Dunedin Multidisciplinary Health & Development Study

Concept Paper Form

Provisional Paper Title: Lifecourse consequences of childhood sexual abuse: A multi-method, multi-domain five-decade longitudinal study
Proposing Author: Hayley Guiney
Author's Email: hayley.guiney@otago.ac.nz
P.I. Sponsor: Richie Poulton
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Objective of the study:

In recent years, several jurisdictions have established formal inquiries into historical sexual abuse of children in state care and/or other institutional settings (e.g., New Zealand Royal Commission of Inquiry into Abuse in Care; Australian Royal Commission into Institutional Responses to Child Sexual Abuse; Northern Ireland Historical Institutional Abuse Inquiry; United Kingdom Independent Inquiry into Child Sexual Abuse). An important function of such inquiries is to provide an opportunity for survivors to share their experiences, and while the specific aims of each inquiry differ, one common objective is to understand the long-term effects of childhood sexual abuse (CSA).

Well-designed quantitative research conducted in the general population and with both subjective and objective outcomes can help to inform the work of such inquiries by providing high quality information about the 'seen' and 'unseen' long-term effects of CSA, after taking into account the role of other major childhood stressors that influence life outcomes and often coincide with CSA. In this way, population-based research can complement the reports of survivors who are willing and able to come forward and talk about their experiences during formal inquiry hearings and interviews.

While a large body of research has demonstrated links between CSA and increased risk for negative life outcomes (reviewed for example in Blakemore, Leslie Herbert, Arney, & Parkinson, 2017; Chen et al., 2010; Hailes, Yu, Danese, & Fazel, 2019), there are a number of methodological limitations in the existing literature. Many studies are conducted with selective samples that are not representative of the general population, or have relied on cross-sectional retrospective designs that do not allow for effective control of confounding factors such as other major childhood stressors that often coincide with abuse (e.g., McCarthy-Jones & McCarthy-Jones, 2014; Sachs-Ericsson, Blazer, Plant, &

Arnow, 2005). Moreover, most studies to date have focused on specific outcomes in only one or two domains of functioning (predominantly mental and physical health), and at one point in adulthood.

The aim of the proposed study is to help inform the work of relevant formal government inquiries by improving the existing quality of evidence relating to the long-term sequelae of CSA. To this end, we propose to assess in a general population birth cohort the longitudinal relationships between CSA and (i) a comprehensive set of outcomes that spans six major domains of functioning and (ii) the degree to which these negative outcomes persist across adulthood, after taking into account the role of prospectively-measured covariates. Our primary research question is:

- What are the relationships between CSA and the extent and persistence of physical, mental, sexual, interpersonal, socioeconomic, and antisocial problems across the 20-year period from young adulthood to early middle age (26 to 45y)?

Data analysis methods:

To provide information that is most useful to a general audience (including members of and participants in relevant formal inquiries), we propose using straightforward analysis methods that enable the results to be readily understood and communicated.

MEASURES OF CHILD SEXUAL ABUSE

Measures of CSA vary considerably across the literature, but it is common to use a measure of severity based on the type(s) of CSA participants experienced (e.g., Fergusson, McLeod, & Horwood, 2013) or a binary indicator (CSA yes/no; e.g., Archer, Pinto Pereira, & Power, 2017). At age 26y, Dunedin Study members answered questions about their unwanted sexual experiences before age 16y, including genital touching, attempted intercourse, and forced intercourse. For our primary analyses, we will consider the most severe form of CSA – forced intercourse.[1] However, as there is no consensus in the literature regarding the most appropriate measure(s) of CSA to use when assessing long-term outcomes, we propose to also assess in supplementary analyses how the pattern of long-term effects changes with different definitions of CSA. In sum, we will compare outcomes for those who reported:

[1]Although forced intercourse tends to occur at older ages than less severe types of CSA, a focus on this group does not preclude understanding the long-term sequelae of earlier CSA because most of the Dunedin study members who reported forced intercourse also reported experiencing other types of CSA that tend to occur at younger ages (e.g., 86% of those who reported forced intercourse also reported genital touching).

