent behavior, sexual pathology, and globally increased psychological and somatic complaints. To the best of our knowledge, in CSO, the association of high neuroticism with these behavioral dimensions has not been investigated so far. The same applies for the association of cognitive distortions with neuroticism, even though cognitive distortions are core features in several theories on sexual offences against children (Abel et al., 1989; Hall & Hirschman, 1991; Ward & Siegert, 2002).

In our current study, we addressed these issues and sought evidence for the following hypotheses: 1. CSO with pedophilic interests are characterized by higher levels of neuroticism than a non-offending adult sexual control group. 2. CSO with high neuroticism values show graver abuse behavior and sexual dysfunction, as well as more cognitive distortions than CSO with low neuroticism levels. 3. CSO with high neuroticism levels report more psychological and somatic complaints on all SCL-90-R scales, as compared to CSO with low neuroticism levels.

The data reported here were collected in the framework of the MIPS study (Measurable Indicators of Pedosexual Offenders). The aim of the MIPS study was to discriminate pedosexual child abusers (Child Sexual Assaulters, CSA) and child pornography consumers without child contact (Child Sexual Exploitation Material, CSEM, users) from a non-offending adult heterosexual control group (Controls, CTL), with regard to psychological, neuropsychological, and electrophysiological characteristics.

2. Method

2.1 Study participants

A sample of 43 male Child Sex Offenders (CSO), consisting of 22 CSA and 21 CSEM users, and a sample of 23 adult-sexual males (CTL) without criminal record were recruited. Due to detected organic brain deficits, missing data and later on conducted median-split of the samples, the analysis reported here is based on 40 CSO consisting of 20 CSA and 20 CSEM users, and 21 CTL. The CSO group was recruited in the Department of Forensic Psychiatry of the University Psychiatry Clinics of Basel (Switzerland) and in other Swiss forensic psychiatric institutions; the CTL group was recruited via newspaper advertisement. The CSA group consisted of individuals with a confirmed pedophilic disorder (n = 18) or with a suspected, but yet not fully attested pedophilic disorder (n = 2), all convicted for child sexual abuse (Art. 187 Swiss Penal Code) or admitting such an offence. The presence or suspect of relevant pedophile disorder had been attested by the attending psychiatrist/therapist and was verified by a senior forensic psychiatrist of our research group. Due to the fact that some of the conducted tests required a laboratory environment, the data collection had to take place in our research facilities. For practical and safety reasons, all included CSA had to be in an

ambulant therapeutic setting, on day parole, or needed to have the legal authorization to leave the hospital treatment. Hence, all included CSA were considered to be at a low risk for recidivism based on their legal status (rather than on the basis of systematic and extensive clinical evaluations). The CSEM group consisted of individuals with a conviction for the consumption of child pornography (Art. 197 Swiss Penal Code) or admitting such a wrongdoing. All participants were between 18 and 55 years of age. Exclusion criteria were relevant neurological and psychiatric deficits and any medication that could have an impact on the cognitive performance. CSO and CTL were comparable in years of training, as well as in verbal and non-verbal intelligence. The CSO group was, however, significantly older than the CTL group (Table 1).

- insert Table 1 here -

2.2 Measuring instruments

During two-day examinations, each participant performed 35 different tests and questionnaires. The current findings are based on the three questionnaires that were relevant for testing our hypotheses about the role of neuroticism in pedosexuality and child sex offences. The other, here not described tests encompassed neuropsychological tests, implicit sexual preference tests, and neurophysiological tests/recordings.

The *NEO-Personality Inventory-Revised* (*NEO-PI-R*, Ostendorf & Angleitner (2004)) is a self-assessment questionnaire with 241 items. The five personality dimensions *neuroticism, conscientiousness, agreeableness, extraversion,* and *openness to experience* are assessed by means of a 5-levels Likert scale (“strongly agree” to “strongly disagree”).

The *Multiphasic Sex Inventory* (*MSI*, Deegener (1996)) is a self-assessment questionnaire with 300 questions. It measures psychosexual characteristics and behavioral abnormalities in the scales *Paraphilia (Sexual Deviation), Paraphilia (Atypical Sexual Outlet),* and *Sexual Dysfunction,* as well as *Validity* scales. Answers are indicated on a dichotomous scale (“true” or “false”).

The *Symptom Checklist-90-R* (*SCL-90-R*, Franke & Derogatis (2002)) is a self-assessment questionnaire with 90 items. It measures the subjectively perceived impairments

by physical and mental symptoms during the last seven days on the following scales: *somatization*, *obsessive-compulsive*, *interpersonal sensitivity*, *depression*, *anxiety*, *anger-hostility*, *phobic anxiety*, *paranoid ideation*, and *psychoticism*. In addition, three global indices are provided (*Global Severity Index*, *Positive Symptom Distress Index* and *Positive Symptom Total*). Answers are indicated on a 5-levels Likert scale ("not at all" to "extremely").

2.3 Analysis

First, we compared the scores of the CSO and CTL group in all NEO-PI-R, MSI, and SCL-90-R scales. Secondly, by median-split we created two CSO subgroups with high and low *neuroticism* values. The split was applied to CSA and CSEM users separately in order to have the same number of CSA and CSEM users in the two subgroups. To achieve that, we also excluded by random one of two CSA who had exactly the median score. Subsequently, we compared the scores of the MSI scales *child molest, sexual dysfunctions,* and *validity,* the SCL-90-R scales, and the four remaining NEO-PI-R scales between CSO with high and low neuroticism. Finally, as a control condition, we split the CSO group in two subsamples with high and low values on the MSI subscale *child molest: total score* and compared the scores in the MSI subscales *sexual dysfunctions* and *cognitive distortion/immaturity,* SCL-90-R, and NEO-PI-R between these two subsamples. Again, to achieve the same number of CSAs and CSEM users in the subsamples, we excluded one CSA subject with the median score. The statistical analyses were performed using the statistics software R (R Core Team, 2015).

3. Results

3.1 Group comparison: Child Sexual Offenders (CSO) vs. Controls (CTL)

NEO-Personality Inventory-Revised (NEO-PI-R). The CSO group showed significantly higher values on the *neuroticism* scale (ten CSO with $T > 60$, maximal $T = 78$) and lower values on the *conscientiousness,* as compared to the CTL group. The two groups did not differ in the scales *agreeableness, extraversion* and *openness to experience* (Figure 1). Of relevance for the current study purpose, the CSA and CSEM users did not differ in their neuroticism scores (CSA: $T = 52$, CSEM: $T = 54$, $\chi^2 = 0.06$, $p = .814$). Detailed group differences between CSA and CSEM users will be reported elsewhere (Boillat et al., *in press*).

- *insert Figure 1 here* -

Multiphasic Sex Inventory (MSI). In the assessment of child molesting, the CSO achieved, as expected, significantly higher values with regard to *fantasy, sexual assault/attack, aggravated sexual assault, incest, total score, abuse of girls* and *abuse of boys* (Table 2). The scale *grooming* includes items such as "children generally liked me and wanted to be with me" which explains values > 0 in the CTL group. The items "I have exposed myself to a child" and "as an adult I have tickled and fooled around with boys/girls" are the reason for values > 0 in the CTL group regarding the scales *sexual assault/attack* and *abuse of boys* and *abuse of girls.* In the assessment of sexual dysfunctions, the CSO group reported significantly more feelings of *sexual inadequacies* and more experience of *impotence* than the CTL group (Table 2). In the validity scales, the CSO group scored significantly higher on the scale *cognitive distortion and immaturity*. The CTL group had significantly higher values on the scale *lie: child molest* than the CSO group. This was an expected finding because the CTL subjects had nothing to distort or to deny. No differences between CSO and CTL were found on the scales *premature ejaculation, physical disabilities, grooming,* and *social sexual desirability.* In sum, the MSI data suggests, as expected, a deviant pattern of sexual behavior in CSO. CSO also reported more feelings of sexual dysfunctions than CTL.

- *insert Table 2 here* -

Symptom Checklist-90-R (SCL-90-R). The CSO group showed significantly higher values on the scales *interpersonal sensitivity, depression, anxiety, phobic anxiety, psychoticism,* and on the *global severity index* than the CTL group (Table 3). No differences were found in the scales *somatization, obsessive-compulsive, anger-hostility,* and *paranoid ideation.* In sum, the CSO reported more symptoms during the last seven days than the CTL group.

- *insert Table 3 here* -

3.2 Group comparison: Child Sexual Offenders (CSO) with high vs. low values of neuroticism

Twenty CSO each were assigned to the subsamples with high and low *neuroticism*.

Multiphasic Sex Inventory (MSI). The CSO group with high neuroticism values showed significantly higher values on the scale *abuse of boys*, but (contrary to our expectation) in none of the other child molesting scales (Table 4). Furthermore, they reported significantly higher values on the *sexual inadequacies*, *premature ejaculation* and *impotence* scales. The CSO group with high neuroticism values exhibited significantly higher *cognitive distortion and immaturity* scores.

- *insert Table 4 here* –

Symptom Checklist-90-R (SCL-90-R). The CSO group with high neuroticism values showed significantly higher values on the *somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, anger-hostility, paranoid ideation, psychoticism* scale and on the *global severity index* than the CSO group with low neuroticism values (Table 5). The two groups did not significantly differ in the scale *phobic anxiety*. In sum, the CSO subjects with high neuroticism values reported clearly more psychological complaints and more physical and mental symptoms than the CSO subjects with low neuroticism values.

- *insert Table 5 here* –

NEO-Personality Inventory-Revised (NEO-PI-R). The CSO group with high neuroticism values showed significantly lower values on the *conscientiousness* and *extraversion* scales than the CSO group with low neuroticism values (Figure 2). The two groups did not differ in the scales *agreeableness* and *openness to experience.*

- *insert Figure 2 here* –

3.3 Group comparison: Child Sexual Offenders (CSO) with high vs. low values in the MSI scale *child molest: total score*

To investigate the relation of deviant sexual behavior with sexual dysfunctions, cognitive distortions, somatic and physical complaints, and personality traits we compared the characteristics of 20 CSO subjects with high values on the scale *child molest: total score* (MSI) to the 20 CSO subjects with low values, with respect to their scores in the

questionnaires MSI, SCL-90-R, and NEO-PI-R. The comparison of the scores in the subscales *sexual dysfunctions* and *cognitive distortion and immaturity* of the MSI questionnaire, as well as the SCL-90-R and NEO-PI-R questionnaire data revealed no group difference. Thus, none of the analyzed personality parameters varied between CSO with benign and severe child molestation behavior.

4. Discussion

The main findings of the current study can be summarized as follows: The personality of CSO was characterized by stronger neurotic traits and lower levels of conscientiousness as compared to CTL (hypothesis 1 confirmed). Splitting the CSO in subsamples with high and low neuroticism revealed no difference in their child molestation behavior, except to a minor extent for the scale *abuse of boys*. However, high neuroticism CSO exhibited more signs of sexual dysfunctions, as well as a greater amount of cognitive distortions and immaturity (hypothesis 2 partly confirmed). Moreover, high neuroticism CSO reported more psychological and somatic complaints than low neuroticism CSO (hypothesis 3 confirmed).

4.1 Neuroticism in Child Sex Offenders as compared to Controls

The personality of the CSO group was characterized by more neuroticism and less conscientiousness, as compared to the CTL group. The neuroticism scores of the majority of CSO subjects were nevertheless in the normal range. In their meta-analysis, Malouff, Thorsteinsson, and Schutte (2005) showed that individuals with other psychiatric disorders tend to have a similar personality profile (i.e. a combination of high neuroticism and low conscientiousness). Fagan et al. (1991) compared the personality profile of paraphilic patients to those of patients with sexual dysfunctions. Paraphilic men scored significantly higher on neuroticism and lower on agreeableness, exceeding the normal range. Moreover, Dennison, Stough, and Birgden (2001) found that child sex offenders scored significantly higher on neuroticism, and lower on extraversion and conscientiousness than a non-offending control sample. Similarly, Becerra-García, García-León, Muela-Martínez, and Egan (2013) reported significantly higher neuroticism and lower extraversion scores in child molesters, as compared to a control group, but no differences in conscientiousness. Wilson and Cox (1983) specifically compared the personality of pedophilic members of a self-help club for men who were sexually attracted to children to the personality of an adult sexual control group: These

men were found to be significantly higher on neuroticism and psychoticism, and lower on extraversion than adult-sexual controls.

Taken together, our finding of increased neuroticism in CSO parallels previous findings in pedophiles (Wilson & Cox, 1983) and in child molesters (Dennison et al., 2001; Becerra-Garcia et al., 2013), whereas our finding of lowered conscientiousness in CSO appears to be related to sex offences rather than to pedosexuality (Dennison et al., 2001; Wilson & Cox, 1983).

4.2 Child molestation behavior in Child Sex Offenders high on neuroticism

Our results revealed no difference in sexual deviant patterns in high versus low neuroticism CSO, except, to a minor extent, for the scale *abuse of boys*. Thus, our findings suggest that neuroticism is only modestly associated with the severity of delinquent sexual behavior in CSO. However, there is evidence for an association of neuroticism and the severity of delinquent behavior in general, such as multiple or violent offences (Caspi et al., 1994). Moreover, research supports the notion of a high neuroticism personality predicting delinquency (Krueger et al., 1994), as well as the increased probability of arrest in neurotic individuals (Listwan et al., 2007). Miller and Lynam (2001) revealed in their meta-analytic review a positive relation of neuroticism and antisocial behavior. Nevertheless, they also found some studies reporting negative correlations, which might suggest that both poles of the neuroticism dimension are related to antisocial behavior.

Miller and Lynam (2001) argued that, on the one hand, highly neurotic individuals may be more prone to impulsive acts, whereas, on the other hand, extremely emotionally stable individuals do not feel normal anxieties and fears that keep them away from antisocial behavior. However, antisocial behavior is neither a necessary nor a sufficient condition for child sexual abuse, even though it has repeatedly been associated with pedophilic offending (Cohen et al., 2002; Cohen & Galynker, 2002; Raymond et al., 1999). Egan, Kavanagh, and Blair (2005) reported a positive correlation of increased neuroticism levels with the presence of thoughts approving sexual acts involving children in child abusers. To the best of our knowledge, no other evidence for the relation of elevated neuroticism in CSO with the severity of child offense behavior has been reported so far. In our sample, no such association was found but for the *abuse of boys*. However, we cannot rule out that this virtual null-finding was due to the characteristics of the study sample, which consisted only of low-risk CSO with only moderately increased neuroticism scores. Future studies should include high-risk CSO

and/or highly neurotic CSO as well, in order to further elucidate the association between neuroticism and child molestation behavior.

4.3 Sexual dysfunctions in Child Sex Offenders with high neuroticism

Our results revealed an association between high neuroticism in CSO and sexual dysfunctions, such as sexual inadequacies, premature ejaculations, and impotence. Eysenck (1971) showed in a study on unmarried students that men who suffered from premature ejaculation, impotence, and lower orgasm frequency scored significantly higher on neuroticism than men who did not suffer from these dysfunctions. He reasoned that sexual pathology is associated with neuroticism, and that the association between sexual pathology and neuroticism is stronger than between sexual pathology and other personality dimensions (Eysenck, 1971). Correspondingly, Rosenheim and Neumann (1981) documented that men with erectile and/or ejaculatory sexual dysfunctions can be characterized by personality variables, such as interpersonal anxiety, sensitiveness to others' negative reactions, and diminished assertiveness, which are personality facets representative for neuroticism. Our current finding is well in line with these previous reports on healthy subjects and complements these findings to CSO.

4.4 Cognitive distortions and immaturity in Child Sex Offenders high on neuroticism

CSO with high neuroticism had elevated levels of cognitive distortions and immaturity, as compared to CSO with low neuroticism. These CSO held offense-related beliefs that facilitated and justified child molestation behavior. In previous studies, the reasons behind cognitive distortions have been discussed controversially. Abel, Becker, and Cunningham-Rathner (1984) provided one of the earliest theories on such cognitive distortions and proposed that men who commit child sexual offenses develop post offense beliefs that justify their thoughts and actions and, therefore, allow them to maintain the offending behavior. In contrast, Ward, Hudson, Johnston, and Marshall (1997) suggested that sexual child offenders hold offense-related implicit theories, *prior* to the offense, and interpret ambiguous situations in a belief-consistent and offense-congruent way. Thus, Ward et al. emphasized the etiological role of such cognitive distortions. Other theories also discussed cognitive distortions as being a primary precursor (Hall & Hirschman, 1991; Ward & Siegert, 2002) leading to sexual abuse of a child.

Opposed to cognitive distortions, immaturity in CSO has been considered to a much lesser extent in previous research. Finkelhor and Araji (1986) provided a four factor model explaining why adults become sexually interested in children. With the first factor "emotional congruence" they seek to explain why adults find it emotionally gratifying and congruent to sexually relate to a child. One factor possibly contributing to this behavior is that pedophiles interact on the same emotional maturity level as children. However, Araji and Finkelhor (1985) found only poor evidence for this hypothesis when reviewing previous research. Araji and Finkelhor emphasized that even well-established evidence of immaturity in pedophiles would not necessarily explain their sexual interaction with children. More recent research has hardly addressed the issue of immaturity in child molesters with or without a pedophilic sexual interest. However, in line with our current finding, Wilson (1999) reported significantly higher levels of immaturity in homosexual pedophiles compared to adult sex offenders and non-sex offenders.

Thus, our results show that cognitive distortions and immaturity is primarily found in CSO with high neuroticism. To better understand the dynamic that leads to child molestation behavior, studies should further investigate the role of cognitive distortions and immaturity in CSO under consideration of their personality profile.

4.5 Psychological problems in Child Sex Offenders high on neuroticism

As hypothesized, high neuroticism CSO reported more psychological problems, such as obsessive-compulsive behavior, interpersonal sensitivity, depression, anxiety, anger-hostility, paranoid ideation, or psychoticism, and symptoms of psychopathology, such as somatization. In line with our observation that increased neuroticism is associated with a broad range of psychological problems, Vassend and Skrondal (1999) proposed that the SCL-90-R scales might record facets of neuroticism.

Several mechanisms might contribute to the increased symptoms reported by high neuroticism individuals: Ormel and Wohlfarth (1991) proposed that the increased sensitiveness to minor failures, frustrations, and irritations of daily life in neurotic individuals leads to more experience of distress. It has also been proposed that facets of neuroticism might directly cause health problems (Anderson, Bradley, Young, McDaniel, & Wise, 1985; Diamond, 1982) or that health problems lead to increased neuroticism (Watson & Pennebaker, 1989). However, previous research has suggested that such somatic complaints are largely unrelated to objective health indicators (Costa Jr. & McCrae, 1987; Feldman et al.,

1999). More accepted models suggest a higher level of attentional focus on body sensations in neurotic individuals and a negative interpretation of such sensations, as well as neurotic individuals recalling symptoms as being worse than they really were (Cioffi, 1991; Feldman et al., 1999; Larsen, 1992; Watson & Pennebaker, 1989).

To sum it up, neuroticism appears to denote more than a personality trait, as our results show that high levels of neuroticism were associated with a broad range of psychological and somatic complaints, supporting the notion of Vassend and Skrondal (1999).

4.6 Implications for treatment of Child Sex Offenders high on neuroticism

Van Voorhis et al. (2002) found that neurotic parolees who participated in a cognitive skill program, encompassing training of problem solving, social skills, or management of emotions, were more likely to drop out of the program and exhibited higher recidivism rates than the control group. Thus, treatment success might depend in parts on whether offenders are neurotic or not. Already previously, it has been suggested that the knowledge about the presence and degree of neuroticism in patients and offenders can be used for optimizing their therapy (Costa, 1991; Dennison et al., 2001; McCrae, 1991). Miller (1991) proposed specific therapy adjustments for individuals with high neuroticism, such as defining realistic therapy objectives and focusing on anxiety and mood swings.

Moreover, cognitive distortions, which in our study were observed in association with high levels of neuroticism, have been identified as a target cognitive behavioral treatment of child sexual abusers (Beech & Mann, 2003). For this purpose, it is crucial to understand the type of implicit theories held by the offender to tailor treatment strategies to individual needs (Beech & Mann, 2003). Otherwise, offenders continue to bolster their distorted beliefs with their distorted perceptions of reality (Ward et al., 1997). It will also be important to help offenders in gaining more confidence in their ability of sexual functioning, in order to avoid feelings of sexual inadequacies in future adult acquaintanceships (Rosenheim & Neumann, 1981). Finally, Barsky and Klerman (1983) stated that the alteration of patients' ideas about the causes of their physical complaints can lower their distress and level of arousal.

Hence, aside from considering neuroticism for adjusting treatment options, therapists should pay attention to the distorted views of CSO with high neuroticism, and help to ameliorate their sexual dysfunctions and feelings of mental and bodily complaints. This might allow a more comprehensive and more promising therapeutic approach for the treatment of highly neurotic CSO. Nevertheless, the aim of a therapy should not be to "cure" personality

traits, especially considering their relative stability (Caspi, Moffitt, Silva, & Stouthamer-Loeber, 1994; Caspi & Roberts, 1990; Miller & Lynam, 2001), but to prevent relapse in accordance with the Risk-Need-Responsivity principles for offender assessment and rehabilitation (Bonta & Andrews, 2007).

4.7 Limitations

Our findings must be considered in the light of some methodological and conceptual limitations: Our results merely indicate a snap-shot of the current situation. Thus, the dynamics behind the associations of neuroticism with pedosexual behavior, sexual dysfunctions, cognitive dysfunctions and immaturity, and mental and somatic complaints cannot be clarified on the basis of the current data. Furthermore, our investigated sample consisted only of low-risk CSO participants. Hence, it remains open to what extent our findings also apply to high-risk CSO. Moreover, we classified the CSO in a group of hands-on (CSA) and a group of hands-off (CSEM) offenders, due to their criminal record. However, we cannot rule out that CSEM users might have sexually abused children. Some participants of the CSEM group indeed showed elevated sores in the MSI scales for child molestation behavior.

4.8 Conclusion and outlook

To our knowledge, this study for the first time shows that neuroticism in CSO, even below the level of personality disorders, is associated with increased levels of sexual dysfunctions, cognitive distortions and immaturity, as well as with a broad range of psychological and somatic complaints. Thus, for successful therapeutic interventions in CSO, it is indispensable to take into account the entire pattern of these combined variables. A multidimensional approach promises a more successful therapeutic intervention than the exclusive focus on personality characteristics, especially due to their relative stability. Further studies on the interplay of personality traits, sexual dysfunctions, cognitive distortions and immaturity in CSO, including high-risk offenders, are highly desirable and would provide valuable information for an optimized treatment of CSO.

Acknowledgements

The authors would like to thank the Federal Office of Justice (Switzerland) for the funding of the MIPS study. We would also like to thank the employees at the Forensic Psychiatric Clinic Basel (Switzerland) who assisted in the data collection: Barbara Buser, Jacqueline Dijkstra, Dr. Patrick Lemoine, Sophie Müller-Siemens, Franziska Prinz, Nina Rüegg, Maria Schmidlin, Dr. Thorsten Spielmann, Matthias Stutz and Michael Weber. We also would like to thank the institutes and practicing psychiatrists and psychologists who assisted in the recruitment of the subjects.

Funding

This work was supported by the Federal Office of Justice Switzerland.

References

Abel, G. G., Becker, J. V., & Cunningham-Rathner, J. (1984). Complications, consent, and cognitions in sex between children and adults. *International Journal of Law and Psychiatry*, *7*(1), 89–103. https://doi.org/10.1016/0160-2527(84)90008-6

Abel, G. G., Gore, D. K., Holland, C. L., Camps, N., Becker, J. V., & Rathner, J. (1989). The measurment of the cognitive distortions of child molesters. *Annals of Sex Research*, *2*(2), 135–152.

Agnew, R., Brezina, T., Wright, J. P., & Cullen, F. T. (2002). Strain, Personality Traits, and Delinquency: Extending General Strain Theory. *Criminology*, *40*, 43–72.

Anderson, K. O., Bradley, L. A., Young, L. D., McDaniel, L. K., & Wise, C. M. (1985). Rheumatoid arthritis: review of psychological factors related to etiology, effects, and treatment. *Psychological Bulletin*, *98*(2), 358.

Araji, S., & Finkelhor, D. (1985). Explanations of pedophilia: Review of empirical research. *Journal of the American Academy of Psychiatry and the Law Online*, *13*(1), 17–37.

Barsky, A. J., & Klerman, G. L. (1983). Overview: hypochondriasis, bodily complaints, and somatic styles. *Am J Psychiatry*, *140*, 273.

Becerra-García, J. A., García-León, A., Muela-Martínez, J. A., & Egan, V. (2013). A controlled study of the Big Five personality dimensions in sex offenders, non-sex offenders and non-offenders: relationship with offending behaviour and childhood abuse. *The Journal of Forensic Psychiatry & Psychology*, *24*(2), 233–246. https://doi.org/10.1080/14789949.2013.764463

Beech, A. R., & Mann, R. (2003). Recent developments in the assessment and treatment of sexual offenders. In *Offender Rehabilitation and Treatment: Effective Programmes and Policies to Reduce Re-offending* (pp. 259–288). John Wiley & Sons.

BFS - Polizeiliche Kriminalstatistik (PKS) 2015. (2016, March 21). Retrieved June 6, 2016, from http://www.bfs.admin.ch/bfs/portal/de/index/themen/19/03/02/key/02.html

Boillat, C., Schwab, N., Stutz, M., Pflueger, M. O., Graf M., & Rosburg, T. (*in press*). Neuroticism as a risk factor for child abuse in victims of childhood sexual abuse. *Child Abuse & Neglect.*

Bonta, J., & Andrews, D. A. (2007). Risk-need-responsivity model for offender assessment and rehabilitation. *Rehabilitation*, *6*, 1–22.

Cale, E. M. (2006). A quantitative review of the relations between the “Big 3” higher order personality dimensions and antisocial behavior. *Journal of Research in Personality*, *40*(3), 250–284.

Caspi, A., Moffitt, T. E., Silva, P. A., & Stouthamer-Loeber, M. (1994). Are Some People Crime-Prone - Replications of the Personality-Crime Relationship across Countries, Genders, Races, and Methods. *Criminology*, *32*, 163–196.

Caspi, A., & Roberts, B. W. (1990). Personality continuity and change across the life course. *Handbook of Personality: Theory and Research*, *2*, 300–326.

Chamorro-Premuzic, T., & Reichenbacher, L. (2008). Effects of personality and threat of evaluation on divergent and convergent thinking. *Journal of Research in Personality*, *42*(4), 1095–1101.

Cioffi, D. (1991). Beyond attentional strategies: A cognitive-perceptual model of somatic interpretation. *Psychological Bulletin*, *109*(1), 25.

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*(1), 103.

Cohen, L. J., & Galynker, I. I. (2002). Clinical features of pedophilia and implications for treatment. *Journal of Psychiatric Practice®*, *8*(5), 276–289.

Cohen, L. J., Grebchenko, Y. F., Steinfeld, M., Frenda, S. J., & Galynker, I. I. (2008). Comparison of Personality Traits in Pedophiles, Abstinent Opiate Addicts, and Healthy Controls: Considering Pedophilia as an Addictive Behavior. *The Journal of Nervous and Mental Disease*, *196*(11), 829–837. https://doi.org/10.1097/NMD.0b013e31818b4e3d

Cohen, L., McGeoch, P., Watras-Gans, S., Acker, S., Poznansky, M. S. W., Cullen, K., & Itskovich, Y. (2002). Personality impairment in male pedophiles. *The Journal of Clinical Psychiatry*, *63*(10), 912–919.

Costa, P. T. J. (1991). Clinical use of the five-factor model: An introduction. *Journal of Personality Assessment*, *57*(3), 393–398.

Costa Jr., P. T., & McCrae, R. R. (1987). Neuroticism, Somatic Complaints, and Disease: Is the Bark Worse than the Bite? *Journal of Personality*, *55*(2), 299–316. https://doi.org/10.1111/1467-6494.ep8970749

Côté, S., & Moskowitz, D. S. (1998). On the dynamic covariation between interpersonal behavior and affect: prediction from neuroticism, extraversion, and agreeableness. *Journal of Personality and Social Psychology*, *75*(4), 1032.

Deegener, G. (1996). *Multiphasic sex inventory (MSI): Fragebogen zur Erfassung psychosexueller Merkmale bei Sexualtätern: Handbuch*. Hogrefe, Verlag für Psychologie.

Dennison, S. M., Stough, C., & Birgden, A. (2001). The big 5 dimensional personality approach to understanding sex offenders. *Psychology, Crime & Law*, *7*(1–4), 243–261. https://doi.org/10.1080/10683160108401796

Desmet, M., Van Hoorde, H., Verhaeghe, P., Meganck, R., Vanheule, S., & Van den Abeele, T. (2008). Interpersonal profiles and neurotic symptoms: Are they associated with each other? *Psychoanalytic Psychology*, *25*(2), 342.

Diamond, E. (1982). The Role of anger and hostility in essential hypertension and coronary heart disease. *Psychological Bulletin*, *92*(2), 410–433.

Egan, V., Kavanagh, B., & Blair, M. (2005). Sexual Offenders Against Children: The Influence of Personality and Obsessionality on Cognitive Distortions. *Sexual Abuse: A Journal of Research and Treatment*, *17*(3), 223–240. https://doi.org/10.1177/107906320501700301

Eysenck, H. J. (1950). *Dimensions of Personality*. Transaction Publishers.

Eysenck, H. J. (1971). Personality and sexual adjustment. *The British Journal of Psychiatry, 118*(547), 593–608.

Fagan, P. J., Wise, T. N., Jr, C. W. S., Ponticas, Y., Marshall, R. D., & Jr, P. T. C. (1991). A Comparison of Five-Factor Personality Dimensions in Males With Sexual Dysfunction and Males With Paraphilia. *Journal of Personality Assessment, 57*(3), 434–448. https://doi.org/10.1207/s15327752jpa5703_4

Feldman, P. J., Cohen, S., Doyle, W. J., Skoner, D. P., & Gwaltney Jr, J. M. (1999). The impact of personality on the reporting of unfounded symptoms and illness. *Journal of Personality and Social Psychology*, *77*(2), 370.

Finkelhor, D., & Araji, S. (1986). Explanations of pedophilia: A four factor model. *Journal of Sex Research*, *22*(2), 145–161.

Franke, G. H., & Derogatis, L. R. (2002). *SCL-90-R: Symptom-Checkliste von LR Derogatis: deutsche Version: Manual*. Beltz Test.

Gunthert, K. C., Cohen, L. H., & Armeli, S. (1999). The role of neuroticism in daily stress and coping. *Journal of Personality and Social Psychology, 77*(5), 1087.

Hall, G. C. N., & Hirschman, R. (1991). Toward a theory of sexual aggression: a quadripartite model. *Journal of Consulting and Clinical Psychology*, *59*(5), 662.

Hall, R. C. W., & Hall, R. C. W. (2007). A Profile of Pedophilia: Definition, Characteristics of Offenders, Recidivism, Treatment Outcomes, and Forensic Issues. *Mayo Clinic Proceedings*, *82*(4), 457–471. https://doi.org/10.4065/82.4.457

Hanson, R. K., & Bussiere, M. T. (1998). Predicting Relapse: A Meta-Analysis of Sexual Offender Recidivism Studies. *Journal of Consulting*, *66*(2), 348–362. https://doi.org/10.1037/0022-006X.66.2.348

Hanson, R. K., & Morton-Bourgon, K. E. (2005). The Characteristics of Persistent Sexual Offenders: A Meta-Analysis of Recidivism Studies. *Journal of Consulting*, *73*(6), 1154–1163.

Krueger, R. F., Schmutte, P. S., Caspi, A., Moffitt, T. E., Campbell, K., & Silva, P. A. (1994). Personality traits are linked to crime among men and women: evidence from a birth cohort. *Journal of Abnormal Psychology*, *103*(2), 328.