1. Forced intercourse versus all other participants (primary analyses)
2. Forced intercourse versus those who reported no CSA (supplementary)
3. Forced or attempted intercourse versus all other participants (supplementary)
4. Genital touching, forced or attempted intercourse (i.e., any CSA) versus those who reported no CSA (supplementary)

ANALYSIS APPROACH

To understand the relationships between CSA and the extent and persistence of negative physical, mental, sexual, interpersonal, socioeconomic, and antisocial outcomes across adulthood (from ages 26 to 45y), we will test whether exposure to CSA is associated with the likelihood of:

1. *Indicator-level analyses (separate analyses for each indicator)*
    a) Meeting criteria for each of the negative outcome indicators that comprise the physical, mental, sexual, interpersonal, socioeconomic, and antisocial outcome domains (see Table 1) at each time point.
    b) Persistently[2] meeting criteria (at ≥ 2 out of 4 time points) for each indicator across adulthood.

2. *Domain-level analyses (separate analyses for each domain)*
    a) Meeting criteria for at least one indicator in each domain at each time point (e.g., having at least one mental health problem).
    b) Persistently meeting criteria (at ≥ 2 out of 4 time points) for negative outcomes in each domain from young adulthood to early middle age.
    c) Meeting criteria for problems across multiple domains (≥ 1 problem in ≥ 2 domains) at each assessment point.
    d) Persistently meeting criteria for problems across multiple domains from young adulthood to early middle age (≥ 1 problem in ≥ 2 domains at ≥ 2 time points).

These domain-level analyses will be presented in the main body of the paper and be used to elucidate the extent to which CSA exposure is associated with six broad domains of functioning at four assessment points and across the 20-year period from young adulthood to early middle age.

These indicator-level analyses will be presented in supplementary tables and used to elucidate the extent to which CSA is associated with increased risk for specific negative outcomes at four assessment points (ages 26, 32, 38, and 45y)

[2] To minimise exclusions due to missing data, the persistence analyses will include study members who have data recorded for a particular variable in at least two out of four phases.

and across the 20-year period from young adulthood to early middle age.

Table 1. Summary of the indicators that comprise each outcome domain
(see 'Variables needed at which ages' section for more details)

Domain	Indicators
Physical health	1. Poor oral health 2. Impaired lung function 3. High systemic inflammation 4. Metabolic syndrome 5. Poor health behaviours 6. Fast Pace of Aging
Mental health	7. Externalising disorder 8. Internalising disorder 9. Thought disorder 10. Suicidality
Sexual behaviour	11. Sexual desire disorder 12. Sexual arousal disorder 13. Orgasm disorder 14. Sexual pain disorder 15. Risky sexual intercourse 16. Sexually transmitted diseases
Interpersonal relationships	17. High conflict intimate partner relationship 18. Low quality intimate partner relationship 19. Parenting difficulties
Socioeconomic outcomes	20. No formal qualifications 21. Low socioeconomic status (SES) 22. Received social welfare 23. Financial struggles
Antisocial behaviour	24. High levels of self-reported delinquency 25. Criminal conviction
Multi-domain	26. At least one negative outcome in two or more domains

As all outcome variables are binary (i.e., yes/no indicating whether the participant meets criteria for that problem at that phase, or for 'persistent' problems),[3] we will use chi-square tests to assess simple bivariate associations between CSA exposure and each outcome of interest, and multiple logistic regression models to understand the role that factors which often covary with CSA (including sex, childhood socioeconomic status [SES], non-CSA Adverse Childhood Experiences [ACEs], and sexual assault in adulthood) play in modifying the relationships between CSA and later life outcomes. We will assess the influence of these covariates in a step-wise way, and use the Sobel test to understand whether the addition of each new covariate significantly reduces the association between CSA and life outcomes:

[3] We will also conduct supplementary sensitivity analyses for continuous variables to ensure any observed effects are not artefacts of cut-offs.

1. **Model 1** will include: Sex
2. **Model 2** will include: Sex & SES
3. **Model 3** will include: Sex & SES & number of non-CSA child harm ACEs[4]
4. **Model 4** will include: Sex & SES & number of non-CSA child harm ACEs & number of household dysfunction ACEs
5. **Model 5** will include: Sex & SES & number of non-CSA child harm ACEs & number of household dysfunction ACEs & sexual assault as adult

It is important to note that this proposed analysis approach is designed to elucidate the contribution of these covariates to the negative life outcomes associated with CSA, rather than to simply control for them and set them aside. In this way, the findings will serve two audiences: 1) a general audience interested in findings that represent people's real-world experiences of CSA and do not artificially 'remove' the effects of other adversities that tend to coincide with CSA; and 2) an academic audience interested in the unique contribution of CSA to later life outcomes, over and above other childhood adversities.