Långström, N., Sjöstedt, G., & Grann, M. (2004). Psychiatric Disorders and Recidivism in Sexual Offenders. *Sexual Abuse: A Journal of Research & Treatment*, *16*(2), 139–150.

Larsen, R. J. (1992). Neuroticism and selective encoding and recall of symptoms: evidence from a combined concurrent-retrospective study. *Journal of Personality and Social Psychology*, *62*(3), 480.

Listwan, S. J., Voorhis, P. V., & Ritchey, P. N. (2007). Personality, Criminal Behavior, and Risk Assessment Implications for Theory and Practice. *ResearchGate*, *34*(1), 60–75. https://doi.org/10.1177/0093854806289195

Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2005). The relationship between the five-factor model of personality and symptoms of clinical disorders: a meta-analysis. *Journal of Psychopathology and Behavioral Assessment*, *27*(2), 101–114.

McCrae, R. R. (1991). The five-factor model and its assessment in clinical settings. *Journal of Personality Assessment*, *57*(3), 399–414.

Miller, J. D., & Lynam, D. (2001). Structural Models of Personality and their Relation to Antisocial Behavior: A Meta-Analytic Review. *Criminology*, *39*, 765–798.

Miller, T. R. (1991). The psychotherapeutic utility of the five-factor model of personality: A clinician's experience. *Journal of Personality Assessment*, *57*(3), 415–433.

Murray, J. B. (2000). Psychological Profile of Pedophiles and Child Molesters. *The Journal of Psychology*, *134*(2), 211–224. https://doi.org/10.1080/00223980009600863

Ormel, J., & Wohlfarth, T. (1991). How neuroticism, long-term difficulties, and life situation change influence psychological distress: a longitudinal model. *Journal of Personality and Social Psychology*, *60*(5), 744.

Ostendorf, F., & Angleitner, A. (2004). *NEO-Persönlichkeitsinventar nach Costa und McCrae, Revidierte Fassung (NEO-PI-R)*. Hogrefe Göttingen.

R Core Team. (2015). R: A language and environment for statistcal computing. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from http://www.R-project.org/.

Raymond, N. C., Coleman, E., Ohlerking, F., Christenson, G. A., & Miner, M. (1999). Psychiatric comorbidity in pedophilic sex offenders. *American Journal of Psychiatry, 156(5)*, 786-788.

Rosenheim, E., & Neumann, M. (1981). Personality characteristics of sexually dysfunctioning males and their wives. *Journal of Sex Research*, *17*(2), 124–138.

Schaefer, G. A., Mundt, I. A., Feelgood, S., Hupp, E., Neutze, J., Ahlers, C. J., … Beier, K. M. (2010). Potential and Dunkelfeld offenders: Two neglected target groups for prevention of child sexual abuse. *International Journal of Law and Psychiatry*, *33*(3), 154–163. https://doi.org/10.1016/j.ijlp.2010.03.005

Van Voorhis, P., Spruance, L., Ritchie, P. N., Johnson-Listwan, S., Seabrook, R., Pealer, J., & others. (2002). The Georgia cognitive skills experiment outcome evaluation: Phase II. *(Unpublished Report.) Cincinnati: University of Cincinnati*.

Vassend, O., & Skrondal, A. (1999). The problem of structural indeterminacy in multidimensional symptom report instruments. The case of SCL-90-R. *Behaviour Research and Therapy*, *37*(7), 685–701. https://doi.org/10.1016/S0005-7967(98)00182-X

Ward, T., Hudson, S. M., Johnston, L., & Marshall, W. L. (1997). Cognitive distortions in sex offenders: An integrative review. *Clinical Psychology Review*, *17*(5), 479–507. https://doi.org/10.1016/S0272-7358(97)81034-3

Ward, T., & Siegert, R. J. (2002). Toward a comprehensive theory of child sexual abuse: A theory knitting perspective. *Psychology, Crime and Law*, *8*(4), 319–351.

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: exploring the central role of negative affectivity. *Psychological Review*, *96*(2), 234.

Wilson, G. D., & Cox, D. N. (1983). Personality of paedophile club members. *Personality and Individual Differences*, *4*(3), 323–329.

Wilson, R. J. (1999). Emotional congruence in sexual offenders against children. *Sexual Abuse: A Journal of Research and Treatment*, *11*(1), 33–47.

Table 1

Demographic data: Median values with the relevant minimum and maximum values per group and differences between the groups

Demographics	CSO (N = 40)		CTL (N = 21)		Group comparison[a]
					CSO vs. CTL
	Md	(range)	Md	(range)	
Age	36.5	(18-55)	26.0	(18-49)	561.0*
Years of training	13.0	(10-23)	13.0	(10-21)	371.5
Verbal IQ	107.0	(64-136)	104.0	(89-130)	478.5
Non-verbal IQ	116.0	(94-138)	114.0	(102-131)	462.0

[a]Wilcoxon Test: W–values

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2

Multiphasic Sex Inventory (MSI): Median values with the relevant minimum and maximum values per group and differences between the groups. Comment: Scores are converted to percentages (% of the maximum item score)

MSI	CSO (N = 40)		CTL (N = 21)		Group comparison[a]
					CSO vs. CTL
	Md	(range)	Md	(range)	
Child Molest					
Fantasy	60.0	(0-100)	0.0	(0-10)	762.0***
Grooming	20.0	(0-80)	20.0	(0-40)	513.0
Sexual Assault/Attack	27.5	(0-89)	0.0	(0-11)	685.5***
Aggravated Sexual Assault	17.0	(0-83)	0.0	(0-00)	651.0***
Incest	0.0	(0-100)	0.0	(0-0)	567.0**
Total Score	25.5	(3-72)	5.0	(0-10)	807.5***
Abuse of Girls	33.0	(0-100)	0.0	(0-33)	654.5***
Abuse of Boys	0.0	(0-100)	0.0	(0-33)	593.0**
Sexual Dysfunctions					
Sexual Inadequacies	12.0	(0-62)	0.0	(0-12)	606.0**
Premature Ejaculation	0.0	(0-100)	0.0	(0-100)	454.5
Physical Disabilities	0.0	(0-25)	0.0	(0-12)	394.5
Impotence	8.0	(0-50)	0.0	(0-8)	601.5**
Validity Scales					
Social Sexual Desirability	78.5	(43-100)	83.0	(49-100)	355.0
Lie: Child Molest	54.0	(8-100)	100.0	(85-100)	58.0***
Cognitive Distortion/Immaturity	22.5	(0-70)	10.0	(0-35)	649.5***

[a]Wilcoxon Test: W–values

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Symptom Checklist-90-R (SCL-90-R): Median values with the relevant minimum and maximum values per group and differences between the groups

SCL-90-R	CSO (N = 40)		CTL (N = 21)		Group comparison[a]
					CSO vs. CTL
	Md	(range)	Md	(range)	
Somatization	17.0	(0.0-83.0)	8.0	(0.0-40.0)	1.96
Obsessive-compulsive	25.0	(0.0-105.0)	12.0	(0.0-55.0)	2.70
Interpersonal sensitivity	22.0	(0.0-122.0)	8.0	(0.0-61.0)	5.88*
Depression	24.0	(0.0-119.0)	8.0	(0.0-63.0)	5.09*
Anxiety	12.0	(0.0-80.0)	5.0	(0.0-50.0)	6.50*
Anger-hostility	17.0	(0.0-175.0)	0.0	(0.0-104.0)	2.17
Phobic anxiety	0.0	(0.0-114.0)	0.0	(0.0-39.0)	8.57**
Paranoid ideation	25.0	(0.0-192.0)	17.0	(0.0-88.0)	2.70
Psychoticism	16.0	(0.0-95.0)	0.0	(0.0-62.0)	13.50***
Global Severity Index	0.4	(0.0-1.4)	0.2	(0.0-0.8)	8.28**

[a]Wilcoxon Test: W–values

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 4

Multiphasic Sex Inventory (MSI): Median values with the relevant minimum and maximum values per group (low/high neuroticism) and differences between the groups. Comment: Scores are converted to percentages (% of the maximum item score)

MSI	low (N = 20)		high (N = 20)		Group comparison[a]
					low vs. high
	Md	(range)	Md	(range)	
Child Molest					
Fantasy	60.0	(0-100)	60.0	(0-90)	218.0
Grooming	30.0	(0-70)	20.0	(0-80)	190.5
Sexual Assault/Attack	16.5	(0-78)	38.5	(0-89)	248.5
Aggravated Sexual Assault	17.0	(0-67)	17.0	(0-83)	210.0
Incest	0.0	(0-75)	25.0	(0-100)	258.5
Total Score	19.5	(8-64)	34.5	(5-72)	224.5
Abuse of Girls	33.0	(0-100)	33.0	(0-100)	207.0
Abuse of Boys	0.0	(0-100)	33.0	(0-100)	270.0*
Sexual Dysfunctions					
Sexual Inadequacies	0.0	(0-25)	18.5	(0-62)	319.5***
Premature Ejaculation	0.0	(0-25)	25.0	(0-100)	312.0***
Physical Disabilities	0.0	(0-12)	0.0	(0-25)	222.0
Impotence	0.0	(0-17)	8.0	(0-50)	285.5*
Validity Scales					
Social Sexual Desirability	83.0	(57-100)	75.5	(43-97)	161.5
Lie: Child Molest	65.5	(8-92)	46.0	(8-100)	175.5
Cognitive Distortion/Immaturity	20.0	(0-45)	35.0	(10-75)	291.0*

[a]Wilcoxon Test: W-values

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5

Symptom Checklist90-R (SCL-90): Median values with the relevant minimum and maximum values per group (low/high neuroticism) and differences between the groups

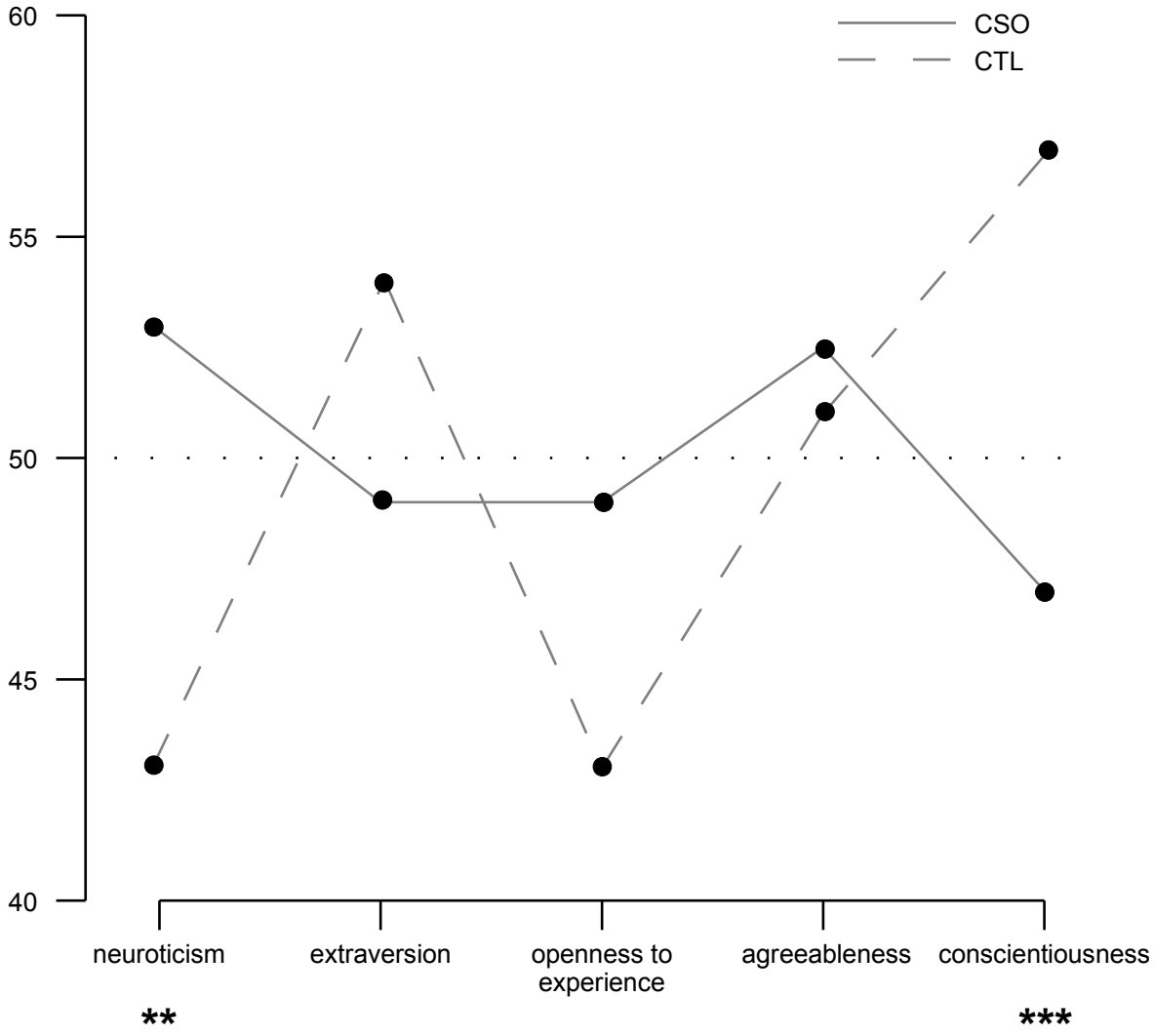
SCL-90-R	low (N = 20)		high (N = 20)		Group comparison[a]
					low vs. high
	Md	(range)	Md	(range)	
Somatization	4.0	(0-27)	10.0	(2-40)	330.5***
Obsessive-compulsive	5.0	(0-12)	21.0	(0-42)	340.0***
Interpersonal sensitivity	3.0	(0-28)	22.0	(3-44)	364.5***
Depression	4.0	(0-31)	22.0	(2-62)	348.0***
Anxiety	2.0	(0-25)	12.0	(2-32)	327.0***
Anger-hostility	0.0	(0-17)	10.0	(0-42)	312.5**
Phobic anxiety	0.0	(0-11)	4.0	(0-32)	256.5
Paranoid ideation	0.0	(0-29)	17.0	(0-46)	315.5**
Psychoticism	2.0	(0-12)	13.5	(0-38)	340.5***
Global Severity Index	0.2	(0.02-0.69)	0.7	(0.16-1.39)	364.0***

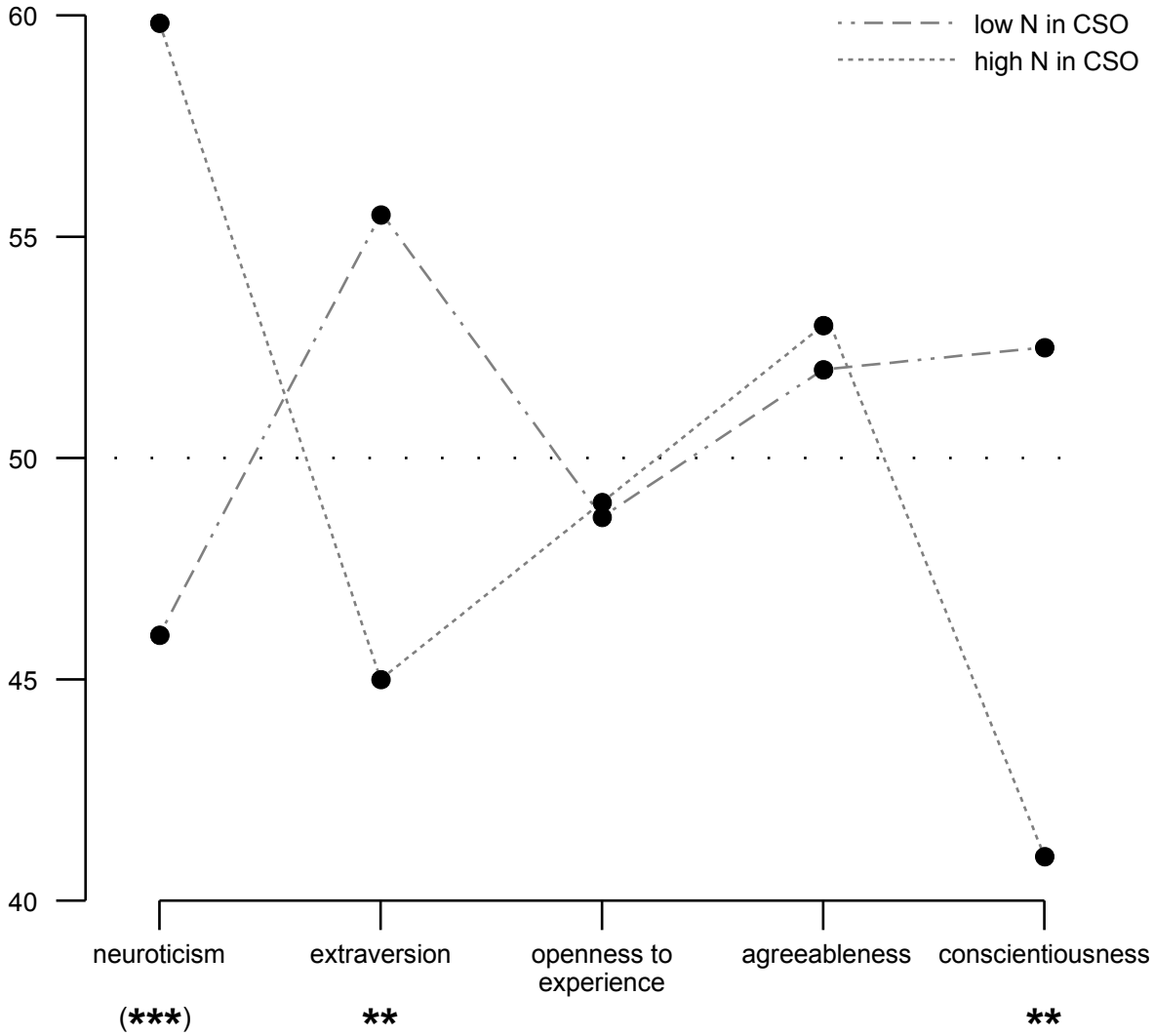
[a]Wilcoxon Test: W–values

* $p < .05$, ** $p < .01$, *** $p < .001$

Figure 1. NEO-Personality Inventory-Revised (NEO-PI-R). Age-corrected profiles of the two groups in the five personality factors. The T-transformed group median values are stated.

Figure 2. NEO-Personality Inventory-Revised (NEO-PI-R). Age-corrected profiles of the two groups (low/high neuroticism) in the five personality factors. The T-transformed group median values are stated.


60
55
50
45
40
CSO
CTL
neuroticism
extraversion
openness to experience
agreeableness
conscientiousness
**
***


low N in CSO
high N in CSO
60
55
50
45
40
neuroticism
extraversion
openness to experience
agreeableness
conscientiousness
(***)
**
**

ANHANG A-3

Publikation 3:

Rosburg, T., Pflueger, M. O., Mokros, A., Boillat, C., Deuring, G., & Graf, M. (*submitted*). Indirect and neuropsychological indicators of pedophilic sexual interest and offending. *Sexual Abuse.*

Sexual Abuse

Indirect and neuropsychological indicators of pedophilic sexual interest and offending

Journal:	*Sexual Abuse*
Manuscript ID	Draft
Manuscript Type:	Original Research Article
Keywords:	Pedophilia, Child Sexual Abuse, Neuropsychology, Paraphilia, Implicit Tests, Child Pornography

Abstract:	The present study aimed at differentiating pedophilic child sex offenders (CSOs) from non-offending adult-sexual controls, as well as contact from non-contact CSOs. For this purpose, we investigated 22 contact CSOs, 21 non-contact CSOs (child pornography offenders), and 21 controls. The outcome variables comprised neuropsychological tests and indirect measures of sexual interest. Based on a machine learning algorithm, three parameters of implicit tasks and neuropsychological tests each allowed differentiating CSOs from controls with a maximum accuracy of 86 %. The implicit test parameters reflect deviant sexual preference, whereas the identified neuropsychological test measures (such as risk taking and impulsivity) presumably capture the tendency to commit sexual offences against children. The differentiation within CSOs was based on neuropsychological test measures only, reflecting somewhat better cognitive functions in non-contact CSOs. The findings suggest that standardized, objective methods can support the assessment of sexual offenders against children in forensic psychiatry and legal psychology.

Running Head: INDICATORS OF PEDOPHILIC SEXUAL INTEREST

Abstract

The present study aimed at differentiating pedophilic child sex offenders (CSOs) from non-offending adult-sexual controls, as well as contact from non-contact CSOs. For this purpose, we investigated 22 contact CSOs, 21 non-contact CSOs (child pornography offenders), and 21 controls. The outcome variables comprised neuropsychological tests and indirect measures of sexual interest. Based on a machine learning algorithm, three parameters of implicit tasks and neuropsychological tests each allowed differentiating CSOs from controls with a maximum accuracy of 86 %. The implicit test parameters reflect deviant sexual preference, whereas the identified neuropsychological test measures (such as risk taking and impulsivity) presumably capture the tendency to commit sexual offences against children. The differentiation within CSOs was based on neuropsychological test measures only, reflecting somewhat better cognitive functions in non-contact CSOs. The findings suggest that standardized, objective methods can support the assessment of sexual offenders against children in forensic psychiatry and legal psychology.

Keywords: Pedophilia; child sex offences; neuropsychology; paraphilia; implicit tests

Pedophilia is a clinical diagnosis for adults who are recurrently and strongly sexually attracted to prepubescent children. The Diagnostic and Statistical Manual of Mental Disorders (DSM)-5 differentiates between pedophilic sexual interest and pedophilic disorder. The latter applies if the person affected suffers from feelings of guilt, shame, or anxiety, if the person is otherwise adversely affected, or if the person acted sexually against minors (American Psychiatric Association, 2013). Of note, child sexual offences can also be related to other traits than pedophilia, such as psychopathy (Porter et al., 2000), as well as to states, such as alcohol consumption (Rada, 1976). Furthermore, situational factors, such as access to children, locations to abuse them, and the trust and compliance of the victims may increase the risk of committing sexual offenses against children (Holt & Massey, 2012). Nevertheless, pedophilia has to be considered as a severe risk factor for sexual offences against children (Ward & Hudson, 1998). Seto (2004) estimated that 40 to 50 % of adult child sex offenders (CSOs) are pedophilic. Seto also pointed out that much of what we have learned about pedophilia comes from studies with criminal samples, rather than from studies on self-identified pedophiles or clinical samples (see also Neutze, Grundmann, Scherner, & Beier, 2012).

Given that CSOs are considered as "one of the most loathed and reviled groups of people in contemporary culture" (Mason, 2014) and because this culture differentiates much too little between CSOs and pedophiles, research on pedophilia is confronted with the problem that only few pedophiles will voluntarily disclose their intense sexual attraction to prepubescent children. Pedophiles might deny their sexual interests in children not just because they fear negative consequences, but also because these interests conflict with their own self-perception and values. Even in convicted CSOs, the rate of perpetrators who deny their offense or minimize their responsibility is considerable (Barbaree, 1991; Marshall, 1994).

The denial and the minimization of pedophilic interest and/or of child sexual offences represent a problem both in the diagnosis of pedophilia as well as in the therapeutic work with CSOs. Clinicians might consider deniers as being unready for psychotherapeutic treatment programs and, therefore, exclude them from participation. Other clinicians considered the reduction of denial and minimization in (child) sex offenders as one major goal of treatment (Marshall, 1994; Schneider & Wright, 2004). However, aside from interviewing the patient or offender or using questionnaires, such as the Multiphasic Sex Inventory (MSI) (Mackaronis,

Strassberg, & Marcus, 2011; Nichols & Molinder, 2001) or the Explicit Sexual Interest Questionnaire (ESIQ) (Banse, Schmidt, & Clarbour, 2010), what are the means for a forensic psychiatrist or psychologist to reveal evidence for the presence of pedophilic interest or pedophilic disorder when it is heavily denied by the patient?

There is yet no established objective method for diagnosing pedophilia. In North America, penile plethysmography, also named phallometry, is commonly used to investigate the reaction to potentially erotic stimuli with the aim to determine sexual preferences. Penile plethysmography measures the blood flow to the penis in reaction to erotic stimuli. It has been shown that this method has a fairly good sensitivity and high specificity for identifying pedophiles (Cantor & McPhail, 2015). Moreover, penile plethysmography has been used in hundreds of court decisions sentencing convicted sex offenders in Canada (Purcell, Chandler, & Fedoroff, 2015). However, penile plethysmography has been criticized for lack of standardization (Marshall & Fernandez, 2003; Purcell et al., 2015), reliability (Marshall & Fernandez, 2003), and temporal stability (Müller et al., 2014). Moreover, erectile reactions can be voluntarily suppressed (McAnulty & Adams, 1991; Quinsey & Chaplin, 1988), further questioning the validity of the method. However, ethical concerns are the major reason why penile plethysmography is hardly used in European countries (Babchishin, Nunes, & Hermann, 2013). The intrusive character of this kind of examination might especially contribute to the hesitant attitude of western European clinicians as well as researchers towards penile plethysmography (Harris, Rice, Chaplin, & Quinsey, 1999).

Another clearly less intrusive approach is to record blood oxygen level decrease (BOLD) responses in fMRI scanners while patients are exposed to sexual stimuli. This method does not record the peripheral physiological response to such stimuli, but the neurocognitive correlates of processing sexual stimuli. Early fMRI studies revealed that pedophiles show increased BOLD responses in the amygdala to images of children, as compared to controls (Sartorius et al., 2008). Moreover, pedophiles show reduced activity to adult-sexual stimuli in the hypothalamus and lateral prefrontal cortex, as compared to controls (Walter et al., 2007). A previous fMRI study was able to discriminate pedophiles from non-pedophiles with very high accuracy on the basis of their BOLD responses to sexual stimuli (nude persons, genitals) (Ponseti et al, 2012) or faces (Ponseti et al., 2014; 2016). Event-related potentials (ERPs) have also been used to investigate the differential processing of erotic stimuli in pedophiles and non-pedophiles (Howard, Longmore, Mason, & Martin, 1994;

Knott, Impey, Fisher, Delpero, & Fedoroff, 2016). At first glance, the results of these still initial ERP and fMRI studies appear promising. However, in most of the studies the included patients admitted their sexual interest in children. Thus, it remains open whether, and to what extent, deception can have an influence on the observed activation patterns and the resulting discrimination accuracy. For any subject participating in such studies, the purpose of the testing is likely more than evident from the presented materials and the context of the testing.

In contrast with the penile plethysmography and the fMRI/ERP recordings described above, attempts at faking good might be successfully avoided through implicit test procedures. This kind of tests seeks to tackle functions of automated response selection and behavioral control. Automated response selection is fast, effortless, and cannot be easily verbalized (Shiffrin & Schneider, 1977). Moreover, implicit tests often quantify indirect behavioral measures, making it difficult for subjects to discover the true purpose of an implicit test without background knowledge. The most prominent example in the context of pedophilia research is measuring viewing time (VT). In VT tests, subjects are instructed to rate the sexual attractiveness of visual stimuli. For subjects, it appears that the ratings of pictures provide the critical information, whereas, in fact, the investigator's primary interest is the VT for categories of visual stimuli, with longer VT for one depicted category indicating a stronger sexual interest (Rosenzweig, 1942). A recent meta-analysis showed that VT allows the differentiation of CSOs and non-offenders, but also of CSOs and other kinds of (sexual) offenders (Schmidt, Babchishin, & Lehmann, 2017). The authors of this meta-analysis do, however, also emphasize that the success of this procedure crucially depends on that the measurement rationale is not transparent to the subjects.

The Implicit Association Test (IAT), developed by Greenwald, McGhee, and Schwartz (1998), represents another example for implicit tests. The IAT measures the strength of automatic associations between a category (e.g. adult vs. child) and an attribute (e.g. sexy vs. non-sexy) by recording the response speed in a sorting task (Babchishin et al., 2013). Again, the critical information derived from the IAT (change in response speed from a congruent to an incongruent condition) cannot be identified by subjects who are naïve about the theoretical background of this test. In their meta-analysis, Babchishin et al. (2013) showed that IAT scores allow distinguishing between CSOs and non-offenders, but with a slightly lower discriminative power compared to VT. Other implicit tests used sexual stimuli as distractors from a primary task (e.g. Dombert et al., 2015; Jordan et al., 2016). Such distractor tasks are

not primarily designed with the purpose to determine sexual preference but to assess the cognitive control functions when encountering sexually salient stimuli and might provide useful tools in therapy assessment.

Several studies on pedophilia aimed at identifying factors contributing to the development of pedophilia or increasing the likelihood of child molesting. Such studies investigated impairments of cognitive control functions (Habermeyer et al., 2013; Schiffer & Vonlaufen, 2011; Suchy, Whittaker, Strassberg, & Eastvold, 2009), structural brain abnormalities (Cantor et al., 2008; Schiffer et al., 2007), lower IQ, and a higher rate of left-handedness (Blanchard et al., 2007; Cantor et al., 2004), lower processing speed (Suchy et al., 2009), or personality profile (Cohen et al., 2002; Wilson & Cox, 1983). Some of these findings, such as the structural brain abnormalities, lower IQ, and a higher rate of left-handedness in pedophiles, support the notion that pedophilia might represent a neurodevelopmental disorder. Of note, these studies indicate that pedophiles, on average, differ from non-pedophilic samples in these characteristics. However, the presence of these characteristics in a subject alone cannot be considered as evidence for pedophilia.

Besides hands-on child abuse, child pornography, virtual child abuse, and grooming via Internet, all increased parallel with the rapid growth and expansion of the Internet (Quayle & Taylor, 2003). Seto, Cantor, and Blanchard (2006) suggested that child pornography offences are a stronger indicator of pedophilia than contact child sexual offences, with over 60 % of the child pornography offenders identified as being pedophilic. A more recent meta-analysis of Seto, Hanson, and Babchishin (2011) indicated that more than half of the child pornography offenders also admitted a contact sexual offence. There has been some debate whether child pornography offenders represent a distinct group of sex offenders (Babchishin, Hanson, & Hermann, 2011). The meta-analysis of Babchishin et al. (2011) shows that online offenders and contact offenders share some characteristics, such as greater rates of experienced sexual childhood abuse than the general population. However, the analysis also suggests some differences between the two groups, with child pornography offenders having better self-control and more psychological barriers to acting on their deviant interests than contact offenders. However, there are very few studies that actually compared contact CSOs and child pornography offenders (non-contact CSOs).

In the current study, [redacted] we investigated contact CSOs with pedophilic responsiveness, non-contact CSOs with no history of child sexual assaults, and a non-offending heterosexual control group with a comprehensive battery of implicit tests, questionnaires, neuropsychological tests, and psychophysiological recordings. The study aimed at differentiating offenders from non-offenders, as well as contact offenders from non-contact offenders, on the basis of the collected behavioral data. For this purpose, the behavioral variables were subjected to a random forest algorithm (Breiman, Friedman, Stone, & Olshen, 1984), which is a machine learning technique that seeks optimal classification by a minimal set of variables. By this, we sought to reveal a circumscribed set of measurable and easily accessible indicators of pedophilic offenders.

Method

Participants

Data on three groups of adult male individuals were obtained: we obtained data from offenders who were either convicted of or admitted to a contact sexual offense against a child (contact CSOs; n = 22); offenders who had been convicted of or admitted accessing, storing, or producing child sexual material (non-contact CSOs, aka child pornography users; n = 21); and healthy non-offender controls (CTL; n = 21). Participants of the sexual offender groups were recruited among the outpatients and, to a lesser extent, among the inpatients of forensic-psychiatric hospitals in [redacted]. CTLs were recruited by advertisements in two local newspapers. All study participants received [redacted] as reimbursement for participation.