Variables needed at which ages:

Independent variables – data from age 26y

	Childhood sexual abuse
1	Any contact CSA prior to age 16 (to be derived from questions YN26_1 to YN26_47)
2	CSA type experienced (genital touching/attempted intercourse/forced intercourse)

Dependent variables – 4 phases of data from 26 to 45y

We request each of the following dependent variables at ages 26, 32, 38, & 45:

	Physical health
1	**Poor oral health** Defined as ≥1 of: - periodontal disease (as used in Israel et al. (2014) for age 38y, but updated to include data for phases 26 to 45y) - high number of caries - high degree of tooth loss
2	**Impaired lung function** Defined as - Low FEV1 relative to age-based norms
3	**High systemic inflammation** Defined as ≥1 of: - Elevated hsCrP (as used in Israel et al. (2014) for age 38y, but updated to include data for phases 26 to 45y)

[4] Where the addition of non-CSA child harm or household dysfunction ACEs contributes to a significant reduction in the association between CSA and life outcomes, we will conduct 'leave-one-out' analyses in which each non-CSA ACE is iteratively removed from the total count to understand whether specific adversities have a greater influence than others.

	- Elevated fibrinogen (compared to normative values) - Elevated white blood cell count (compared to normative values)
4	**Metabolic syndrome** - as used in Israel et al. (2014) for age 38y, but updated to include data for phases 26 to 45y Defined as ≥3 of: - Obesity - High blood pressure - Low HDL - High triglycerides - High glycated haemoglobin
5	**Poor health behaviours** Defined as ≥1 of: - Current smoking - Heavy alcohol use - Insomnia - Physical inactivity
6	**Fast Pace of Aging** - as used in Bourassa et al. (Aging & RIps manuscript)
	Mental health
7	**Externalising disorder** - as used in Caspi et al. (2020) Comprises meeting criteria for ≥1 of: - ADHD - Conduct disorder - Alcohol, tobacco, cannabis, or other drug dependence
8	**Internalising disorder** - as used in Caspi et al. (2020) Comprises meeting criteria for ≥1 of: - Generalised Anxiety Disorder - Panic disorder - Simple phobia, social phobia, or agoraphobia - Major depressive episode - PTSD
9	**Thought disorder** - as used in Caspi et al. (2020) Comprises meeting criteria for ≥1 of: - Obsessive compulsive disorder - Mania - Schizophrenia
10	**Suicide attempts** - as used in (Goldman-Mellor et al., 2014) up to age 38y, but updated to include data for phase 45y
	Sexual behaviour
11	**Desire disorder** Defined as having ≥1 of the following problems for ≥ 6 months and feeling distressed by the problem (note that this definition follows the DSM-IV diagnosis criteria as closely as possible with the questions available in the Dunedin Study dataset): - Lacked interest in having sex - Felt anxious during sex
12	**Arousal disorder** Defined as having ≥1 of the following problems for ≥ 6 months and feeling distressed by the problem (note that this definition follows the DSM-IV diagnosis criteria as closely as possible with the questions available in the Dunedin Study dataset): - Had trouble with vaginal dryness (females) or maintaining erection (males) - Felt no arousal or excitement during sex