Inclusion criteria for all participants were male gender, between 18 and 55 years of age, an IQ of 70 or above, and a sufficient command of written and spoken German, as well as unrestricted legal capacity to consent. For CTLs, only individuals who identified themselves as heterosexual were included. For contact CSOs, a diagnosis of pedophilia and at least one corresponding conviction of a sexual offense against a child, or admitting to such an offense, were mandatory, as well as a low risk for reoffending due to security precautions. For non-contact CSOs, either a previous conviction for a child pornography offense or admitting to the use of such material was obligatory, as well as heterosexual sexual gender orientation.

Heterosexuality in the non-contact CSO and CTL groups was stipulated in order to limit sample heterogeneity. The same criterion could not be applied to the individuals eligible for the contact CSO group, however. Otherwise, not enough individuals could have been recruited for this group.

For all participants, exclusion criteria were acute diagnoses of psychiatric Axis I disorders according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders, revised fourth edition (*DSM-IV-TR*; American Psychiatric Association, 2000), physical health conditions (e.g., severe head trauma, other neurological conditions or systemic diseases possibly affecting a valid cognitive and clinical assessment), the use of medication potentially impairing performance in the tests conducted, substance abuse/dependency, and anti-androgenic therapy. Finally, for CTLs, a sexual preference for children and a previous conviction for sexual or violent offenses were incompatible with study participation. In order to counteract the potential risk of cognitive response bias, participants were not fully informed about the study aims. Instead, a cover story was used, focusing on male social gender roles. Participants were informed about the actual study aims after the administration of the implicit tests on the second day of testing (**Table 1**).

- insert Table 1 here -

All participants were assessed individually on two consecutive days: by first checking eligibility based on the inclusion/exclusion criteria, followed by obtaining demographic data, job status, psychological state, and medical history through semi-structured interviews and self-report questionnaires. Subsequently, a comprehensive neuropsychological assessment was conducted. On the second day of assessment, the neurophysiological and implicit procedures, including a virtual reality (VR) exposure, were conducted. The VR exposure entailed the simulation of a walk on a beach, with avatars of child, adolescent, and adult holidaymakers, allowing measurement of physiological signatures contingent upon sexual preference or experience. Following the VR exposure, the actual study aims were disclosed, complemented by the assessment of the used Not Real People (NRP) picture set (Pacific Behavioral Assessment Corporation, 2004), questionnaires on experienced childhood trauma / abuse (Childhood Trauma Questionnaire, CTQ) (Bernstein & Fink, 1998) and on sexual characteristics (Multiphasic Sex Inventory, MSI) (Deegener, 1996). The order of tests was fixed (**Table 1**).

The study was conducted in accordance with the Declaration of Helsinki (2001) and approved by the local Ethics Committee (EK: 256/12). Written informed consent was obtained from all participants. All offenders were informed that all study data were stored anonymously and, thus, could not have any repercussions for their court case.

Materials and Procedures

The principal domains of assessment for the purpose of the current study comprised neuropsychological testing and implicit tests of sexual age preference. Neurophysiological data recorded during one cognitive test (Go/NoGo) and one implicit test (semantic misattribution procedure, SMP), as well as during the VR exposure, were not considered for the current data analysis. The main reason for this decision was that neurophysiological data are, in themselves, highly complex. For example, ERP data have, at minimum, a temporal dimension (latency) and a spatial dimension (electrode position). Moreover, the processing of such data includes several steps from the raw signal (recorded EEG) to the refined ERP signal that is finally considered. Therefore, the psychophysiological data will be published separately.

Neuropsychology. The neuropsychological testing battery was administered in order to assess attention, working memory, episodic memory, executive functions, risk-taking behavior, intelligence, and motor functions. The individual tests are summarized in **Table 2**. The neuropsychological assessment yielded 50 variables in total that were subjected to the classification analysis later on.

- insert Table 2 here -

Implicit tests. Four implicit tests on sexual preference were conducted (IAT, VT, SMP, choice reaction time CRT task, **Table 1**). The IAT allows estimating the strengths of implicit attitudes by comparing carry-over effects when shifting concept/response contingencies from congruent to incongruent conditions (e.g., when a button originally assigned to both the concept “adult” and attribute “sexual” is used for the concept “child” and attribute “sexual”). In the current study, the concept of maturation (adult vs. child) was represented by five Not-Real-People pictures (Pacific Behavioral Assessment Corporation, 2004) of children (Tanner stage 1) and adults (Tanner stage 5) from either gender, all clad in

swimwear. The set of attributes was subdivided in five sexual and five non-sexual (neutral) ones. The concepts/attributes were presented and scored according to Greenwald, Nosek, and Banaji (2003). The resulting outcome measure yielded a single latency-based effect size (*d*), which was presumed to indicate both the degree and direction of the sexual preference for either children or adults. This single variable was included in the classification analysis.

In the VT paradigm, participants were requested to rate 40 images of a balanced NRP picture set on a 6-point Likert scale from "highly sexually and aesthetically attractive" to "highly sexually and aesthetically unattractive". In order to adjust the influence of gender on the outcome measure we used the maximum median values in VT per Tanner stage irrespective of the gender of a depicted NRP individual (Mokros et al., 2013). These 5 variables (VT per Tanner stage) were subjected to the classification analysis later on.

The third implicit test, the SMP, makes use of conceptual priming effects on the subsequent semantic evaluation of Chinese ideographs that are generally meaningless for Europeans (Blaison, Imhoff, Hühnel, Hess, & Banse, 2012). Basically, the capacity of the SMP to draw inferences on sexual preference has been demonstrated in previous studies by its application to groups of homo- and heterosexual subjects (Imhoff, Schmidt, Bernhardt, Dierksmeier, & Banse, 2011). We adopted the approach described by Imhoff et al. (2011) and modified the SMP by varying the temporal masking conditions of the prime stimulus in order to obtain subliminal and supraliminal prime trials which likely give rise to differential modes of stimulus processing (Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006; Del Cul, Baillet, & Dehaene, 2007). As prime stimuli, we again used the standardized computer-generated NRP picture set and selected 12 different pictures, showing nude male and female subjects (one each) at pre-, peri-, and postpubertal stages of development (i.e., Tanner stages 1, 3, and 5). Participants were instructed to ignore the prime and to respond the Chinese ideograph only. Participants indicated by pressing a designated button whether a particular ideograph presumably had a sexual or non-sexual meaning (Imhoff et al., 2011). We hypothesized that the Chinese ideographs were more likely assessed as having a sexual meaning after presenting a preferred sexual prime. That is, for controls, sexual attribution would be more likely after primes of Tanner stage 5 than after primes of Tanner stage 1 or 3, whereas pedophile sex offenders would show the opposite pattern. We also expected shorter reaction times (RTs) after sexually preferred primes. Analogously to the analysis of VTs (Mokros et al., 2013), we selected either female or male primes, depending on which of the

two led to higher sexual meaning ratings for the ideograph. We subjected 12 variables of the SMP, 6 response rates (3 Tanner stages x 2 masking conditions) and 6 RTs to the classification analysis later on.

The forth implicit test, the Choice Reaction Time (CRT) task, takes advantage of the effect that sexually attractive imagery induces a sexual content related delay to subsequent cognitive processes (Geer & Bellard, 1996; Gress & Laws, 2009; Mokros, Dombert, Osterheider, Zappalà, & Santtila, 2010). Thus, the relative preference for a stimulus image can be estimated by measuring the time a participant takes to release attention from the image in order to perform a cognitive choice task. Forty female and male NRP images of all 5 Tanner stages, dressed in bathing suits or nude, were presented in the center of a screen. Subjects were instructed to press one of five buttons when an orange mark appeared in one of the four corners or the center of the screen, corresponding to the position of the mark (Mokros et al., 2010; Wright & Adams, 1994, 1999). The RTs were averaged for all combinations of sex by Tanner stage, ignoring the dressed/nude factor. Analogous to the VT procedure, the factor sex was eliminated by choosing the RT values of the sex with longer RTs for each Tanner stage. The resulting 5 variables were also entered into the classification analysis.

Statistics and Classification

The analysis was twofold: (1) we sought to identify indicators for pedophilic vs. teleiophilic sexual preference (i.e., for pre-pubertal children or for adults, respectively). (2) We sought to identify characteristics that would allow the differentiation of contact vs. non-contact offenders within CSOs. For this second analysis, only the data of offenders were considered. Both analyses aimed at identifying a sparse set of variables that would allow optimal differentiation between the groups of participants. For this purpose, we used a random forest algorithm (Breiman et al., 1984; Pflueger, Franke, Graf, & Hachtel, 2015). In short, random forest algorithms represent a kind of stochastic machine learning procedure that optimizes the rate of correct classifications (or predictions) for multivariate data sets.

The random forest algorithm makes use of an array of binary classification and regression trees. Each decision tree is grown from two-thirds of the sample using a randomly selected subset of available variables. Once the forest is completely grown, the overall classification result is achieved by a majority vote of the individual trees. The random forest algorithm provides a “permutation importance” measure that can be used to rank the variables

according to their relative weight for the classification at hand. For the current study, we used a two-step approach for selecting classification variables, with an initial importance optimization and subsequent cross-validated prediction error minimization (Genuer, Poggi, & Tuleau-Malot, 2010). After obtaining the ultimate predictive set of variables from the random forest procedure, we ran a 100-fold model-building and calculated the area under a Receiver Operating Characteristic (ROC) curve from the resulting mean probabilities of class allocation. After the identification of sparse sets in each of the two analyses, post-hoc analyses were performed to estimate the contribution of each variable in the set.

Statistics

Statistical and numerical analyses were performed by using the R environment for statistical computing version 3.2.3 (R Core Team, 2015). Fisher's exact test was used for count data, and the two-sample Wilcoxon test was used for ranked data. The random forest package version 4.6-12 and ranger package version 0.3.0 were used to conduct two variable reduction steps and to create the ultimate prediction model.

Results

Sample characteristics

The three samples were similar in age, education, job prestige, and percentage of Swiss nationals, as well as in verbal and non-verbal intelligence. An exception was a minor but statistically significant effect of more left-handedness in the contact CSO group (**Table 3**).

- insert Table 3 here -

Classification of sexual preference

In order to determine variables that allowed the correct classification of subjects with pedophile vs. teleiophile preferences, the two CSO samples were contrasted to the sample of CTL. The random forest algorithm identified a minimal set of six variables that optimally classified sexual preference. These six variables comprised three implicit task measures: a) viewing time for Tanner stage II (VT_{T2}), b) IAT score, and c) RTs to supraliminally presented

cues of Tanner stage III in the SMP ($SMP_{RT\ T3}$), as well as three neuropsychological test measures: d) impulsivity score of the Cambridge Gambling Task (CGT_{IMP}), e) short delay free recall of the California Verbal Learning Test ($CVLT_{SDFR}$), and f) false alarm rate in the Go/Nogo task ($Nogo_{FA}$). The indicators are listed in descending order, based on their relative contributions to the classification for each of the two kinds of tests. The mean values of these variables for each of the two samples are displayed in **Table 4**. The CSOs were characterized by lower IAT scores and longer VTs, as compared to CTL. Moreover, the CSOs performed worse in the short delay free recall, produced more errors in the Go/Nogo task, and showed an increased impulsivity in the CGT. As the random forest algorithm considers the whole data structure and takes collinearities and higher-order interactions into account, variables used for classification do not necessarily reflect significant group differences, as it here became evident for the identified RT variable in the SMP (**Table 4**).

- insert Table 4 here -

Due to the stochastic nature of its procedure, random forest-modelling was repeated 100 times and the probabilities of correct class allocation were repeatedly derived. The predicted class-probabilities resulted in an average area under the ROC curve (AUC) of 0.940 (±0.011 SD, **Figure 1**), which indicates a large effect size (Dolan & Doyle, 2000). From each of the 100 obtained ROC curves, three cut-off points (COPs) were derived under different constraints. One COP was determined by optimizing specificity, defined as the maximal value where specificity exceeded 95%; a second COP was selected by optimizing sensitivity, defined as the minimal value where sensitivity exceeded 95%; a third COP was revealed by weighting sensitivity and specificity equally (*'Newton criterion'*). For all three COPs, the classification accuracy was > 0.8, as depicted in **Table 5** (upper half). By subdividing the range of predicted class probabilities by these three COPs, four indices of low, mild, moderate, and marked sexual preference for children were derived (**Table 6**). Please note that, due to the probabilistic nature of the random forest classifier, the class boundaries can slightly vary between different runs of the algorithm.

- insert Table 5 here -

- insert Table 6 here -

Classification contact vs. non-contact CSOs

The second random forest analysis aimed at identifying variables for correctly classifying contact CSOs within the offender group. By considering only data from CSOs, the random forest classifier identified three variables for optimally classifying contact CSOs with a minimal set of variables. These three variables were a) the interference score from the Stroop test ($Stroop_{IF}$), b) the total number of errors in the Attention Network Test (ANT_{Err}), and c) the risk height in the Cambridge Gambling Task (CGT_{Risk}) (in descending order based on their relative contribution to the classification). Contact CSOs were characterized by larger levels of interference in the Stroop test, more errors in the ANT, and taking higher risks in CGT, as compared to non-contact CSOs (**Table 7**).

- insert Table 7 here -

The predicted class-probabilities resulted in an average area under the ROC curve (AUC) of 0.764 (±0.012 SD, **Figure 2**). ROC-AUCs > 0.75 are considered as large effect sizes (Dolan & Doyle, 2000). In correspondence with the steps taken to identify margins of classification for pedophilic sexual preference as described in the previous section, again, three COPs were derived that optimized specificity, sensitivity, or the tradeoff between both. The classification accuracies of the three COPs are depicted in **Table 5** (lower half). Classification accuracy was, however, below chance level when specificity was optimized. Finally, a calibration table for different levels of risk was constructed, corresponding to the CSO vs. CTL differentiation (**Table 8**).

- insert Table 8 here -

Discussion

The current study shows that pedophilic sex offenders could be identified on the basis of implicit and neuropsychological test data with an accuracy exceeding 80 %. Both kinds of measurements (implicit tests and neuropsychological tests) contributed to the correct classification. The differentiation between contact CSOs and non-contact CSOs was less pronounced than the differentiation between CSOs and CTL and only neuropsychological tests contributed to it.

Implicit test measures qualifying pedophilic CSOs

Three implicit test measures contributed to the correct classification of pedophilic CSOs: one VT measure, the IAT score, and one RT measure of the SMP. The inclusion of both the VT measure and the IAT score are very well in line with previous studies that described these measures as highly promising for differentiating CSOs from non-offenders or non-sex offenders (Babchishin et al., 2013; Mokros et al., 2013; Schmidt et al., 2017).

In contrast, two other implicit tests (CRT task and SMP) did either not contribute to the classification or did not contribute to the classification in the expected way: Mokros et al. (2010) and Dombert et al. (2015) showed a differential RT pattern in the CRT task between CSOs and non-sex offenders. The current study did not reveal such differences. However, as Santtila et al. (2009) have shown, the CRT effect dissipates with repetitive blocks within an experiment and, thus, might be sensitive to repeated exposure to the stimulus material. In the present study, the CRT was administered after other tests using the identical stimulus material, which might tentatively explain the absence of differential, group specific RT patterns in the current CRT task. Similar to our study, Rönspies et al. (2015) did not reveal a sexual orientation specific RT pattern in the CRT task when comparing men with hetero- and homosexual orientation, but, in this study, the CRT task was administered after other implicit tests as well.

Imhoff et al. (2011) differentiated participants with heterosexual preference from those with homosexual preference on the basis of the SMP. The authors also showed that the frequency of sexual attributions of the Chinese idiom increased with the Tanner stage of the cue. In the current study, the response patterns did not vary between CSOs and controls, and the Tanner stage of the cue had no influence on the likelihood of sexual attributions, either. One possible explanation is that the inclusion of a subliminal cue presentation condition led to the disruption of previously reported effects. In contrast, an RT measure of the SMP unexpectedly contributed to the classification of pedophilic CSOs, even though there were no significant group differences (**Table 4**). The finding underlines that the random forest algorithm considers the complete data structure rather than individual variables and takes collinearities into account. However, it still needs to be shown whether the contribution of this measure to the classification accuracy is temporally stable (replicable).