13	**Orgasm disorder** Defined as having ≥1 of the following problems for ≥ 6 months and feeling distressed by the problem (note that this definition follows the DSM-IV diagnosis criteria as closely as possible with the questions available in the Dunedin Study dataset): - Did not come to climax or took a long time to reach climax - Came to climax more quickly than desired
14	**Sexual pain disorder** Defined as feeling pain as a result of sex for ≥ 6 months and feeling distressed by the problem (note that this definition follows the DSM-IV diagnosis criteria as closely as possible with the questions available in the Dunedin Study dataset).
15	**Risky sexual intercourse** - as used in Ramrakha, Caspi, Dickson, Moffitt, and Paul (2000) for age 21y, but updated to include data for phases 26 to 45y
16	**Sexually transmitted diseases** Defined as having ≥1 STD, as indicated by serology data
	Interpersonal relationships
17	**High conflict intimate partner relationship** – to be derived from the intimate partner relationship violence score used in Bourassa et al. (Aging & RIps manuscript)
18	**Low quality intimate partner relationship** – to be derived from the intimate partner relationship quality score used in Bourassa et al. (Aging & RIps manuscript)
19	**Parenting difficulties** - data from home assessments when first child was 3y; variables by Jay Belsky Defined as ≥1 of: - Low responsiveness to child - Low opportunity for child to engage in productive activity - Harsh parenting
	Socioeconomic outcomes
20	**No formal qualifications**
21	**Low SES** (all participants, not just those who are employed)
22	**Received social welfare** - as indicated in government administrative dataset
23	**High financial struggles score** - as used in Moffitt et al. (2011) for age 32y, but updated to include scores for phases 26 to 45y
	Antisocial behaviour
24	**High levels of self-reported delinquency** (based on self-reported delinquency scale)
25	**Criminal convictions** - as indicated in government administrative dataset
	Multi-domain variable
26	**Problems across multiple domains** - Number of domains (out of 6) in which participants had at least one problem. This variable will be created through the analysis process.

Covariates

1	**Sex**
2	**Childhood SES** (birth to 15y)
3	Number (out of 4) of non-CSA **child harm ACEs** (physical abuse, emotional abuse, physical neglect, emotional neglect) - prospective ACEs used by Reuben et al. (2016)
4	Number (out of 5) of **household dysfunction ACEs** (family member incarcerated, household substance abuse, household mental illness, loss of parent, household partner violence) - prospective ACEs used by Reuben et al. (2016)
5	**Sexually assaulted as an adult** Defined as ≥1 of: - Forced first time had sex (reported at 21y)

	- Past-year forced intercourse, attempted intercourse, unwanted touching (32y) - Past 1-6 years forced intercourse, attempted intercourse, unwanted touching (32y) - Past-year forced intercourse (38y) - Ever raped & age first raped ≥19y (38y) - Reported being sexually assaulted in Life History Calendar interview (38, 45y)

Significance of the Study (for theory, research methods or clinical practice):

By assessing in a single general population birth cohort the longitudinal links between CSA and a comprehensive set of subjective and objective outcomes across six major domains of functioning up to four decades later, and after taking into account the role of prospectively-measured covariates, the proposed study will provide:

1. Higher quality and more comprehensive evidence of the long-term outcomes associated with CSA than currently available.

2. Novel evidence about the degree to which the negative outcomes associated with CSA persist across the 20-year period from young adulthood to early middle age.

Moreover, by assessing how the patterns of effects change with different definitions of CSA, the proposed study will provide novel and important methodological information to help guide the design of future CSA research.

In sum, the proposed study will help to advance the relevant academic literature while also providing robust evidence to inform the work of those who aim to help survivors of CSA, including policy makers, clinicians, and formal government inquiries into CSA in state care and other institutional settings.

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Data Security Agreement

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Please keep one copy for your records and return one to the PI Sponsor

Please initial your agreement: (customize as necessary)

✓	I am current on Human Subjects Training [CITI www.citigrogram.org] or equivalent.
✓	My project is covered by the Dunedin Study's ethics approval OR I have /will obtain ethical approval from my home institution (please specify).
✓	I will treat all data as "restricted" and store in a secure fashion. My computer or laptop is: • encrypted (recommended programs are FileVault2 for Macs, and Bitlocker for Windows machines) • password-protected • configured to lock-out after 15 minutes of inactivity AND • has an antivirus client installed as well as being patched regularly.
✓	I will not "sync" the data to a mobile device.
✓	In the event that my laptop with data on it is lost, stolen or hacked, I will immediately contact my PI Sponsor or Study Director, Richie Poulton (richie.poulton@otago.ac.nz).
✓	I will not share the data with anyone, including my students or other collaborators not specifically listed on this concept paper.
✓	I will not post data online or submit the data file to a journal for them to post. *Some journals are now requesting the data file as part of the manuscript submission process. The Dunedin Study Members have not given informed consent for unrestricted open access, so we have a managed-access process. Speak to your PI Sponsor or Richie Poulton for strategies for achieving compliance with data-sharing policies of journals.*
✓	I will delete all data files from my computer after the project is complete. Collaborators and trainees may not take a data file away from the office. The data remains the property of the Study and cannot be used for further analyses without an approved concept paper for new analyses.

Signature: Hayley Guiney