To sum up, the findings indicate that implicit tests are potentially useful in assessing pedophilic sexual interest. Moreover, the results suggest that it is more reasonable to use a

range of such tests for this purpose rather than just singular tests, as also recommended by others (Banse et al., 2010; Ó Ciardha & Gormley, 2013; van Leeuwen et al., 2013). The use of different tests increases the reliability of the assessment and, maybe more importantly, it increases the difficulty for tested subjects to manipulate the results of such tests. A refinement of the existing implicit tests and their standardization, as well as the collection of normative data, would be as desirable as the development of new implicit test procedures for the described purpose.

Neuropsychological measures distinguishing pedophilic CSOs

Aside from implicit tests, neuropsychological measures contributed to the correct classification of pedophilic CSOs. Two of these measures referred to impulse control (CGT impulsivity score and FA rate in the Go/Nogo task) and the third referred to memory functions (CVLT short delay free recall). The impairment of executive functions has previously been described and represents a relatively consistent finding in pedophilic CSOs (Habermeyer et al., 2013; Schiffer & Vonlaufen, 2011; Suchy et al., 2009). Highly similar to the current findings, Schiffer and Vonlaufen (2011) reported an increased FA rate in a Go/Nogo task for child molesters, as well as deficits in immediate verbal memory recall. These authors argued that the deficits in verbal memory skill appeared to be associated with criminality or violence rather than pedophilia, as the memory deficits were more pronounced in non-pedophilic than pedophilic child molesters. Cantor et al. (2004) reported deficits of immediate verbal recall in pedophiles as well, but also a lower IQ. The IQ in the current study did not vary between the samples, which might be due to a selection bias of the current study, as only low risk, relatively high-functioning, volunteering CSOs were considered for the study. Thus, the here reported neuropsychological deficits probably just represent the tip of the iceberg and may underrepresent the deficits that are present in high-risk pedophilic CSOs. Neuropsychological deficits in pedophilic CSOs might be related to some extent to brain structural alterations, such as lower amounts of gray matter volume in the orbitofrontal cortex (Schiffer et al., 2007) or white matter deficiencies (Cantor et al., 2008). However, to the best of our knowledge, no study has yet attempted to relate brain-structural alterations and neuropsychological deficits in pedophilia. Brain structural alterations in pedophilia support the notion of a neurodevelopmental pathway in this disorder. The increased ratio of left-handers, as previously reported (Cantor et al., 2004) and in the current study observed, has also been considered such evidence (Tenbergen et al., 2015). It remains open currently, as

well, whether the observed neuropsychological deficits are primarily related to the sexual preference (i.e. the recurrent and intensive sexual attraction to prepubescent children) or to the tendency to commit child sexual offences (i.e. to the lack of withstanding the urge of the sexual preference and, thus, acting on these impulses). It appears plausible that the described diminished impulse control in CSOs contributes to the latter. However, the recurrent and intensive sexual attraction to prepubescent children, as well as the urge of acting on these impulses, might be so closely intertwined that the differentiation is rather of theoretical nature than of practical relevance.

This possible intertwining between sexual preference and the tendency to commit child sexual offences is also of importance for considering treatment aims and for evaluating therapy effects, such as for the treatment of pedophilic CSOs with antiandrogen drugs. Antiandrogen drug therapy (ADT) is considered the most potent way to significantly lower or even inhibit sexual drive, which lowers the risk for recidivism (Houts, Taller, Tucker, & Berlin, 2011). The primary goal of ADT is not to erase the sexual drive of patients, but to lower it towards a level that permits the patient to have sufficient control over his urges and, in consequence, prevent sexual behaviors that harm others (Houts et al., 2011). As noted by these authors, ADT is only a starting point for paraphilia management and should be accompanied by psychotherapy (see also Thibaut, 2012). One psychotherapeutic aim should be to make the CSOs aware of his inhibitory (and other) deficits and to create ways to cope with these deficits. Current findings underline the need for neuropsychological assessments in the diagnosis and therapy of CSOs in order to reveal such deficits and to tailor treatment plans adapted to the individual's deficits (and strengths).

Neuropsychological measures distinguishing between contact and non-contact sexual offenders against children

Three neuropsychological measures, but no implicit test measures, contributed to an optimized correct classification between contact CSOs and non-contact CSOs. Even though pedophilia was an inclusion criterion for the contact offenders and none for the non-contact sample, the implicit test parameters did not contribute to the differentiation of the two samples. This finding corroborates the view of Seto et al. (2006), who suggested that the consumption of child pornography itself is a strong indicator of pedophilia. Child pornography offenders often have prior sexual contact offences (Seto & Eke, 2005). Moreover, they show an increased risk for contact offences, whereby the latter appears to be

driven by the combination with prior contact offences rather than by child pornography alone (Endrass et al., 2009; Seto & Eke, 2005). Thus, even though non-contact CSOs might excuse the possession and consumption of child pornography with pure curiosity, both appear commonly to be driven by pedophilic interest.

Merdian, Wilson, and Boer (2009) suggested that non-contact CSOs have higher education, including higher computer literacy, as compared to contact offenders, due to the fact that child pornography is usually accessed directly from websites (via downloads or streaming) or indirectly, via the exchange of such material in Internet-based child pornography communities. Moreover, non-contact CSOs might exhibit less cognitive distortions, as compared to contact CSOs (Merdian, Curtis, Thakker, Wilson, & Boer, 2014). In line with the assumption that contact and non-contact offenders share many similarities, but also differ in some psychological dimensions, we found that non-contact CSOs showed superior performance in some cognitive domains; in particular, they were less prone to interference and errors and were less risk-taking than contact CSOs. However, the accuracy with which the two samples could be classified was lower than the differentiation of CSOs from controls, underlining that there were no striking differences between the two CSO samples.

Seto et al. (2011) proposed in their meta-analysis that there appears to be a subgroup of online-only offenders with a relatively low risk of committing contact offences. Associated with this hypothesis, Merdian et al. (2016); Merdian, Curtis, Thakker, Wilson, & Boer (2013) suggested that a conceptual distinction between fantasy-driven and contact-driven child pornography offenders might be useful. Merdian et al. (2016) proposed that contact-driven child pornography offenders might be more comparable with contact CSOs, in particular in their cognitive distortions, whereas fantasy-driven child pornography offenders might be characterized by intimacy deficits and more intense use of deviant sexually explicit material. One might speculate that contact-driven child pornography offenders are more prone to committing child sexual assaults than fantasy-driven child pornography offenders. For the purpose of the current study, we did not differentiate between subtypes of child pornography offenders, also due to the small sample size.

Limitations and outlook

The small sample size represents a major limitation of the current study. Moreover, all included pedophiles were offenders with a low risk for re-offending. This assessment of the

recidivism risk was based on the legal status of offenders and permitted their participation in the study without surveillance. Our study did not include CSOs with high risk for recidivism. High-risk CSOs presumably show more distinctive features than low-risk CSOs, but the inclusion of high-risk CSOs in research settings outside custody is very delicate, due to safety concerns. On the other hand, all included pedophiles were offenders. The observations made in the current study characterize pedophilic CSOs and not pedophiles in general. We presume that non-offending pedophiles show a deviant pattern in implicit tests, similar to that of pedophilic CSOs, but less neuropsychological deficits. However, this has to remain a speculation at this time point.

It needs to be stated that the recruitment of pedophiles for the purpose of the current study turned out to be very difficult and time-consuming. The study required an extension of the project run time to achieve the planned sample sizes of 20 individuals in each CSO group. Aside from candidates not being suited for participation or not being interested in participation, treatment programs for pedophiles were often not frequented in the expected extent or were sometimes announced but not offered, due to the lack of trained therapists. Thus, the recruitment problems also point to some still existing deficiencies in the therapeutic treatment of pedophiles in [redacted].

With the small sample size and the difficult recruitment, the influence of many confounding factors, such as influence of drug history, medication status, comorbidities, life events, homosexual vs. heterosexual orientation, etc. could not be addressed. Creating more homogenous contact and non-contact CSO samples was not possible, due to the described recruitment problems. Statistically controlling for confounding factors within the CSO samples was not possible either, due to the small numbers. Thus, a replication of the current findings in a larger sample that also covers high-risk pedophilic CSOs and pedophiles with no history of child sex offences would be highly desirable.

Conclusion

Findings suggest that standardized, objective testing can support forensic psychiatrists and psychologists in their assessment of child sex offenders. Implicit test parameters, such as longer viewing times or lower IAT scores, suggest the presence of pedophilic interest, whereas certain neuropsychological test measures, such as increased risk taking and high impulsivity scores, might be more related to the tendency to commit child sexual offences. Even though the neuropsychological profile of contact and non-contact CSOs varies to some

extent, the implicit test measures did not allow a differentiation of the two samples, suggesting that the pedophilic interest in the two offender groups is similar. In order to implement standardized, objective testing for the assessment of pedophilia, guidelines should be formulated and standard procedures should be defined. Moreover, for defined standard procedures, normative data need to be obtained.

Conflict of interest

None of the authors have potential conflicts of interest to be disclosed.

References

American Psychiatric Association. (2000). *Diagnostic criteria from dsm-iv-tr*. American Psychiatric Pub.

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5).

Babchishin, K. M., Hanson, R. K., & Hermann, C. A. (2011). The Characteristics of Online Sex Offenders: A Meta-Analysis. *Sexual Abuse: A Journal of Research and Treatment*, *23*(1), 92–123. https://doi.org/10.1177/1079063210370708

Babchishin, K. M., Nunes, K. L., & Hermann, C. A. (2013). The validity of Implicit Association Test (IAT) measures of sexual attraction to children: A meta-analysis. *Archives of Sexual Behavior*, *42*(3), 487–499.

Banse, R., Schmidt, A. F., & Clarbour, J. (2010). Indirect measures of sexual interest in child sex offenders: A multimethod approach. *Criminal Justice and Behavior*, *37*(3), 319–335.

Barbaree, H. E. (1991). Denial and minimization among sex offenders: Assessment and treatment outcome. In *Forum on corrections Research* (Vol. 3, pp. 30–33).

Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition*, *50*(1), 7–15.

Bernstein, D. P., & Fink, L. (1998). *Childhood trauma questionnaire: A retrospective self-report: Manual*. Psychological Corporation.

Blaison, C., Imhoff, R., Hühnel, I., Hess, U., & Banse, R. (2012). The affect misattribution procedure: Hot or not? *Emotion*, *12*(2), 403.

Blanchard, R., Kolla, N. J., Cantor, J. M., Klassen, P. E., Dickey, R., Kuban, M. E., & Blak, T. (2007). IQ, Handedness, and Pedophilia in Adult Male Patients Stratified by Referral Source. *Sexual Abuse: A Journal of Research and Treatment*, *19*(3), 285–309. https://doi.org/10.1007/s11194-007-9049-0

Breiman, L., Friedman, J., Stone, C. J., & Olshen, R. A. (1984). *Classification and regression trees*. CRC press.

Cantor, J. M., Blanchard, R., Christensen, B. K., Dickey, R., Klassen, P. E., Lee, A., … Kuban, M. E. (2004). Intelligence, Memory, and Handedness in Pedophilia. *Neuropsychology*, *18*(1), 3–14. https://doi.org/10.1037/0894-4105.18.1.3

Cantor, J. M., Kabani, N., Christensen, B. K., Zipursky, R. B., Barbaree, H. E., Dickey, R., … Blanchard, R. (2008). Cerebral white matter deficiencies in pedophilic men. *Journal of Psychiatric Research*, *42*(3), 167–183. https://doi.org/10.1016/j.jpsychires.2007.10.013

Cantor, J. M., & McPhail, I. V. (2015). Sensitivity and specificity of the phallometric test for hebephilia. *The Journal of Sexual Medicine*, *12*(9), 1940–1950.

Cohen, L., McGeoch, P., Watras-Gans, S., Acker, S., Poznansky, M. S. W., Cullen, K., & Itskovich, Y. (2002). Personality impairment in male pedophiles. *The Journal of Clinical Psychiatry*, *63*(10), 912–919.

Corsi, P. M., & Michael, P. (1972). *Human memory and the medial temporal region of the brain* (Vol. 34). McGill University Montreal.

Deegener, G. (1996). *Multiphasic sex inventory (MSI): Fragebogen zur Erfassung psychosexueller Merkmale bei Sexualtätern: Handbuch*. Hogrefe, Verlag für Psychologie.

Dehaene, S., Changeux, J.-P., Naccache, L., Sackur, J., & Sergent, C. (2006). Conscious, preconscious, and subliminal processing: a testable taxonomy. *Trends in Cognitive Sciences*, *10*(5), 204–211.

Del Cul, A., Baillet, S., & Dehaene, S. (2007). Brain Dynamics Underlying the Nonlinear Threshold for Access to Consciousness. *PLoS Biol*, *5*(10), e260. https://doi.org/10.1371/journal.pbio.0050260

Dolan, M., & Doyle, M. (2000). Violence risk prediction. *The British Journal of Psychiatry*, *177*(4), 303–311.

Dombert, B., Antfolk, J., Kallvik, L., Zappalà, A., Osterheider, M., Mokros, A., & Santtila, P. (2015). Identifying pedophilic interest in sex offenders against children with the indirect choice reaction time task. *European Journal of Psychological Assessment*.

Endrass, J., Urbaniok, F., Hammermeister, L. C., Benz, C., Elbert, T., Laubacher, A., & Rossegger, A. (2009). The consumption of Internet child pornography and violent and sex offending. *BMC Psychiatry*, *9*(1), 43. https://doi.org/10.1186/1471-244X-9-43

Fan, J., McCandliss, B. D., Fossella, J., Flombaum, J. I., & Posner, M. I. (2005). The activation of attentional networks. *Neuroimage*, *26*(2), 471–479.

Featherman, D. L., & Stevens, G. (1982). A revised socioeconomic index of occupational status: Application in analysis of sex differences in attainment. *Social Structure and Behavior: Essays in Honor of William Hamilton Sewell*, 141–82.

Geer, J. H., & Bellard, H. S. (1996). Sexual content induced delays in unprimed lexical decisions: Gender and context effects. *Archives of Sexual Behavior*, *25*(4), 379–395. https://doi.org/10.1007/BF02437581

Genuer, R., Poggi, J.-M., & Tuleau-Malot, C. (2010). Variable selection using random forests. *Pattern Recognition Letters*, *31*(14), 2225–2236.

Greenwald, A G, McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual differences in implicit cognition: the Implicit Association Test. *Journal of Personality and Social Psychology*, *74*(6), 1464–1480.

Greenwald, Anthony G, Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*(2), 197–216.

Gress, C. L. Z., & Laws, D. R. (2009). Cognitive Modelling of Sexual Arousal and Interest: Choice Reaction Time Measures. In D. Thornton & D. R. Laws (Eds.), *Cognitive Approaches to the Assessment of Sexual Interest in Sexual Offenders* (pp. 85–99). Oxford, UK: Wiley-Blackwell.

Habermeyer, B., Esposito, F., Händel, N., Lemoine, P., Kuhl, H. C., Klarhöfer, M., … others. (2013). Response inhibition in pedophilia: An fMRI pilot study. *Neuropsychobiology*, *68*(4), 228–237.

Harris, G. T., Rice, M. E., Chaplin, T. C., & Quinsey, V. L. (1999). Dissimulation in phallometric testing of rapists' sexual preferences. *Archives of Sexual Behavior*, *28*(3), 223–232.

Heaton, R. K., Chelune, G. J., Curtiss, G., Kay, G. G., & Talley, J. L. (1993). *Wisconsin card sorting test*. Psychological Assessment Resources.

Holt, K., & Massey, C. (2012). Sexual preference or opportunity: An examination of situational factors by gender of victims of clergy abuse. *Sexual Abuse*, *25*(6), 606–621.

Horn, W. (1983). Leistungsprüfsystem LPS. 2., erweiterte und verbesserte Auflage. *Göttingen: Hogrefe*.

Houts, F. W., Taller, I., Tucker, D. E., & Berlin, F. S. (2011). Androgen deprivation treatment of sexual behavior. In *Sexual Dysfunction: Beyond the Brain-Body Connection* (Vol. 31, pp. 149–163). Karger Publishers.

Howard, R. C., Longmore, F. J., Mason, P. A., & Martin, J. L. (1994). Contingent negative variation (CNV) and erotic preference in self-declared homosexuals and in child sex offenders. *Biological Psychology*, *38*(2), 169–181.

Imhoff, R., Schmidt, A. F., Bernhardt, J., Dierksmeier, A., & Banse, R. (2011). An inkblot for sexual preference: A semantic variant of the Affect Misattribution Procedure. *Cognition & Emotion*, *25*(4), 676–690. https://doi.org/10.1080/02699931.2010.508260

Jordan, K., Fromberger, P., von Herder, J., Steinkrauss, H., Nemetschek, R., Witzel, J., & Müller, J. L. (2016). Impaired attentional control in pedophiles in a sexual distractor task. *Frontiers in Psychiatry*, *7*.

Kirchner, W. K. (1958). Age differences in short-term retention of rapidly changing information. *Journal of Experimental Psychology*, *55*(4), 352.

Knott, V., Impey, D., Fisher, D., Delpero, E., & Fedoroff, P. (2016). Pedophilic brain potential responses to adult erotic stimuli. *Brain Research*, *1632*, 127–140.

Kotovsky, K., Hayes, J. R., & Simon, H. A. (1985). Why are some problems hard? Evidence from Tower of Hanoi. *Cognitive Psychology*, *17*(2), 248–294. https://doi.org/10.1016/0010-0285(85)90009-X

Lehrl, S. (1977). Mehrfachwahl-Wortschatz-Test (MWT-B). *Straube, Erlangen*.

Lezak, M. (1995). Verbal Fluency. Oxford University Press. *New York*.

Mackaronis, J. E., Strassberg, D. S., & Marcus, D. K. (2011). The latent structure of Multiphasic Sex Inventory–Assessed Pedophilic Interest. *Psychological Assessment*, *23*(4), 1017.

Marshall, W. L, & Fernandez, Y. M. (2003). Sexual preferences: Are they useful in the assessment and treatment of sexual offenders? *Aggression and Violent Behavior*, *8*(2), 131–143. https://doi.org/10.1016/S1359-1789(01)00056-8

Marshall, William L. (1994). Treatment effects on denial and minimization in incarcerated sex offenders. *Behaviour Research and Therapy*, *32*(5), 559–564.

Mason, G. (2014). Victim Attributes in Hate Crime Law Difference and the Politics of Justice. *British Journal of Criminology*, *54*(2), 161-179.

McAnulty, R. D., & Adams, H. (1991). Voluntary control of penile tumescence among homosexual and heterosexual subjects. *Archives of Sexual Behavior*, *21*(1), 17–31.

Merdian, Hannah L., Curtis, C., Thakker, J., Wilson, N., & Boer, D. P. (2014). The endorsement of cognitive distortions: Comparing child pornography offenders and contact sex offenders. *Psychology, Crime & Law*, *20*(10), 971–993.

Merdian, Hannah L., Moghaddam, N., Boer, D. P., Wilson, N., Thakker, J., Curtis, C., & Dawson, D. (2016). Fantasy-Driven Versus Contact-Driven Users of Child Sexual Exploitation Material Offender Classification and Implications for Their Risk

Assessment. *Sexual Abuse: A Journal of Research and Treatment*. https://doi.org/10.1177/1079063216641109

Merdian, Hannah Lena, Curtis, C., Thakker, J., Wilson, N., & Boer, D. P. (2013). The three dimensions of online child pornography offending. *Journal of Sexual Aggression*, *19*(1), 121–132. https://doi.org/10.1080/13552600.2011.611898

Merdian, Hannah Lena, Wilson, N., & Boer, D. P. (2009). Characteristics of internet sexual offenders: a review. *Sexual Abuse in Australia and New Zealand*, *2*(1), 34–47.

Mokros, A., Dombert, B., Osterheider, M., Zappalà, A., & Santtila, P. (2010). Assessment of Pedophilic Sexual Interest with an Attentional Choice Reaction Time Task. *Archives of Sexual Behavior*, *39*(5), 1081–1090. https://doi.org/10.1007/s10508-009-9530-6

Mokros, A., Gebhard, M., Heinz, V., Marschall, R. W., Nitschke, J., Glasgow, D. V., … Laws, D. R. (2013). Computerized Assessment of Pedophilic Sexual Interest Through Self-Report and Viewing Time Reliability, Validity, and Classification Accuracy of the Affinity Program. *Sexual Abuse: A Journal of Research and Treatment*, *25*(3), 230–258. https://doi.org/10.1177/1079063212454550

Müller, K., Curry, S., Ranger, R., Briken, P., Bradford, J., & Fedoroff, J. P. (2014). Changes in Sexual Arousal as Measured by Penile Plethysmography in Men with Pedophilic Sexual Interest. *The Journal of Sexual Medicine*, *11*(5), 1221–1229. https://doi.org/10.1111/jsm.12488

Neutze, J., Grundmann, D., Scherner, G., & Beier, K. M. (2012). Undetected and detected child sexual abuse and child pornography offenders. *International Journal of Law and Psychiatry*, *35*(3), 168–175. https://doi.org/10.1016/j.ijlp.2012.02.004

Nichols, H. R., & Molinder, I. (2001). Multiphasic sex inventory manual. *Tacoma, WA: Author*.

Niemann, H., Sturm, W., Thöne-Otto, A., & Willmes-von-Hinkeldey, K. (2008). *California Verbal Learning Test-German adaptation*. Pearson As. Frankfurt.

Ó Ciardha, C., & Gormley, M. (2013). Measuring sexual interest using a pictorial modified Stroop task, a pictorial Implicit Association Test and a Choice Reaction Time task. *Journal of Sexual Aggression*, *19*(2), 158–170.

Oldfield, R. C. (1971). The assessment and analysis of handedness: The Edinburgh inventory. *Neuropsychologia*, *9*(1), 97–113. https://doi.org/10.1016/0028-3932(71)90067-4

Pacific Behavioral Assessment Corporation. (2004). The NRP (Not Real People) Visual Stimulus Set.

Partington, J. E., & Leiter, R. G. (1949). Halstead-Reitan Trail Making Test. *Arizona: Reitan Neuropsychology Laboratory*.

Pflueger, M. O., Franke, I., Graf, M., & Hachtel, H. (2015). Predicting general criminal recidivism in mentally disordered offenders using a random forest approach. *BMC Psychiatry*, *15*(1), 62.

Ponseti J, Granert O, Jansen O, & et al. (2012). Assessment of pedophilia using hemodynamic brain response to sexual stimuli. *Archives of General Psychiatry*, *69*(2), 187–194. https://doi.org/10.1001/archgenpsychiatry.2011.130

Ponseti, J., Granert, O., Van Eimeren, T., Jansen, O., Wolff, S., Beier, K., … Siebner, H. (2014). Human face processing is tuned to sexual age preferences. *Biology Letters*, *10*(5), 20140200.

Ponseti, Jorge, Granert, O., Van Eimeren, T., Jansen, O., Wolff, S., Beier, K., … others. (2016). Assessing paedophilia based on the haemodynamic brain response to face images. *The World Journal of Biological Psychiatry*, *17*(1), 39–46.

Porter, S., Fairweather, D., Drugge, J., Hervé, H., Birt, A., & Boer, D. P. (2000). Profiles of psychopathy in incarcerated sexual offenders. *Criminal Justice and Behavior*, *27*(2), 216–233.

Purcell, M. S., Chandler, J. A., & Fedoroff, J. P. (2015). The Use of Phallometric Evidence in Canadian Criminal Law. *The Journal of the American Academy of Psychiatry and the Law*, *43*(2), 141–153.

Quayle, E., & Taylor, M. (2003). Model of problematic Internet use in people with a sexual interest in children. *CyberPsychology & Behavior*, *6*(1), 93–106.

Quinsey, V. L., & Chaplin, T. C. (1988). Preventing faking in phallometric assessments of sexual preference. *Annals of the New York Academy of Sciences*, *528*(1), 49–58.

R Core Team. (2015). R: A language and environment for statistcal computing. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from http://www.R-project.org/.

Rada, R. T. (1976). Alcoholism and the child molester. *Annals of the New York Academy of Sciences*, *273*(1), 492–496.

Reitan, R. M., & Wolfson, D. (1985). *The Halstead-Reitan neuropsychological test battery: Theory and clinical interpretation* (Vol. 4). Reitan Neuropsychology.

Rogers, R. D., Everitt, B. J., Baldacchino, A., Blackshaw, A. J., Swainson, R., Wynne, K., … others. (1999). Dissociable deficits in the decision-making cognition of chronic amphetamine abusers, opiate abusers, patients with focal damage to prefrontal cortex,

and tryptophan-depleted normal volunteers: evidence for monoaminergic mechanisms. *Neuropsychopharmacology*, *20*(4), 322–339.

Rolls, E. T. (1999). The functions of the orbitofrontal cortex. *Neurocase*, *5*(4), 301–312.

Rönspies, J., Schmidt, A. F., Melnikova, A., Krumova, R., Zolfagari, A., & Banse, R. (2015). Indirect measurement of sexual orientation: Comparison of the Implicit Relational Assessment Procedure, viewing time, and choice reaction time tasks. *Archives of Sexual Behavior*, *44*(5), 1483–1492.

Rosenzweig, S. (1942). The Photoscope as an Objective Device for Evaluating Sexual Interest. *Psychosomatic Medicine*, *4*(2), 150–158.

Rosvold, H. E., Mirsky, A. F., Sarason, I., Bransome Jr, E. D., & Beck, L. H. (1956). A Continuous Performance Test of Brain Damage1'5. *Journal of Consulting Psychology, 20*(5), 343-350.

Santtila, P., Mokros, A., Viljanen, K., Koivisto, M., Sandnabba, N. K., Zappala, A., & Osterheider, M. (2009). Assessment of sexual interest using a choice reaction time task and priming: A feasibility study. *Legal and Criminological Psychology*, *14*(1), 65–82.

Sartorius, A., Ruf, M., Kief, C., Demirakca, T., Bailer, J., Ende, G., … Dressing, H. (2008). Abnormal amygdala activation profile in pedophilia. *European Archives of Psychiatry and Clinical Neuroscience*, *258*(5), 271–277.

Schiffer, B., Peschel, T., Paul, T., Gizewski, E., Forsting, M., Leygraf, N., … Krueger, T. H. (2007). Structural brain abnormalities in the frontostriatal system and cerebellum in pedophilia. *Journal of Psychiatric Research*, *41*(9), 753–762.

Schiffer, B., & Vonlaufen, C. (2011). Executive Dysfunctions in Pedophilic and Nonpedophilic Child Molesters. *The Journal of Sexual Medicine*, *8*(7), 1975–1984. https://doi.org/10.1111/j.1743-6109.2010.02140.x

Schmidt, A. F., Babchishin, K. M., & Lehmann, R. J. (2017). A meta-analysis of viewing time measures of sexual interest in children. *Archives of Sexual Behavior*, *46*, 287–300.

Schneider, S. L., & Wright, R. C. (2004). Understanding denial in sexual offenders A review of cognitive and motivational processes to avoid responsibility. *Trauma, Violence, & Abuse*, *5*(1), 3–20.

Seto, M. C. (2004). Pedophilia and sexual offenses against children. *Annual Review of Sex Research*, *15*(1), 321–361.

Seto, M. C., Cantor, J. M., & Blanchard, R. (2006). Child pornography offenses are a valid diagnostic indicator of pedophilia. *Journal of Abnormal Psychology*, *115*(3), 610.

Seto, M. C., & Eke, A. W. (2005). The criminal histories and later offending of child pornography offenders. *Sexual Abuse*, *17*(2), 201–210.

Seto, M. C., Karl Hanson, R., & Babchishin, K. M. (2011). Contact sexual offending by men with online sexual offenses. *Sexual Abuse*, *23*(1), 124–145.

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending and a general theory. *Psychological Review*, *84*(2), 127.

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*(6), 643.

Suchy, Y., Whittaker, J. W., Strassberg, D. S., & Eastvold, A. (2009). Neurocognitive differences between pedophilic and nonpedophilic child molesters. *Journal of the International Neuropsychological Society*, *15*(02), 248–257. https://doi.org/10.1017/S1355617709090353

Tenbergen, G., Wittfoth, M., Frieling, H., Ponseti, J., Walter, M., Walter, H., … Kruger, T. H. (2015). The neurobiology and psychology of pedophilia: recent advances and challenges. *Frontiers in Human Neuroscience*, *9*.

Thibaut, F. (2012). Pharmacological treatment of paraphilias. *The Israel Journal of Psychiatry and Related Sciences*, *49*(4), 297–305.

van Leeuwen, M. L., van Baaren, R. B., Chakhssi, F., Loonen, M. G., Lippman, M., & Dijksterhuis, A. (2013). Assessment of implicit sexual associations in non-incarcerated pedophiles. *Archives of Sexual Behavior*, *42*(8), 1501–1507.

Walter, M., Witzel, J., Wiebking, C., Gubka, U., Rotte, M., Schiltz, K., … Northoff, G. (2007). Pedophilia is Linked to Reduced Activation in Hypothalamus and Lateral Prefrontal Cortex During Visual Erotic Stimulation. *Biological Psychiatry*, *62*(6), 698–701. https://doi.org/10.1016/j.biopsych.2006.10.018

Ward, T., & Hudson, S. M. (1998). The construction and development of theory in the sexual offending area: A metatheoretical framework. *Sexual Abuse: A Journal of Research and Treatment*, *10*(1), 47–63.

Wechsler. (2008). Wechsler Adult Intelligence Scale-IV (WAIS-IV). *Administration and Scoring Manual. San Antonio, TX, USA: The Psychological Corporation*.

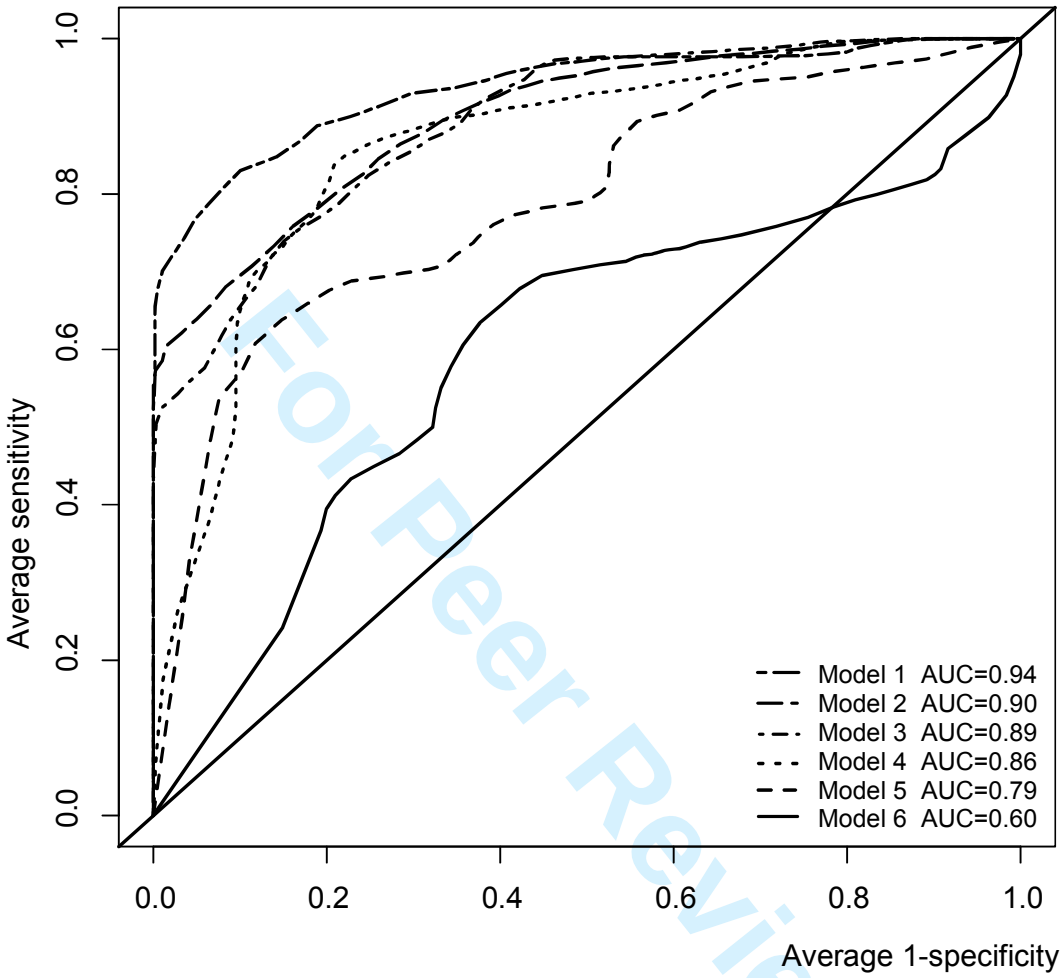
Wechsler. (2009). Wechsler Memory Scale IV (WMS-IV). *New York: Psychological Corporation*.

Wilson, G. D., & Cox, D. N. (1983). Personality of paedophile club members. *Personality and Individual Differences*, *4*(3), 323–329.

Wright, L. W., & Adams, H. E. (1994). Assessment of sexual preference using a choice reaction time task. *Journal of Psychopathology and Behavioral Assessment*, *16*(3), 221–231. https://doi.org/10.1007/BF02229209

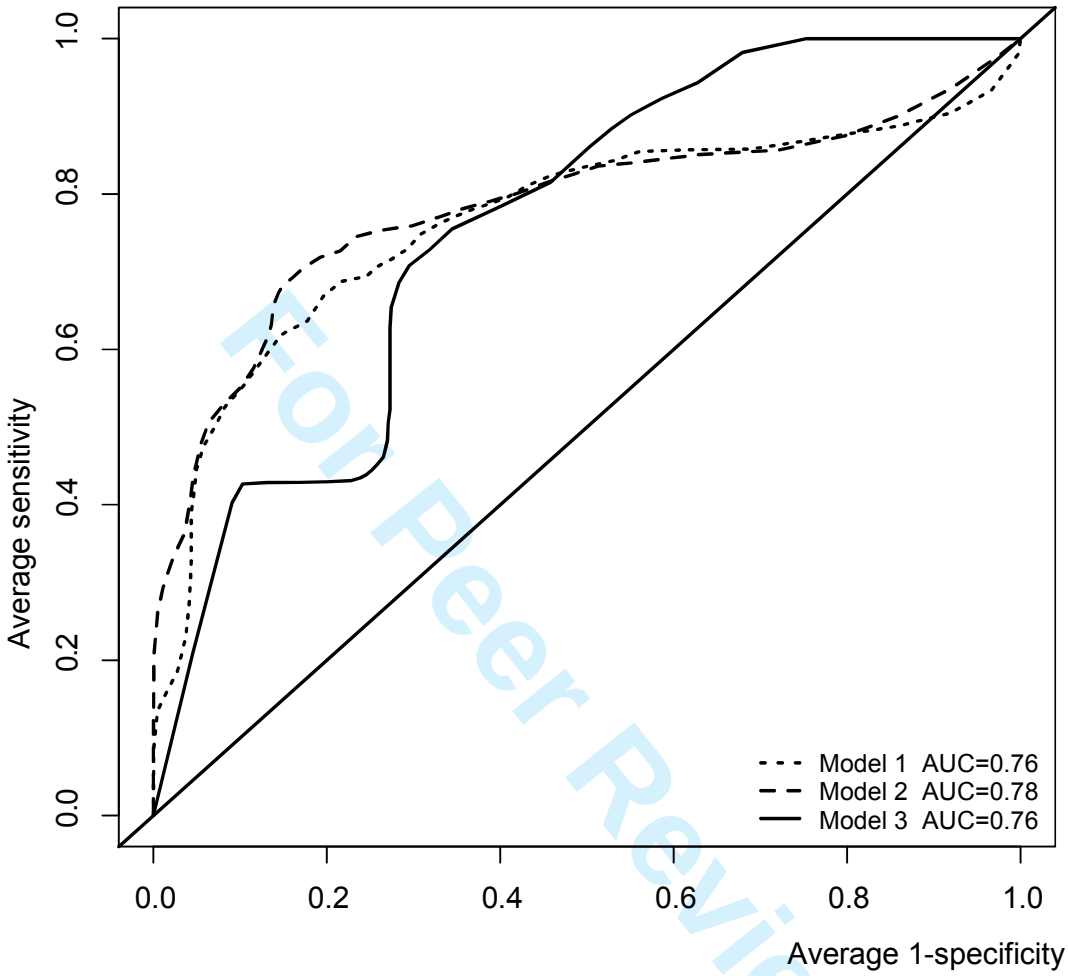
Wright, L. W., & Adams, H. E. (1999). The effects of stimuli that vary in erotic content on cognitive processes. *Journal of Sex Research*, *36*(2), 145–151. https://doi.org/10.1080/00224499909551979

Figure 1 The cumulated classification accuracy of sexual preference



The here described classification model encompassed six variables (Model 1: VT_{T2} + CGT_{IMP} + $CVLT_{SDFR}$ + $Nogo_{FA}$ + IAT + $SMP_{RT\ T3}$). The ROCs of Models 2 to 5 show the contribution of variables by removing consecutively one variable from this model in the reversed order with which they were identified by the random forest algorithm (Model 2: VT_{T2} + CGT_{IMP} + $CVLT_{SDFR}$ + $Nogo_{FA}$ + IAT; Model 3: VT_{T2} + CGT_{IMP} + $CVLT_{SDFR}$ + $Nogo_{FA}$; Model 4: VT_{T2} + CGT_{IMP} + $CVLT_{SDFR}$; Model 5: VT_{T2} + CGT_{IMP}; Model 6: VT_{T2}).

Figure 2 The cumulated classification accuracy of contact and non-contact CSOs



The here described classification model encompassed three variables (Model 1: $Stroop_{IF}$ + ANT_{ERR} + CGT_{RISK}). The ROCs of Models 2 and 3 show the contribution of variables by removing consecutively one variable from this model in the reversed order with which they were identified by the random forest algorithm (Model 2: $Stroop_{IF}$ + $ANT_{ERR;\ Model\ 3:}$ $Stroop_{IF}$).

Table 1 Overview of the conducted procedures*

Day 1	Day 2
Clinical examination - Demographic data - Family anamnesis - Case history - Drugs / alcohol / smoking - Sexual orientiation - Critical life events - Personality disorders - Psychopathy	*Neurophysiology* - Go/NoGo paradigm *Implicit Tests* - Implicit Association Test (IAT) - Semantic misattribution procedure (SMP) - Viewing Time (VT) - Choice reaction time (CRT) task *VR ('beach walk')* *Disclosure of the study aims*
Neuropsychological testing - Attention - Working memory - Episodic memory - Executive functions - Risk taking behavior - Intelligence - Motor behavior	*Explicit tests/questionnaires* - Childhood Trauma Questionnaire (CTQ) - Multiphasic Sex Inventory (MSI) - Screening Scale for Pedophilic Interests (SSPI-2)

* The procedures are shown in their chronological order, except that the VR exposure took place between the SMP and VT.

Table 2 Summary of the neuropsychological tests administered

Task/assessment	Tested domain	Extracted variables
Attention Network Test, ANT, (Fan, McCandliss, Fossella, Flombaum, & Posner, 2005)	Attention	Total errors, alertness, orientation, conflict
California Verbal Learning Test, CVLT (Niemann, Sturm, Thöne-Otto, & Willmes-von-Hinkeldey, 2008)	Episodic memory	Learning curve intercept and slope, interference, short delay (SD) and long delay (LD) free recall, SD and LD cued recall, SD and LD savings, LD recognition hits and hit rate, false alarms and false alarms rate
Trail Making Test, TMT, A/B (Partington & Leiter, 1949)	Executive functions (cognitive flexibility)	TMT-A-time: processing speed, TMT-B-time: cognitive flexibility
Wisconsin Card Sorting Test, WCST (Heaton, Chelune, Curtiss, Kay, & Talley, 1993)	Executive functions (cognitive flexibility)	Perseveration errors, concept failures, number of correct concepts, average time per move
Go/Nogo, (Rosvold, Mirsky, Sarason, Bransome Jr, & Beck, 1956)	Executive functions (motor inhibition)	False alarm (FA) rate, reaction time [RT] to hits and FA
Reversal Learning, RL (Rolls, 1999)	Executive functions (learning)	RL capacity
Tower of Hanoi, ToH (Kotovsky, Hayes, & Simon, 1985)	Executive functions (problem solving)	number of moves, completion time
Stroop Task (Stroop, 1935)	Executive functions (response conflict)	Interference
Wechsler Adult Intelligence Scale, WAIS, IV, Similarities, (Wechsler, 2008)	Executive functions (verbal abstraction)	Score
Verbal Fluency (Lezak, 1995)	Executive functions (verbal production)	Sum score animals and "S"- words
Leistungsprüfsystem LPS (Horn, 1983)	Intelligence (abstract reasoning)	Scale 3, sum score
Multiple Choice Vocabulary Test MWT-B (Lehrl, 1977)	Intelligence (verbal)	Score
Motor Tapping Test, MTT (Reitan & Wolfson, 1985)	Motor behavior	Taps per second
Cambridge Gambling Task, CGT (Rogers et al., 1999)	Risk taking	Total score, impulsivity, risk height
Iowa Gambling Task (Bechara, Damasio, Damasio, & Anderson, 1994)	Risk taking	Total gain
n-back task (Kirchner, 1958)	Working memory	Mean score, standard deviation, omission errors, commission errors
Corsi Block-Tapping Test CBTT (Corsi & Michael, 1972)	Working memory (spatial)	Span forward, n of correct forward, Span backward, n of correct backward
Wechsler Memory Scale , WMS, IV (Wechsler, 2009)	Working memory (verbal)	Digit span forward (DSF) and backward (DSB)

Table 3 Demographic characteristics, handedness, and intelligence of the three study samples (median values, the values in brackets refer to the lower and upper quartile); p values were obtained by calculating Wilcoxon Rank Sum and Signed Rank Tests for non-normal data or Fisher's Exact Test for count data.

	Contact CSO N=22	Non-contact CSO N=21	CTL N=21	p
Age	36.5 [26.0;42.2]	36.0 [30.0;48.0]	26.0 [23.0;40.0]	0.101
School education	9.0 [9.0;10.0]	10.0 [9.0;10.0]	10.0 [9.0;13.0]	0.188
Occupational education	3.0 [2.6;3.0]	3.0 [3.0;4.0]	3.0 [2.0;4.0]	0.761
Job prestige[1]	39.2 [32.2;39.2]	38.2 [35.8;39.2]	48.4 [38.2;53.5]	0.245
Home country national	20 (90.9%)	15 (71.4%)	14 (66.7%)	0.129
Handedness[2]	86.7 [60.0;100.0]	100.0 [100.0;100.0]	100.0 [77.8;100.0]	0.017
Verbal IQ	102.5 [95.5;112.0]	112.0 [100.0;118.0]	104.0 [101.0;107.0]	0.318
Nonverbal IQ	116.0 [108.5;121.8]	116.0 [106.0;121.0]	114.0 [110.0;118.0]	0.821

[1] job prestige was defined as occupation translated into an occupational prestige score (Featherman & Stevens, 1982); [2] handedness was determined by Edinburgh Handedness Scale (Oldfield, 1971)

Table 4 The mean values (± SD) of the six variables identified by the random forest algorithm for classifying (contact and non-contact) CSOs vs. CTL. Data were compared by oneway analyses of variance (ANOVA). Data were Boxcox-transformed to account for the skewness of the data distributions. Larger Boxcox **λ** indicate larger skewness. VT_{T2}: viewing time for Tanner stage II; IAT: IAT score, $SMP_{RT\ T3}$: RTs to supraliminally presented cues of Tanner stage III in the SMP; CGT_{IMP}: impulsivity score of the CGT; $CVLT_{SDFR}$: short delay free recall of the CVLT; $Nogo_{FA}$: false alarm rate in the Go/Nogo task.

Variable	CSO	CTL	F	d.f.	p	Boxcox λ
VT_{T2} [ms]	2187.0 (919.6)	1586.0 (1401.5)	6.622	1, 61	0.015	0.5
IAT	0.022 (0.445)	0.356 (0.335)	9.850	1, 58	0.003	1.4
$SMP_{RT\ T3}$ [ms]	721.9 (388.0)	596.1 (167.8)	0.709	1, 61	0.403	0.4
CGT_{IMP}	0.702 (0.981)	0.208 (0.760)	5.236	1, 61	0.029	-0.1
$CVLT_{SDFR}$	9.9 (2.9)	12.3 (2.3)	13.038	1, 61	0.001	1.3
$Nogo_{FA}$	35.3 (14.6)	26.9 (15.1)	5.109	1, 58	0.030	0.5

Table 5 Classification accuracies for different COPs, optimizing either specificity, sensitivity, or weighting sensitivity and specificity equally (Newton criterion): The upper half describes the accuracy for correctly identifying pedophiles (CSOs vs. CTLs); the lower half describes the accuracy for correctly identifying contact CSOs within offenders; contact CSO (CSO_n); non-contact CSO (CSO_{nc}).

	Specificity optimized		Sensitivity optimized		Newton criterion	
COP	0.681, 99% CI [0.670, 0.684]		0.530, 99% CI [0.519, 0.535]		0.665, 99% CI [0.652, 0.677]	
Classified as:	CSO	CTL	CSO	CTL	CSO	CTL
CSO	34	9	41	2	35	8
CTL	0	21	8	13	2	19
Accuracy	0.859		0.844		0.844	
COP	0.720 99% CI [0.707, 0.733]		0.042 99% CI [0.040, 0.049		0.551 CI99% [0.525, 0.576]	
Classified as:	CSO_c	CSO_{nc}	CSO_c	CSO_{nc}	CSO_c	CSO_{nc}
CSO_c	0	22	21	1	17	5
CSO_{nc}	2	19	12	9	6	15
Accuracy	0.442		0.698		0.744	

Table 6 Average probability of sexual preference for children according to four categories derived by the random forest classification models: The risk index is based on three COP optimized for specificity, sensitivity, and equally weighted for sensitivity and specificity. Abbr. Pr_c: mean class-probability

Risk index	CSO		CTL		Pr_c
	n	(%)	n	(%)	
Low	2	5	13	62	0.333
Mild	6	14	6	29	0.584
Moderate	1	2	2	9	0.668
Marked	34	79	0	0	0.857

Table 7 The mean values (± SD) of the three variables identified by the random forest algorithm for classifying contact vs. non-contact CSOs (CSO_c vs. CSO_{nc}). These three variables were the interference score from the Stroop test ($Stroop_{IF}$), the total number of errors in the Attention Network Test (ANT_{Err}), and the risk height in the Cambridge Gambling Task (CGT_{Risk}). Data were compared by oneway analyses of variance (ANOVA). Data were Boxcox-transformed to account for the skewness of the data distributions. Larger Boxcox **λ** indicate larger skewness.

Variable	CSO_c	CSO_{nc}	**F**	**d.f.**	**p**	**Boxcox λ**
$Stroop_{IF}$	86.2 (17.5)	72.8 (26.0)	6.407	1, 40	0.017	0.5
ANT_{Err}	8.5 (4.4)	4.4 (4.9)	11.271	1, 40	0.002	0.3
CGT_{Risk}	0.455 (0.215)	0.289 (0.173)	7.388	1, 40	0.010	-0.9

Table 8 Probability of contact child sexual offences according to four categories derived by the random forest classification models, analogously to Table 6.

Risk index	CSO_c		CSO_{nc}		Pr_c
	n	(%)	n	(%)	
Low	1	5	9	43	0.108
Mild	4	18	6	29	0.353
Moderate	17	77	4	19	0.730
Marked	0	0	2	9	0.905